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# THE RIGHT TO BEAR 3D-PRINTED FIREARMS: PROBLEMS CREATED BY MODERN GUNSMITHING

CHELSEA KAREN\*

## INTRODUCTION

Picture a typical Friday evening at London's St. Pancras train station with travelers trying to get away for the weekend. You board a train leaving for Paris after going through a vigorous safety check, which includes walking through a metal detector and having your bag scanned. You finally take a seat in a crowded train car when you notice a man standing at the front of the car holding what appears to be a child's toy gun. It's clunky, plastic, and crude-looking in that it seems it would fall apart if the man attempted to pull the trigger. In reality, that man is not holding a toy gun but a 3D-printed plastic gun called "The Liberator," capable of firing a .38 caliber bullet.<sup>1</sup> This scene was a reality on a Friday in May of 2013 when two reporters for *The Mail on Sunday* downloaded The Liberator blueprints online, bought a £1,700 3D printer (roughly \$2,200)<sup>2</sup> printed the 16-part pistol in under 36 hours, purchased one common nail to function as the gun's firing pin, and smuggled the pieces onto a crowded

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<sup>1</sup> See Simon Murphy & Russell Myers, *How Mail On Sunday 'Printed' First Plastic Gun in UK Using a 3D Printer - and Then Took it on Board Eurostar Without Being Stopped in Security Scandal*, DAILY MAIL (May 11, 2013, 8:13 PM), <https://www.dailymail.co.uk/news/article-2323158/How-Mail-On-Sunday-printed-plastic-gun-UK—took-board-Eurostar-stopped-security-scandal.html> (describing how two reporters for *The Mail on Sunday* were able to smuggle an operational 3D printed gun on board a crowded Eurostar despite the high level of security passengers are subjected to).

<sup>2</sup> See *British Pound to US Dollar Conversion*, XE CURRENCY CONVERTER, <https://www.xe.com/currencyconverter/convert/?Amount=1700&From=GBP&To=USD> (last visited Nov. 1, 2020).

Eurostar heading to Paris.<sup>3</sup> The two reporters passed through airport-like security, including metal detectors and scanners, though they were not patted down.<sup>4</sup> Once on board the train, the reporters assembled the gun and posed for pictures among passengers who were unaware that a fully operational firearm was on their train.<sup>5</sup>

This experiment by *The Mail on Sunday* occurred in 2013 when 3D printed guns were first introduced to the world by Cody Wilson, a law student<sup>6</sup> and self-proclaimed crypto-anarchist who founded the company Defense Distributed.<sup>7</sup> Defense Distributed circulates Computer-Aided Design (CAD) files on the internet which contain gun blueprints or instructions that are readable by 3D printers.<sup>8</sup> The Liberator was the first fully functioning 3D-printed gun Wilson created in April of 2013.<sup>9</sup> Since The Liberator fired its first shot in 2013, 3D-printed guns have only become more sophisticated.<sup>10</sup>

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<sup>3</sup> Murphy & Myers, *supra* note 1. If the reporters had been subject to a pat-down, the pieces of the gun might have been discovered, as the reporters were carrying it on their person. *See id.* Regardless, this experiment shows how easy it is to get past metal detectors and airport scanners when the only piece of metal in the gun is the firing pin. *See id.* (discussing Eurostar officials' response to *The Mail on Sunday's* investigation, where one official said that "these weapons . . . are very difficult to detect").

<sup>4</sup> *Id.*

<sup>5</sup> *Id.*

<sup>6</sup> Deanna Paul, *Meet the Man Who Might Have Brought on the Age of 'Downloadable Guns,'* WASH. POST (July 18, 2018), <https://www.washingtonpost.com/news/post-nation/wp/2018/07/18/meet-the-man-who-wants-to-bring-on-the-age-of-downloadable-guns-and-may-have-already-succeeded/> (explaining that Cody Wilson attended the University of Texas Law School when he developed The Liberator and subsequently dropped out during his second-year exams).

<sup>7</sup> *See* Catherine Tremble, *Don't Bring a CAD File to a Gun Fight: A Technological Solution to the Legal and Practical Challenges of Enforcing ITAR on the Internet*, 87 *FORDHAM L. REV. ONLINE* 129, 130–31 (2018) (stating that Wilson has described himself as a "crypto-anarchist," which means he believes in "defeating a certain idea of technical control" and believes Defense Distributed can be used to show that citizens can share technology without any form of government interference).

<sup>8</sup> *See id.* at 130; *About*, DEFENSE DISTRIBUTED, <https://defdist.org/> (last visited Jan. 24, 2022) (stating that Defense Distributed was the first private defense contractor for "small scale, digital, personal gunsmithing technology").

<sup>9</sup> Paul, *supra* note 6. The Liberator was the first completely 3D-printed firearm Wilson developed after first creating a 3D printed lower receiver for an AR-15. *Id.* Wilson was able to fire the AR-15 five times before it broke, and this made him believe it was possible to then create a fully 3D-printed firearm. *Id.*

<sup>10</sup> *3D Printed Guns in 2021: The Current Situation*, ALL3DP (Feb. 3, 2021), <https://all3dp.com/1/3D-printed-gun-firearm-weapon-parts/> (explaining that while most 3D-printable guns are a less ideal alternative to standard guns, "this is changing and a lot of improvements have been made since The Liberator was released . . . [i]n the Deterrence Dispensed community . . . AR-15 lowers, Glock frames, AK lower receivers (which are

A similar situation to *The Mail on Sunday* experiment, though with a slightly different outcome, occurred on February 20, 2020, when the TSA found multiple 3D-printed firearms in a carry-on bag at Raleigh-Durham International Airport.<sup>11</sup> While the two reporters from *The Mail on Sunday* were able to smuggle a 3D-printed gun onto the train by wearing it on their bodies,<sup>12</sup> here, the TSA was able to discover the 3D-printed guns because the firearms were in the traveler's carry-on.<sup>13</sup> The confiscated 3D-printed guns were a far cry from the chunky, toy-like appearance of *The Liberator* used by *The Mail on Sunday* reporters—and more closely resembled a functional modern-day pistol.<sup>14</sup> Additionally, that was not the first time the TSA had found 3D-printed guns in a carry-on bag, but rather was just another example in the history of increasing incidents reported by the TSA.<sup>15</sup>

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capable of handling 2,000 rounds and are only partially 3D printed) and some pistols” are all now capable of being 3D printed using CAD files).

<sup>11</sup> *TSA Week in Review Feb 10 - Feb 23*, TSA (Feb. 27, 2020), <https://www.tsa.gov/blog/2020/02/27/tsa-week-review-feb-10-feb-23> (explaining how the TSA found 145 loaded firearms, including 3D-printed guns, in a two-week period).

<sup>12</sup> See Murphy & Myers, *supra* note 1 (“But although we were carrying parts of a potentially deadly weapon, we were able to walk through a metal detector without triggering the alarm.”).

<sup>13</sup> *TSA Week in Review Feb 10 - Feb 23*, *supra* note 11. If the traveler had broken the 3D-printed gun into its different components and worn it on their person, the traveler might have been able to get it past the TSA as the reporters from *The Mail on Sunday* did because typically the only metal piece the metal detectors could potentially pick up would be the firing pin. See Murphy & Myers, *supra* note 1 (remarking that 3D-printed guns are “[m]ade entirely of plastic except for a small firing pin and ammunition . . .”).

<sup>14</sup> See *TSA Week in Review Feb 10 - Feb 23*, *supra* note 11 (displaying photos of realistic gun replicas in a TSA article, the text of which contains a link to a “realistic replicas” carry-on rule); Murphy & Myers, *supra* note 1 (displaying a photo of a reporter holding the toy-like gun, *The Liberator*); *Firearms Classification*, UNITED NATIONS OFF. ON DRUGS AND CRIME, [https://www.unodc.org/documents/organized-crime/Firearms/Firearms\\_classification.pdf](https://www.unodc.org/documents/organized-crime/Firearms/Firearms_classification.pdf) (last visited Feb. 4, 2022) (displaying photos of different types of firearms). Comparing the image and descriptions of real firearms provided by the UNODC, the picture TSA took of the 3D-printed gun recovered, and the image of the *Liberator* printed by *The Mail on Sunday* makes clear that 3D-printed firearms have become increasingly sophisticated.

<sup>15</sup> See, e.g., Mahita Gajanan, *The TSA Has Found 3D Printed Guns at Airport Checkpoints 4 Times Since 2016*, TIME (Aug. 2, 2018, 10:58 AM), <https://time.com/5356179/3d-printed-guns-tsa/> (explaining how the TSA has been able to spot 3D printed guns four times since 2016, though without the aid of Advanced Imaging Technology, it would be difficult to continue to discover these non-metallic weapons if concealed on a person); J. Weston Phippen, *What the TSA Found in Carry-On Luggage Last Week*, THE ATLANTIC (Aug. 12, 2016), <https://www.theatlantic.com/news/archive/2016/08/tsa-instagram-3d-printed-gun/495317/> (explaining how the TSA was able to recover a 3D-printed gun because it was loaded with five .22 caliber bullets which set off the metal detector).

While the reality of 3D-printed guns may be alarming, the proliferation of such weapons is, arguably, just another step in the long history of gun modernization.<sup>16</sup> Americans have a longstanding history of gunsmithing rights, the right to build a gun.<sup>17</sup> The Gun Control Act of 1968 (“GCA”) regulates the right to gunsmith; it applies if an individual builds a gun with the intent to distribute, sell, or transfer the gun, which would consequently cause that individual to be labeled a manufacturer.<sup>18</sup> For example, manufacturers are required to imprint a serial number onto each receiver and keep a record of purchasers and the firearm bought.<sup>19</sup> The GCA also prohibits the sale of firearms from federally licensed manufacturers to specifically prohibited classes of people.<sup>20</sup> These prohibitions under the GCA were expanded by the Brady Bill.<sup>21</sup> Furthermore, there are regulations in place to prevent individuals from manufacturing and smuggling completely plastic firearms and weapons through security, as in the cases mentioned above. Under 18 U.S.C. § 922(p)(1)(A), it is unlawful for “any person to manufacture, import, sell, ship, deliver, possess, transfer, or receive any firearm that, after removal of grips, stocks, and magazines, is not [] detectable . . . by walk-through metal detectors.”<sup>22</sup> However, as exhibited by the examples above, with

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<sup>16</sup> James B. Jacobs & Alex Haberman, *3D Printed Firearms, Do-It-Yourself Guns, & the Second Amendment*, 80 LAW & CONTEMP. PROBS. 129, 137–38 (2017) (discussing the history of traditional American gunsmithing and the emergence of 3D printed firearms).

<sup>17</sup> See *id.* at 137 (explaining how until the founding of Remington Arms in 1816 all guns were made by specialized gunsmiths); *What is ATF Doing in Regards to People Making Their Own Firearms?*, ATF, <https://www.atf.gov/firearms/qa/what-atf-doing-regards-people-making-their-own-firearms> (last visited Feb. 4, 2022) (“An individual may generally make a firearm for personal use. However, individuals engaged in the business of manufacturing firearms for sale or distribution must be licensed by the ATF.”).

<sup>18</sup> 18 U.S.C. § 921(10). “The term ‘manufacturer’ means any person engaged in the business of manufacturing firearms or ammunition for purposes of sale or distribution; and the term ‘licensed manufacturer’ means any such person licensed under the provisions of this chapter.” § 921(10).

<sup>19</sup> 18 U.S.C. § 923, et. seq.; *Letter from B. Todd Jones, Director, ATF, ATF Rul. 2015-1* (Jan. 2, 2015), <https://www.atf.gov/file/11711/download>.

<sup>20</sup> 18 U.S.C. § 922(d). Examples of classes of people prohibited under the GCA include individuals under indictment or convicted of a crime for a term longer than one year, fugitives, individuals who have unlawfully used a controlled substance, or individuals committed to a mental institution. § 922(d).

<sup>21</sup> 18 U.S.C. § 922(t).

<sup>22</sup> 18 U.S.C. § 922(p)(1); § 922(p)(2)(C) (explaining how a gun needs to contain 3.7 ounces of metal to be detected by a metal detector).

the rise of 3D-printed guns, these regulations are not always effective.<sup>23</sup>

The problem is not the act of 3D printing a gun specifically, but rather the larger overall issues that result from the ability to 3D print guns. This gunsmithing method allows individuals to circumvent gun regulations because they can print components of a gun that normally would be considered “gun parts” and subject to a serial number, background check, and record-keeping requirement.<sup>24</sup> The “gun part” or firearm is subject to those requirements when purchased from a federally licensed firearm dealer (“FFL”).<sup>25</sup> In addition, a permit or background check might be needed for citizens of states that require one if purchased from a private seller, though private sellers are not required to keep records of buyers or provide a serial number under federal law.<sup>26</sup>

3D printing allows users to circumvent these requirements. If an individual 3D prints a firearm, there is no record of the individual obtaining a firearm because the firearm was printed at home, and if the firearm is then used to commit a crime, there is no serial number to allow law enforcement to trace the firearm to an individual.<sup>27</sup> Additionally, 3D-printed firearms that are made almost entirely of plastic and can be broken down into

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<sup>23</sup> See Murphy & Myers, *supra* note 1 (noting that the 3D guns were not detected by security or onlookers); *but see TSA Week in Review Feb 10 - Feb 23*, *supra* note 11 (explaining that some 3D printed firearms have been caught before).

<sup>24</sup> See *Letter from B. Todd Jones*, *supra* note 19 (discussing how individuals or corporations who are “engaged in the business” of performing machining or molding must be licensed as a manufacturer under the GCA, but this requirement does not extend to individuals milling for private use); 18 U.S.C. § 923.

<sup>25</sup> See *Letter from B. Todd Jones*, *supra* note 19; 18 U.S.C. § 923. The Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF) states that under the GCA any licensed manufacturer is required to identify each firearm produced with a serial number and to keep a record of purchasers.

<sup>26</sup> *Letter from B. Todd Jones*, *supra* note 19; see 18 U.S.C. § 923; *Most Frequently Asked Firearms Questions and Answers*, ATF (Jan. 2021), <https://www.atf.gov/resource-center/docs/0813-firearms-top-12-qaspdf/download> (stating that any person may transfer or sell a firearm to an unlicensed resident living in the same state as the seller as long as there is no reason to believe the unlicensed individual would be prohibited from receiving a firearm under Federal law).

<sup>27</sup> See Jacobs & Haberman, *supra* note 16, at 144 (explaining the potential problems 3D printed firearms create in terms of tracing, background checks, and metal detector evasion); 18 U.S.C. § 923(i) (explaining licensed importers and manufacturers are required to “engrave or cast” a serial number on the receiver or frame of each firearm they create).

smaller components make it easier for individuals to smuggle these weapons through security.<sup>28</sup>

To prevent this runaround of federal regulations, this Note proposes an amendment to GCA § 921(a)(10) which would require 3D-printed gun CAD file distributors to become “licensed manufacturers” and subject to federal regulations.<sup>29</sup> This would require 3D gun CAD file distributors to keep records of individuals to whom they sell and permit to download the CAD files, as well as assign an individual serial number to each gun blueprint downloaded or sold.<sup>30</sup> This is arguably the most effective solution, as, under the GCA, individuals are permitted to purchase and make unfinished “gun parts” without restrictions, meaning putting regulations on 3D printing “gun parts,” both finished and unfinished, would conflict with the long-standing right to gunsmith.<sup>31</sup> An individual could 3D print an unfinished “gun part” and be within their right to do so.<sup>32</sup> Thus, placing restrictions on the distribution of the CAD files themselves will give the federal government the power to restrict individuals who normally would not be able to purchase a gun from downloading a CAD file to 3D print a firearm.<sup>33</sup>

Distributors of CAD files to 3D print firearms operate similarly to traditional firearm manufacturers.<sup>34</sup> Gun manufacturers are often overlooked by policymakers who instead focus on limiting

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<sup>28</sup> Carolyn Wilke, *3-D Printed ‘Ghost Guns’ Pose New Challenges for Crime-scene Investigators*, SCIENCE NEWS (Sept. 24, 2019, 10:00 AM), <https://www.sciencenews.org/article/3D-printed-guns-plasticballistics-crime>.

<sup>29</sup> See *Are “80%” or “Unfinished” Receivers Illegal?*, ATF; <https://web.archive.org/web/20150905204055/https://www.atf.gov/firearms/qa/are-%E2%80%9C80%E2%80%9D-or-%E2%80%9Cunfinished%E2%80%9D-receivers-illegal> (last visited Feb. 8, 2022) (discussing how receiver blanks or unfinished 80% lower receivers that do not meet the definition of a “firearm” are not subject to GCA requirements); *Letter from B. Todd Jones, supra* note 19 (explaining how 80% lower receivers are legal, but individuals who conduct business in milling or machining the unfinished receivers must become licensed manufacturers under the GCA subject to regulations).

<sup>30</sup> See *Letter from B. Todd Jones, supra* note 19; 18 U.S.C. § 923.

<sup>31</sup> 18 U.S.C. § 922; see Jacobs & Haberman, *supra* note 16, at 137–38.

<sup>32</sup> See *Are “80%” or “Unfinished” Receivers Illegal?*, *supra* note 29; *Letter from B. Todd Jones, supra* note 19.

<sup>33</sup> See Rukmani Bhatia, Chelsea Parsons, and Eugenio Weigend Vargas, *The Gun Industry in America: The Overlooked Player in a National Crisis*, CTR. FOR AM. PROGRESS (Aug. 6, 2020), <https://www.americanprogress.org/issues/guns-crime/reports/2020/08/06/488686/gun-industry-america/> (describing how the role of firearm manufacturers in the large gun crisis is often overlooked and that to properly address the gun violence problem in America there must be stricter regulations on gun manufacturers).

<sup>34</sup> See *id.*

individual access to firearms.<sup>35</sup> However, only focusing on individual access to firearms would be an incomplete regulatory scheme.<sup>36</sup> CAD file distributors control what type of 3D-printed firearm CAD files are available online, just as traditional manufacturers determine what types of firearms are created.<sup>37</sup> Consequently, by placing regulations on the CAD file distributors, the federal government would be able to prevent 3D-printed firearms from ever reaching individual consumers.

To explain the controversy surrounding 3D-printed guns, Part I of this Note addresses the American gun culture and statistics that exhibit our nation's fixation on guns.<sup>38</sup> Part II will focus on the Second Amendment, the right to gunsmith, and the current federal gun regulations. Part III will discuss 3D printing and how it is the new frontier of modern gunsmithing. Part IV will discuss Cody Wilson and the ongoing Defense Distributed litigation. Part V explains how with the rise of 3D-printed guns there are consequently unique and specific safety problems that exacerbate issues with the current gun regulations that are already in place. Lastly, Part VI will discuss the proposed change to the definition of "manufacturer" under the GCA § 921(a)(10) and propose that all 3D-printed firearm CAD file distributors register and obtain a Federal-Firearm License.<sup>39</sup>

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<sup>35</sup> See *id.* (describing how focusing on individuals has often led to overcriminalization of communities of color).

<sup>36</sup> See *id.* (describing how gun manufacturers "exacerbate" and "enable" gun violence in America).

<sup>37</sup> See *id.* (noting the trajectories of gun development based on manufacturers); DEFCAD, <https://defcad.com/faq/> (last visited Jan. 23, 2022) (explaining how DEFCAD is a repository for small arms technical data and that to access the repository an individual only needs to create a profile and start downloading or purchasing files).

<sup>38</sup> See generally ROBERT J. SPITZER, *THE POLITICS OF GUN CONTROL* (Routledge 8th ed. 2021) (describing the history of American gun culture, the changing politics surrounding gun control, and the changing dialogue surrounding America's current gun regulations).

<sup>39</sup> See 18 U.S.C. § 921(a)(10); *Federal Firearms Licensing: An Overview*, ABA (Nov. 28, 2018), [https://www.americanbar.org/groups/public\\_education/publications/teaching-legal-docs/federal-firearms-licensing—an-overview/](https://www.americanbar.org/groups/public_education/publications/teaching-legal-docs/federal-firearms-licensing—an-overview/) (explaining how the Federal Firearms License (FFL) is what allows individuals to conduct business related to the manufacturing or firearms and ammunition either in interstate or intrastate commerce).



## I. AMERICAN GUN CULTURE

Gun activists and those who support stricter gun control regulations react strongly to 3D-printed guns because firearms are deeply rooted in American history and culture. Robert J. Spitzer in his book, *The Politics of Gun Control*, poses the question, “Why do relatively simple metal-and-wood objects that do nothing more than propel small bits of metal at high speeds evoke such strong feelings?”<sup>40</sup> Spitzer answers this question in two parts.<sup>41</sup> The first answer he states is that firearms are dangerous—they intimidate, kill, and wound thousands of people every year.<sup>42</sup> The second answer, Spitzer argues, is American gun culture.<sup>43</sup>

### *A. The Customs that Underly American Gun Culture*

There is a strong sentimental attachment to guns in American culture that stems from the nation’s very beginning: the fight for independence, the frontier experience, the struggle for survival, and the almost “cultural mythology” that American children grow up with as seen in books, movies, and television.<sup>44</sup> Spitzer puts forth two elements as the core foundation of American gun culture today: the hunting/sporting ethos, and the militia/frontier ethos.<sup>45</sup> The hunting/sporting ethos stems from when the country was agriculturally-based and hunting was necessary for survival.<sup>46</sup> In contrast, the militia/frontier ethos is based on politics.<sup>47</sup>

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<sup>40</sup> See SPITZER, *supra* note 38, at 18–19.

<sup>41</sup> *Id.* at 19.

<sup>42</sup> *Id.*

<sup>43</sup> *Id.*

<sup>44</sup> See *id.* American gun culture has grown a “mythology” due to books, movies, folklore, and other pop culture references. Movies have made certain guns “famous” and contributed to America’s gun culture, such as *Star Wars*, *Bonnie and Clyde*, *James Bond*, *Pirates of the Caribbean*, and others. See Geoffrey Ingersoll, *25 Of The Most Famous Guns In Cinema*, BUSINESS INSIDER (Aug. 1, 2013), <https://www.businessinsider.com/25-of-the-most-famous-guns-in-cinema-2013-8>.

<sup>45</sup> SPITZER, *supra* note 38, at 20.

<sup>46</sup> *Id.*

<sup>47</sup> *Id.* at 21.

The hunting/sporting ethos originates from a time when American settlers were reliant on hunting not only as a source of food but as a means to earn an income from the developing market for furs.<sup>48</sup> Early settlers considered guns necessary protection from wild animals and Native Americans.<sup>49</sup> Additionally, in early colonial times, there was the sense that a gun was a mark of maturity.<sup>50</sup> Despite America's eventual urbanization and the decline in gun use in hunting for food, the "hunting tradition" as a means of sport and competition lives on in rural areas.<sup>51</sup> In 2017, a federal survey reported that in the United States there are about 11.5 million hunters.<sup>52</sup> While 11.5 million might seem like a large number, that number represents a decline of 2.2 million hunters in 2011 and an even greater decline from 1975 when there were 17 million.<sup>53</sup> Even as hunting for leisure declines, the hunting/sporting ethos continues to be a fundamental component of American gun culture.

The militia/frontier ethos also dates back to early colonial times, but in a much more political fashion.<sup>54</sup> The early American colonies did not have the budget or the requisite amount of people needed to maintain an army, and England would not aid the colonies by sending troops.<sup>55</sup> This meant citizens who were capable of using weapons had to participate in local defense activities.<sup>56</sup> It was this citizen militia that won American independence; however, after the War of 1812 failed, it became clear there were significant drawbacks in relying on citizen-based militias when compared to a professional full-time army.<sup>57</sup>

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<sup>48</sup> *Id.* at 20.

<sup>49</sup> *Id.*

<sup>50</sup> *See id.* Spitzer notes the "connection between shooting skills, survival, and the acquisition of these skills as a 'rite of passage' for boys entering manhood." *Id.*

<sup>51</sup> *Id.*

<sup>52</sup> *Id.* at 21.

<sup>53</sup> *Id.* ("A 2017 federal survey of hunting in America reported 11.5 million hunters in the country; that represented a decline of 2.2 million since 2011. . . . These numbers reflect a decade's long decline in hunting, both in absolute numbers and as a percentage of the total population: in 1975 the hunting population was 17 million.")

<sup>54</sup> *See id.* (noting that "the militia/frontier ethos[] has more direct political antecedents and consequences. Early Americans had to rely on their wits and skills to protect themselves and their families from hostile Native Americans and foreign armies").

<sup>55</sup> *Id.*

<sup>56</sup> *Id.* (noting that "able-bodied men were pressed, even required, not only to serve but also to provide their own arms and ammunition because the colonies' very survival depended on these citizen militias").

<sup>57</sup> *See id.* at 21–22 ("The death knell of the citizen militia was its abysmal

Related to the militia tradition is the frontier tradition, which tied westward movement and firearms together.<sup>58</sup> Native Americans and outlaws were considered the dominant enemies of settlers moving west and consequently led to most of those settlers arming themselves for protection.<sup>59</sup> Despite historical data contradicting the widespread characterizations of the west as a wild and lawless place, guns have an almost legendary status among Americans that fuels the belief that “guns are not only an integral part of but also a force responsible for America as it exists today.”<sup>60</sup>

These two the contributed to the modern gun culture of the 21st century.<sup>61</sup> The contemporary gun culture includes those individuals who use and own guns for hunting, sporting, and other related activities. However, contemporary gun culture also includes those who use guns as participants in urban street gangs and as criminals, in addition to other asocial groups of people.<sup>62</sup> Statistics including how many Americans own guns, how many guns are typically owned by one individual, and how guns are purchased, demonstrate America’s gun obsession and modern gun culture. Statistics about who owns guns in America also demonstrate that 3D-printed firearms are a widespread problem.

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performance in the War of 1812, after which it ceased to play any active role in national defense.”).

<sup>58</sup> *Id.* at 22.

<sup>59</sup> *See id.* (“The principal enemies of westward-moving settlers, said to be outlaws and Indians, necessitated an armed citizenry ready and willing to use their Winchesters, Smith & Wessons, Remingtons, and Colts to defend hearth and home at a time when allegedly the only reliable justice came from the barrel of a gun . . .”).

<sup>60</sup> *Id.* at 24.

<sup>61</sup> *See id.* (“In contemporary society, the gun culture revolves around those who continue to own and use guns for legitimate hunting, sporting and related purposes . . .”).

<sup>62</sup> *See id.* (explaining how the modern gun culture is typically composed of individuals who use guns for hunting and sporting, which are considered “legitimate purposes,” while individuals who use guns and are members of gangs or criminals are not always included in modern gun culture as they are not typically considered “legitimate” uses of guns).

### B. Gun Ownership in America

Though America's gun culture dates back to colonial times, guns are still popular today.<sup>63</sup> The popularity of guns today is exhibited in a 2015 Harvard/Northeastern University Study that reported Americans own around 265 million guns.<sup>64</sup> It was also reported that 133 million of those guns are owned by 3 percent of the population.<sup>65</sup> However, up until the COVID-19 pandemic, there had been a gradual decline in gun ownership, with 22 percent of Americans reporting in a 2015 survey that they owned a gun.<sup>66</sup> Interestingly, with the decline in people owning guns, there has been an increase in the number of guns a single individual tends to own.<sup>67</sup> In the 1960s, households reported owning on average two and a half guns, whereas by the twenty-first century that number increased to an average of more than eight guns per individual.<sup>68</sup>

However, the COVID-19 pandemic caused an unprecedented spike in gun purchases. The Federal Bureau of Investigation ("FBI") reported that nearly 2 million guns were purchased in March of 2020, and in April of 2020 almost 1.6 million guns were sold—a 71 percent increase compared to April 2019.<sup>69</sup> The FBI

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<sup>63</sup> See *id.* at 20 ("Regardless of its origins, the American gun culture as it exists today contains at least two elements that have survived since the country's early history: the hunting/sporting ethos and the militia/frontier ethos.").

<sup>64</sup> Deborah Azrael et al., *The Stock and Flow of U.S. Firearms: Results from the 2015 National Firearms Survey*, 3 RSF: THE RUSSELL SAGE FOUND. J. OF THE SOC. SCI. 38, 38 (2017) (noting that the number of civilian-owned guns in the U.S. grew from around 192 million in the mid-1990s to around 265 million).

<sup>65</sup> *Id.* at 43.

<sup>66</sup> *Id.* at 39 (describing how in 1980 28% of U.S. adults owned firearms and that this decline is owed to fewer adult men owning firearms).

<sup>67</sup> See SPITZER, *supra* note 38, at 17–18 (noting that although half of all American households had a gun in the early 1960s and only around 30% had a gun by the 2010s, the average number of guns owned per person increased from two and a half to over eight in the same timespan).

<sup>68</sup> *Id.* at 18 ("With the decline in gun ownership has come a dramatic rise in the average number of guns owned per person: in the 1960s it was about two and a half guns per household; by this century, it had increased to more than eight guns per owner.").

<sup>69</sup> See, e.g., Keith Collins & David Yaffe-Bellany, *About 2 Million Guns Were Sold in the U.S. as Virus Fears Spread*, N.Y. TIMES (April 1, 2020), <https://www.nytimes.com/interactive/2020/04/01/business/coronavirus-gun-sales.html> (noting that Americans purchased approximately 2 million guns in March 2020); Chelsea Parsons & Rukmani Bhatia, *Dangerous Gaps in Gun Laws Exposed by the Coronavirus Gun Sale Surge*, CTR. FOR AM. PROGRESS (July 8, 2020), <https://www.americanprogress.org/article/dangerous-gaps-gun-laws-exposed-coronavirus-gun-sale-surge/> (noting that around 1.6 million guns were sold in April 2020); NICS *Firearm Checks: Top 10 Highest Days/Weeks*, FBI,

based these statistics on the number of times they ran a background check through the National Instant Criminal Background Check System (“NICS”).<sup>70</sup> This background check is conducted if the individual purchases a firearm through a Federal Firearm Licensee.<sup>71</sup> The number of background checks conducted by FFLs, however, does not include the number of guns purchased through private sales, as there is no way to keep track of those purchases in states that do not require background checks.<sup>72</sup> The issue of private sales is highlighted by a statistic detailing how 22 percent of gun owners reported purchasing their most recent gun through a transaction where no background check was necessary.<sup>73</sup>

The COVID-19 Pandemic brought to the attention of the general public a problem that has existed for years: while there are checks in place along the road to purchasing a gun, these laws are weak and allow individuals to circumvent those checks.<sup>74</sup> 3D printing is one way an individual can obtain a gun and take advantage of these weaknesses—circumventing background checks, a lack of serial numbers, and metal detector

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[https://www.fbi.gov/file-repository/nics\\_firearm\\_checks\\_top\\_10\\_highest\\_days\\_weeks.pdf](https://www.fbi.gov/file-repository/nics_firearm_checks_top_10_highest_days_weeks.pdf) (last visited Jan. 23, 2022) (showing that from November 30, 1998, to December 31, 2021, the nine weeks with the highest amount of NICS background checks performed span from March of 2020 to March of 2021, with March 15 to March 21, 2021, having the highest recorded checks at 1,218,002).

<sup>70</sup> See Collins & Yaffe-Bellany, *supra* note 69; *NICS Firearm Checks: Top 10 Highest Days/Weeks*, *supra* note 69. Sales of firearms are based on the number of times a background check is requested through the NICS, though the FBI points out these numbers do not include any sales of firearms purchased from private sellers where a background check through NICS is not required.

<sup>71</sup> *Facilitating Private Sales: A Federal Firearms Licensee Guide*, ATF, <https://www.atf.gov/file/110076/download#:~:text=although%20it's%20legal%20under%20federal,access%20to%20complete%20background%20checks> (last visited Feb. 10, 2022) (explaining how FFLs are important as they maintain records of sales and conduct background checks whereas unlicensed individuals do not).

<sup>72</sup> See *NICS Firearm Checks: Top 10 Highest Weeks*, *supra* note 69; *Most Frequently Asked Firearms Questions and Answers*, *supra* note 26 (explaining how there are no restrictions on sales between unlicensed individuals as long as the sale occurs between a buyer and seller in the same state).

<sup>73</sup> Deborah Azrael et al., *Firearm Acquisition Without Background Checks: Results of a National Survey*, *ANNALS OF INTERNAL MEDICINE* (Feb. 2017), <https://www.acpjournals.org/doi/10.7326/M16-1590> (describing how the main objective of a national survey was to estimate the number of current U.S. gun owners who purchased a firearm without a background check on a national level and on a state level).

<sup>74</sup> Parsons & Bhatia, *supra* note 69 (“Just as the coronavirus pandemic has exposed gaps in the U.S. health care and economic systems, the surge in gun sales during this period brings to the forefront the weaknesses in the current laws and systems governing the sale and ownership of firearms and ammunition.”).

evasion.<sup>75</sup> An individual might have a right to 3D print a gun, but there are security risks that need to be evaluated. The current gaps in gun regulations in the United States demonstrate why there are unique security risks involved with 3D-printed guns.

## II. THE SECOND AMENDMENT AND THE RIGHT TO GUNSMITH

Modern gun regulations, including gunsmithing and 3D-printed gunsmithing methods, are a product of an “individualist” reading of the Second Amendment under *D.C. v. Heller*<sup>76</sup> and American gun culture.<sup>77</sup> The Second Amendment of the United States Constitution states, “A well-regulated Militia, being necessary to the security of a free State, the right of the people to keep and bear arms, shall not be infringed.”<sup>78</sup> The phrasing “to keep and bear arms” has caused debate among various activist groups, the federal government, and the courts in terms of what that language truly means.<sup>79</sup> Second Amendment activists won a large victory in 2008 when in *D.C. v. Heller* the Supreme Court ruled that the Second Amendment protected an individual right to own a handgun for self-protection inside an individual’s home.<sup>80</sup>

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<sup>75</sup> See *Letter from B. Todd Jones*, *supra* note 19; 18 U.S.C. § 923(g)(1)(A).

<sup>76</sup> See generally *D.C. v. Heller*, 554 U.S. 570 (2008) (holding that the Second Amendment protects an individual right to possess a firearm unconnected with service in a militia and to use that arm for traditionally lawful purposes, such as self-defense within the home).

<sup>77</sup> See SPITZER, *supra* note 38, at 56, 64 (explaining how *D.C. v. Heller* allowed the Second Amendment for the first time to be applied to civilians, rather than only those in militia service to the government).

<sup>78</sup> U.S. CONST. amend. II.

<sup>79</sup> See SPITZER, *supra* note 38, at 34 (explaining how prior to *D.C. v. Heller* lower courts held that the Second Amendment only applied to gun ownership related to service in a militia); *U.S. v. Miller*, 307 U.S. 174, 178 (1939) (explaining how a shotgun is not a militia weapon and thus is not protected by the Second Amendment); Simon Maloy, *Ted Cruz’s Frightening Gun Fanaticism: When a Presidential Contender Encourages Armed Insurrection*, SALON (Apr. 17, 2015, 5:21 PM), [https://www.salon.com/2015/04/17/ted\\_cruz\\_frightening\\_gun\\_fanaticism\\_when\\_a\\_presidential\\_contender\\_encourages\\_armed\\_insurrection/](https://www.salon.com/2015/04/17/ted_cruz_frightening_gun_fanaticism_when_a_presidential_contender_encourages_armed_insurrection/) (explaining how Ted Cruz incorporates both individualist approach and militia approach in that he believes the Second Amendment allows for personal self-protection and the use of firearms against the government).

<sup>80</sup> *Heller*, 554 U.S. at 592 (“Putting all of these textual elements together, we find that [the Second Amendment] guarantee[s] the individual right to possess and carry weapons in case of confrontation.”).

Before *Heller*, the Supreme Court held that the Second Amendment only protected an individual's right to carry or own a firearm if it was in connection to service in a government-organized and regulated militia.<sup>81</sup> This idea was also known as the "collective" or "militia" view of the Second Amendment.<sup>82</sup> *Heller* had been brought in response to the District of Columbia's gun law enacted in 1976 that was considered to be strict.<sup>83</sup> The law banned the new registration of handguns and handgun carrying and required any guns in a home to be locked and unloaded.<sup>84</sup> On appeal from the District of Columbia Court of Appeals, the Supreme Court stated that the D.C. law was inconsistent with the Court's individualist reading of the Second Amendment and was thus unconstitutional.<sup>85</sup> This case was the first time a federal court overturned a gun regulation stating it was a violation of the Second Amendment.<sup>86</sup>

The Supreme Court, in deciding *Heller*, looked to the history of gun laws in America.<sup>87</sup> The Court explained that gun laws existed before the birth of the country—as early as the 1600s—and included gun regulations requiring the registration of a firearm or outright bans on certain gun types.<sup>88</sup> Though *Heller* sets a precedent for an individual to have the right to carry a gun, state laws and federal laws regulating gun use and carrying have been upheld as constitutional.<sup>89</sup> Thus, *Heller* is limited in allowing an individual a personal right to use and carry a

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<sup>81</sup> See SPITZER, *supra* note 38, at 35; *Miller*, 307 U.S. at 178 (stating that the Second Amendment only applies to the protection of firearms in connection with an organized militia); *Presser v. Illinois*, 1156 U.S. 252, 265 (1886) (explaining how the states were prohibited from regulating the use of firearms under the Second Amendment as to do so would "deprive the United States of their rightful resource for maintaining the public security").

<sup>82</sup> SPITZER, *supra* note 38, at 34.

<sup>83</sup> *Id.* at 52; see *Heller*, 544 U.S. at 574.

<sup>84</sup> *Heller*, 544 U.S. at 574–75.

<sup>85</sup> *Id.* at 576.

<sup>86</sup> See SPITZER, *supra* note 38, at 51; *Heller*, 544 U.S. at 576.

<sup>87</sup> *Heller*, 544 U.S. at 584–85.

<sup>88</sup> See SPITZER, *supra* note 38, at 63; *Heller*, 544 U.S. at 631–34.

<sup>89</sup> See *Heller*, 544 U.S. at 626–28 (quoting *Miller*, 307 U.S. at 179) (explaining that the Second Amendment does not protect the right to carry any weapon but those "in common use"); SPITZER, *supra* note 38, at 64–65 ("Although one must assume that at least some gun laws around the country will eventually be struck down as incompatible with th[is] ruling, the Court has gone to great pains to say that most existing gun laws are presumptively constitutional.").

firearm.<sup>90</sup> Under this individualist reading, *Heller* would arguably support 3D printing firearms, as any limitations on printing could be seen as a limitation on the personal use of a gun.<sup>91</sup> However, there have been longstanding regulations on gunsmithing that can be expanded to include the manufacturing and printing of 3D firearms.<sup>92</sup>

### *A. The Gun Control Act of 1968 and Regulating the Firearms Industry*

Gunsmithing is regulated primarily through the Gun Control Act of 1968.<sup>93</sup> The GCA was proposed in response to the assassination of President Kennedy and expanded what had originally been a bill intended to restrict mail-order handgun sales to minors to additionally include restrictions on mail-order purchases of shotguns and rifles.<sup>94</sup> The GCA is codified under 18 U.S.C. § 921 et seq. and includes certain provisions preserved from the Federal Firearms Act of 1938 (“FFA”).<sup>95</sup> Under the GCA, gun manufacturers, importers, and dealers are required to apply for a federal firearms license.<sup>96</sup> Today, the term FFL typically refers to individuals and companies in the firearms industry who are required to register with the Justice Department’s Bureau of Alcohol, Tobacco, Firearms, and Explosives (“ATF”) to conduct business within the firearms industry.<sup>97</sup>

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<sup>90</sup> See *Heller*, 544 U.S. at 626–28; SPITZER, *supra* note 38, at 64.

<sup>91</sup> See *Heller*, 544 U.S. at 626–28. An interesting point to consider would be if under *Heller* a 3D printed firearm would be considered a gun type “in common use.” If 3D-printed firearms are not considered “in common use,” *Heller* would not support a right to 3D-print firearms.

<sup>92</sup> See generally 18 U.S.C. §§ 921–931.

<sup>93</sup> See 18 U.S.C. § 921 et seq.

<sup>94</sup> See SPITZER, *supra* note 38, at 197 (explaining how the Gun Control Act of 1968 initially began with the intention of banning mail-order sales of handguns to minors); 18 U.S.C. § 922(a).

<sup>95</sup> See 18 U.S.C. §§ 921–931 et seq.; Sarah Gray, *Here’s a Timeline of the Major Gun Control Laws in America*, TIME (Apr. 30, 2019, 11:13 AM), <https://time.com/5169210/us-gun-control-laws-history-timeline/>.

<sup>96</sup> See Gray, *supra* note 95 (explaining how many of the provisions found in the FFA were essentially replaced by similar provisions in the GCA); 18 U.S.C. § 923.

<sup>97</sup> See *Key Federal Regulation Acts*, GIFFORDS LAW CENTR. TO PREVENT GUN VIOLENCE, <https://giffords.org/lawcenter/gun-laws/policy-areas/other-laws-policies/key->



In addition to requiring gun manufacturers, importers, and dealers to obtain a license, the GCA's restrictions include a ban on the shipment of firearms (including handguns and long guns) and ammunition between states to private individuals, a ban on the sale of guns to minors, those suffering from drug addiction or a mental disorder, to convicted felons, an extension of the tax on firearms to include "destructive devices" (land mines, bombs, hand grenades, etc.), an increase in penalties for those who used a gun while committing a crime covered under federal law, and a ban on the importation of surplus firearms unless the firearm is considered appropriate for sporting purposes.<sup>98</sup> For a discussion concerning 3D-printed firearms, the most relevant provisions of the GCA are 18 U.S.C. §§ 921–922.

Under 18 U.S.C. § 922(a)(1), it is unlawful "for any person except a licensed importer, licensed manufacturer, or licensed dealer to engage in the business of importing, manufacturing, or dealing in firearms, or in the course of such business to ship, transport, or receive any firearm in interstate or foreign commerce."<sup>99</sup> This provision of the GCA requires a manufacturer, importer, or dealer to be licensed to engage in the manufacturing of firearms and participate in interstate or foreign commerce.<sup>100</sup> A manufacturer is defined under 18 U.S.C. § 921(a)(1) as "any person engaged in the business of manufacturing firearms or ammunition for purposes of sale or distribution."<sup>101</sup> Current federal regulations do not restrict the manufacture or distribution of CAD files to 3D print a gun.<sup>102</sup> The ATF has also

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federal-regulation-acts/ (last visited Feb. 5, 2022) (describing key federal regulations on firearms and how the modern understanding of an FFL are those in the gun industry who are required to register with the ATF); *Apply for a License*, ATF, <https://www.atf.gov/firearms/apply-license> (last visited Feb. 5, 2022) (explaining the application process to become an FFL and registering with the ATF); 18 U.S.C. § 921(a)(9)–(11) (defining licensed importer, manufacturer, and dealer).

<sup>98</sup> See SPITZER, *supra* note 38, at 199 (discussing the provisions actually enacted by the GCA); 18 U.S.C. § 921 et seq.

<sup>99</sup> 18 U.S.C. § 922(a)(1).

<sup>100</sup> *Id.*

<sup>101</sup> 18 U.S.C. § 921(a)(10).

<sup>102</sup> Josh Blackman, *The Right to Code and Share Arms*, 83 LAW & CONTEMP. PROBS. 1, 2 (2020) (explaining how a global injunction was issued to block a previous settlement between Defense Distributed and the State Department that would have allowed for the 3D printed gun CAD files to be posted online); *What Say Does ATF Have in the Technology Used to Produce Firearms*, ATF (last reviewed Sept. 23, 2016), <https://www.atf.gov/firearms/qa/what-say-does-atf-have-technology-used-produce->

not provided any guidance on distributing CAD files to 3D print a firearm, however, the ATF's website does state that companies or individuals who manufacture with the intent to sell a 3D-printed firearm would be required to become an FFL.<sup>103</sup>

The other relevant section of the GCA is 18 U.S.C. § 922(p).<sup>104</sup> This provision makes it illegal for a firearm to contain less than 3.7 ounces of metal where the firearm would be undetectable by a walk-through metal detector.<sup>105</sup> However, as exhibited by the earlier example of *The Mail on Sunday* reporters, a 3D printed gun can easily circumvent this regulation when the only metal piece on the gun is the firing pin, which is a nail you can find at a hardware store.<sup>106</sup> With the rise of 3D-printed guns and the ability to make these weapons, it becomes almost impossible to enforce a regulation requiring 3.7 ounces of metal in a firearm.

While §§ 921 and 922 of the GCA focus on manufacturers and the components of a firearm, the GCA was amended in 1993 to include the Brady Bill which shifts the focus of the regulations onto the specific individuals attempting to purchase a firearm.<sup>107</sup>

### *B. The Brady Bill and the Expansion of the GCA*

The Brady Bill was passed in 1993 and amended the GCA in that it provided for a five-business-day waiting period for anyone purchasing a handgun.<sup>108</sup> The purpose of this waiting period was to give the authorities time to conduct a background check on the potential buyer, and the waiting period provided a “cooling off” period for any individual who was possibly attempting to

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firearms. However, the ban preventing the distribution of CAD files was lifted in March 2021. *Washington v. United States Dep't of State*, 996 F.3d 552, 556–57 (2021).

<sup>103</sup> *Can an Individual Now Manufacture These Firearms and Sell Them?*, ATF (last reviewed May 14, 2015), <https://www.atf.gov/firearms/qa/can-individual-now-manufacture-these-firearms-and-sell-them>.

<sup>104</sup> 18 U.S.C. § 922(p).

<sup>105</sup> 18 U.S.C. § 922(p)(1)(A)–(2)(C).

<sup>106</sup> See Murphy & Myers, *supra* note 1.

<sup>107</sup> *Brady Law*, ATF (last reviewed July 2, 2019), <https://www.atf.gov/rules-and-regulations/brady-law>; 18 U.S.C. § 922 (section 103 of Pub. L. 103-159).

<sup>108</sup> See *Brady Law*, *supra* note 107; 18 U.S.C. § 922 (section 103 of Pub. L. 103-159).

purchase a handgun while in a fit of anger.<sup>109</sup> These background checks would be conducted using the National Instant Criminal Background Check System, which was established under the Brady Bill and is today operated by the FBI.<sup>110</sup> However, these background checks are only required to be conducted by FFLs and only in those states that do not have any alternative way to effectively conduct a background check.<sup>111</sup> This is because originally the Brady Bill required state police officers to make a “reasonable effort” to check the background of potential gun purchasers.<sup>112</sup> However, this provision of the bill was later struck down by the Supreme Court in *Printz v. United States*.<sup>113</sup> The Court held that to require police officers to have “the obligation to ‘make a reasonable effort to ascertain within five business days whether receipt or possession [of a handgun] would be in violation of the law,’” and to conduct these background checks using State and local records available through the NICS, would be unconstitutional.<sup>114</sup>

In the wake of *Printz*, the Brady Bill was amended to no longer require state authorities to conduct background checks, though President Bill Clinton asked states to continue to conduct the background checks voluntarily if a gun was not purchased from a federally licensed dealer, manufacturer, or importer.<sup>115</sup> Additionally, in 1998, the five-day waiting period was amended to a three-day waiting period once the FFL contacts the NICS.<sup>116</sup> Consequently, though the Brady Bill focuses on the potential

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<sup>109</sup> Spitzer, *supra* note 38, at 212 (explaining how a national waiting period was meant to be a “modest” regulation but became a major point of contention for gun activists); 18 U.S.C. § 922 (section 103 of Pub. L. 103-159).

<sup>110</sup> See Gray, *supra* note 95.

<sup>111</sup> See *National Instant Criminal Background Check System (NICS)*, FBI, <https://www.fbi.gov/services/cjis/nics>. The NICS is used by FFLs in order to conduct background checks for individuals attempting to purchase a firearm. The FFL contacts the NICS electronically or by phone and provides information on the buyer in order to conduct the background check. 18 U.S.C. § 922 (section 103 of Pub. L. 103-159).

<sup>112</sup> See Spitzer, *supra* note 38, at 215.

<sup>113</sup> *Printz v. United States*, 521 U.S. 898, 933 (1997).

<sup>114</sup> *Id.* (explaining that the federal government cannot compel the officers of the states to conduct background checks as part of a federal regulation and to do so would be unconstitutional).

<sup>115</sup> See Spitzer, *supra* note 38, at 215 (describing how the Brady Bill was not a challenge to the Second Amendment, but rather that the Brady Bill infringed on state police power); Gray, *supra* note 95 (explaining how the Brady Bill was passed by President Clinton and created the NICS).

<sup>116</sup> See Spitzer, *supra* note 38, at 216; 18 U.S.C. § 922(t)(1)(B)(ii).

purchaser of the firearm, the FFL determines whether the potential purchaser meets the requirements for purchase in conjunction with the NICS.<sup>117</sup> In addition to regulating who may purchase and sell a firearm, the GCA also regulates parts of the gun.<sup>118</sup> This in turn also places restrictions on the ability to gunsmith.

### *C. Restrictions on Gunsmithing under the GCA*

Gunsmithing is regulated under the GCA, which restricts the ability of an individual to purchase certain parts of a firearm without first obtaining a serial number or going through a background check.<sup>119</sup> The term “firearm” as defined under the GCA includes,

any weapon (including a starter gun) which will or is designed to or may be readily converted to expel a projectile by the action of an explosive; (B) the frame or receiver of any such weapon; (C) any firearm muffler or firearm silencer; or (D) any destructive device.<sup>120</sup>

This means that fully built and operational guns, the frame or lower receiver, a muffler or silencer, and any other destructive device as defined in the GCA are regulated by the ATF.<sup>121</sup> What the definition leaves out are unfinished frames and receivers, or what is commonly referred to as an 80% lower receiver.<sup>122</sup> This

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<sup>117</sup> See *National Instant Criminal Background Check System (NICS)*, supra note 111; 18 U.S.C. § 922(t)(1)(B)(ii).

<sup>118</sup> See 18 U.S.C. § 921(a)(3).

<sup>119</sup> 18 U.S.C. § 921(a)(3).

<sup>120</sup> *Id.*; see Figures 1 and 2 at end of the Note.

<sup>121</sup> *Firearms-Guides-Importation and Verification of Firearms, Ammunition – Gun Control Act Definitions – Firearm*, ATF (last reviewed Apr. 27, 2018), <https://www.atf.gov/firearms/firearms-guides-importation-verification-firearms-ammunition-gun-control-act-definitions>.

<sup>122</sup> See *Are “80%” or “Unfinished” Receivers Illegal?*, supra note 29. This definition of

means an 80% lower receiver is not subject to regulations under the GCA.<sup>123</sup> Therefore, manufacturers, distributors, and sellers are not required to keep records of those individuals buying those unfinished parts or provide serial numbers.<sup>124</sup>

The ability to 3D print an unfinished lower receiver would consequently not be considered a violation of the GCA as the GCA does not restrict any form of 80% lower receiver manufacturing.<sup>125</sup> As a result, placing regulations on 3D printed “gun parts” would not be a viable option to limit who has access to a firearm, as an individual has the right to purchase unfinished “gun parts” and build their firearm.<sup>126</sup> 3D printing is just a modern form of gunsmithing.<sup>127</sup> However, 3D-printed guns pose significantly different safety issues than traditionally constructed metal guns.<sup>128</sup> These safety issues are due primarily to the process and materials used in 3D printing.

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“frame or receiver” has the potential to be expanded to include frames and receivers that are sold as part of gun kits under proposed Rule 2021R-05. This would mean unfinished frames or receivers sold as a part of gun kits would be required to be sold with a serial number to consumers. See *Definition of “Frame or Receiver” and Identification of Firearms*, ATF (last reviewed May 24, 2021) <https://www.atf.gov/rules-and-regulations/definition-frame-or-receiver>. The comment period for the proposed rule closed on August 19, 2021. *Definition of “Frame or Receiver” and Identification of Firearms*, 86 Fed. Reg. 27720 (proposed May 21, 2021).

<sup>123</sup> See *Are “80%” or “Unfinished” Receivers Illegal?*, *supra* note 29; *Definition of “Frame or Receiver” and Identification of Firearms*, *supra* note 122.

<sup>124</sup> See Letter from B. Todd Jones, *supra* note 19, at 1–2, 5. The ATF explains how a manufacturer or distributor who performs the required milling to make a receiver suitable as part of a weapon or allows a purchaser to do their own milling on a receiver using the manufacturer’s equipment, is still subject to the licensing, serial number marking, and record-keeping requirements under the Gun Control Act of 1968. The ATF does not say those same requirements are necessary if the purchaser takes the unfinished receiver and does their own milling using the purchaser’s own equipment. *Id.* at 1, 5–6.

<sup>125</sup> See *Are “80%” or “Unfinished” Receivers Illegal?*, *supra* note 29; Letter from B. Todd Jones, *supra* note 19, at 1–2.

<sup>126</sup> See Letter from B. Todd Jones, *supra* note 19, at 1.

<sup>127</sup> See *What is ATF Doing in Regards to People Making Their Own Firearms?*, *supra* note 17; Paul, *supra* note 6.

<sup>128</sup> See Letter from B. Todd Jones, *supra* note 19, at 5–6 (stating that under the GCA any licensed manufacturer is required to identify each firearm produced with a serial number and to keep a record of purchasers; Jacobs & Haberman, *supra* note 16, at 141–44 (explaining how individuals will be able to print the firearms themselves and evade background checks, evade serial tracing techniques used by police officers to solve crimes, and evade metal detectors).

### III. THE RISE OF 3D PRINTERS AND THE ABILITY TO PRINT A FIREARM

3D-printing technology has been on the rise since its inception in 1986, and its creation is attributed to Charles Hull.<sup>129</sup> Ten years after its birth, Wake Forest Institute of Regenerative Medicine used 3D printing technology to create 3D scaffolding for organ augmentation, and then in the 2000s attempted to print fully functioning organs.<sup>130</sup> Since then, 3D printing has expanded into the automotive industry, manufacturing, aviation, medicine, cake decorating, and at-home use, and in 2013, Cody Wilson expanded its application to the firearm industry.<sup>131</sup> Not much skill is required to 3D print a gun, and this is partly due to the simplistic nature of the 3D-printing process.<sup>132</sup>

3D printers can print in materials such as plastic, metal, ceramic, cement, wood, food, and human cells.<sup>133</sup> The 3D printer sets these raw materials into two-dimensional patterns on a platform and slowly raises to stack each layer of the raw material until the object being printed is complete.<sup>134</sup> This process is made possible through the use of a Computer-Aided Design file, which is an electronic blueprint.<sup>135</sup> Individuals can create their CAD files from scratch or scan the object the user wants to 3D print and then edit and share the CAD file online.<sup>136</sup> While creating a

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<sup>129</sup> Carlos M. González, *Infographic: The History of 3D Printing*, AM. SOC. MECH. ENGRS (Jan. 30, 2020), <https://www.asme.org/topics-resources/content/infographic-the-history-of-3D-printing> (Charles Hull was granted the first patent in 3D printing after inventing the first stereolithography apparatus (SLA) and before co-founding 3D Systems Corporation).

<sup>130</sup> See *id.*; Jasper Tran, *The Law and 3D Printing*, 31 J. MARSHALL J. INFO. TECH. & PRIVACY L. 505, 508 (2015).

<sup>131</sup> See Stuart Dredge, *30 Things Being 3D Printed Right Now (And None of Them are Guns)*, THE GUARDIAN, (Jan. 29, 2014, 7:40 AM), <https://www.theguardian.com/technology/2014/jan/29/3D-printing-limbs-cars-selfies> (BAE Systems 3D printed fighter jet components, Honda 3D printed models of cars, 3D Systems printed various foods using sugar and cocoa butter); Paul, *supra* note 6.

<sup>132</sup> See Tran, *supra* note 130, at 508 (discussing the background of 3D printing and how this rise in technology intersects with the law).

<sup>133</sup> See *id.* (explaining how 3D printers have the ability to use various materials to print out objects including food, metal, or plastic); Jessica Berkowitz, *Computer-Aided Destruction: Regulating 3D Printed Firearms Without Infringing on Individual Liberties*, 33 BERKELEY TECH. L.J. 51, 56 (2018).

<sup>134</sup> See Tran, *supra* note 130, at 508.

<sup>135</sup> *Id.*

<sup>136</sup> *Id.*

CAD file requires a certain level of expertise, especially for complex designs, there are numerous sources online where a beginner could easily download an already-made CAD file.<sup>137</sup>

Cody Wilson developed the first 3D blueprint to print a gun known as The Liberator.<sup>138</sup> The Liberator at first glance looks like it would hardly be able to fire a bullet as it appears more like a toy than a fully functioning firearm.<sup>139</sup> This is because most 3D-printed guns are printed using plastic, as those materials are more accessible and user-friendly compared to 3D-printed guns created by 3D printers using metal materials.<sup>140</sup> Until recently, most 3D-printed guns were only capable of firing a couple of rounds before needing a replacement part, and there were reported instances where the gun exploded in the user's hand.<sup>141</sup> This is because while there are many materials capable of being used to form a 3D-printed object, in terms of plastic, the most common thermoplastics are PLA and ABS.<sup>142</sup> PLA is a softer thermoplastic, meaning it deforms fairly quickly, and while ABS is harder, it means that the object constructed typically cracks and breaks completely rather than just deforms.<sup>143</sup>

While some 3D-printed guns were only capable of firing one shot before breaking, others were able to fire up to fourteen shots before needing parts replaced.<sup>144</sup> Due to the unpredictability of the number of shots a 3D-printed gun can fire, a man in

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<sup>137</sup> Berkowitz, *supra* note 133, at 57 (explaining how websites like GrabCAD.com and Thingiverse.com allow skilled designers to upload CAD files available to the public for free).

<sup>138</sup> See Paul, *supra* note 6. After 3D printing only the lower receiver of an AR-15 and successfully firing the gun, Wilson was determined to create an entirely 3D-printed firearm and not just 3D-printed gun parts.

<sup>139</sup> *Id.*

<sup>140</sup> See Aysha M., *3D Printed Guns: Where Are We Now?*, 3D NATIVES (Sept. 2, 2020), <https://www.3dnatives.com/en/3D-printed-gun-020920205/>. A replica of a Browning 1911 handgun was the first 3D printed metal gun and is capable of firing more than 600 bullets without any damage to the gun; however, the cost of the 3D metal printer was between \$500,000 to \$1 million at the time the gun was printed in 2013. *Id.*

<sup>141</sup> See *id.* (stating how an Australian police department tested out a 3D-printed firearm in 2013 and was able to fire a 17cm bullet, but the firearm immediately exploded).

<sup>142</sup> See *id.* (discussing how even though PLA and ABS are the most common thermoplastics, they are not perfect in order to create fully operational 3D-printed firearms).

<sup>143</sup> See *id.*

<sup>144</sup> See Carl Franzen, *World's First 3D Printed Rifle Gets Update, Fires 14 Shots*, THE VERGE (Aug. 4, 2013, 7:20 PM), <https://www.theverge.com/2013/8/4/4588162/worlds-first-3d-printed-rifle-the-grizzly-updated> (explaining how a rifle-maker was able to 3D print a rifle and fire fourteen shots before exploding); Aysha M., *supra* note 140 (explaining how an Australian police department could only fire one bullet before the weapon exploded).

Pennsylvania has been working on 3D-printing ammunition that would be more compatible with a fully plastic 3D-printed gun.<sup>145</sup> The bullet is thicker and longer than a traditional bullet.<sup>146</sup> However, federal law does not allow him to manufacture and then sell the ammunition until he obtains a license in accordance with the GCA.<sup>147</sup>

While the mechanics of successfully firing a 3D-printed firearm are not always easy, advances in CAD files have allowed the actual 3D printing of a firearm to become relatively simple.<sup>148</sup> 3D-printed guns originally could not be printed in one piece.<sup>149</sup> The individual components of the gun were all 3D printed and then the user assembled the pieces to form the gun.<sup>150</sup> However, as technology has been perfected, a user can download a complete CAD file from websites like GrabCAD.com and have a functioning firearm with no assembly required.<sup>151</sup>

Innovations in 3D printing and CAD files like the advances just mentioned are increasing the popularity of 3D printers in the private sector.<sup>152</sup> This is partly because, as technology has developed, it has become cheaper for households to purchase their 3D printers.<sup>153</sup> Right now, an individual can purchase a desktop 3D printer for less than \$150.<sup>154</sup> As 3D printers become more popular, there is more opportunity for the technology to be abused and to further illegal activities.<sup>155</sup> 3D-printed guns are just one example of how this technology can be abused.

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<sup>145</sup> See Berkowitz, *supra* note 133, at 59 (explaining how the 3D printed bullet developed causes less stress on the barrel of the 3D printed firearm).

<sup>146</sup> See *id.* at 59–60.

<sup>147</sup> See *id.* at 60; 18 U.S.C. § 922(a)(1)(B).

<sup>148</sup> See Berkowitz, *supra* note 133, at 59.

<sup>149</sup> See *id.*

<sup>150</sup> See Aysha M., *supra* note 140.

<sup>151</sup> See Berkowitz, *supra* note 133, at 59.

<sup>152</sup> See *id.* at 57.

<sup>153</sup> See *id.* (explaining how private consumers can purchase 3D printers at stores like Best Buy, Home Depot and Amazon at affordable prices for private consumers).

<sup>154</sup> See *Voxelab Polaris 2K Color LCD Resin 3D Printer*, VOXELAB, [https://www.voxelab3dp.com/product/polaris-lcd-3Dprinter?CID=31&gclid=CjwKCAiAl-6PBhBCEiwAc2GOVJpS0kl12XUHzc\\_adBJuvpat0y3enpovD4seG8EdgzdS7BOdW3MUahoC3vIQAvD\\_BwE](https://www.voxelab3dp.com/product/polaris-lcd-3Dprinter?CID=31&gclid=CjwKCAiAl-6PBhBCEiwAc2GOVJpS0kl12XUHzc_adBJuvpat0y3enpovD4seG8EdgzdS7BOdW3MUahoC3vIQAvD_BwE) (last accessed Feb. 2, 2022).

<sup>155</sup> Berkowitz, *supra* note 133, at 58 (explaining how a gang used a 3D printed scanner to steal \$400,000 from an ATM); see Helen Dickinson, *The Next Industrial Revolution? The Role of Public Administration in Supporting Government to Oversee 3D Printing Technologies*, 78 PUB. ADMIN. REV. 922, 923 (2018) (explaining how 3D printers have been used to print pharmaceuticals which means there could be a rise in users printing illegal substances).



## IV. CODY WILSON AND THE FIGHT TO 3D PRINT FIREARMS

Whether 3D-printed guns are legal, should be regulated, and to what degree, are issues currently being litigated by the founder of Defense Distributed: Cody Wilson.<sup>156</sup> Wilson founded Defense Distributed in 2012 with Ben Denio and stated that the purpose of the corporation was to “defend the human and civil right to keep and bear arms . . . and to collaboratively produce, publish, and distribute to the public information and knowledge related to the digital manufacture of arms.”<sup>157</sup> Through Defense Distributed, individuals can access CAD files to 3D print various types of firearms.<sup>158</sup> For example, The Liberator’s CAD file was downloaded over 100,000 times.<sup>159</sup>

The State Department responded quickly to the unveiling of The Liberator by sending a letter to Wilson demanding the removal of the CAD files from the Defense Distributed website.<sup>160</sup> Wilson complied, but the files had already been shared across other websites.<sup>161</sup> Wilson has since filed for authorization from the State Department, but any blueprint Wilson has created has yet to be approved.<sup>162</sup> In response to the State Department’s lack of authorization, Defense Distributed sued the State Department in 2015 in the U.S. District Court for the Western District of Texas.<sup>163</sup> Wilson requested a preliminary

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<sup>156</sup> See *Def. Distributed v. U.S. Dep’t of State*, 121 F. Supp. 3d 680, 689 (W.D. Tex. 2015); Deanna Paul, *Are They Deadly? Are They Free Speech? Explaining 3-D Printed Guns*, WASH. POST (Aug. 1, 2018), <https://www.washingtonpost.com/news/post-nation/wp/2018/08/01/are-they-deadly-are-they-free-speech-explaining-3-d-printed-guns/> (explaining how Defense Distributed has been involved in litigation over the right to 3D print guns for more than five years); Berkowitz, *supra* note 133, at 61–62.

<sup>157</sup> Berkowitz, *supra* note 133, at 60; see *Defense Distributed*, *supra* note 8.

<sup>158</sup> See Berkowitz, *supra* note 133, at 60.

<sup>159</sup> *Id.* at 61.

<sup>160</sup> *Id.* at 63; see Letter from Glenn Smith, Chief DDTC Enforcement Division, to Defense Distributed, U.S. DEPT OF STATE (May 8, 2013), [https://en.wikisource.org/wiki/Letter\\_from\\_Department\\_of\\_State](https://en.wikisource.org/wiki/Letter_from_Department_of_State). The State Department claimed Wilson had violated the International Traffic in Arms Regulations (ITAR), which prohibits the export of technical data concerning firearms without the Directorate of Defense Controls’ authorization. See 22 C.F.R. §120–130; Blackman, *supra* note 102, at 7.

<sup>161</sup> See Berkowitz, *supra* note 133, at 61.

<sup>162</sup> *Id.* at 62.

<sup>163</sup> See *Def. Distributed*, 121 F. Supp. 3d at 692 (describing Defense Distributed’s argument that the State Department’s interpretation of ITAR constituted prior restraint

injunction that was denied which would have allowed Wilson to post the CAD files on the internet while the suit was pending.<sup>164</sup> On appeal, the Fifth Circuit affirmed, and the Supreme Court denied certiorari.<sup>165</sup>

Once the case was remanded, the District Court encouraged the parties to settle.<sup>166</sup> The State Department and Defense Distributed agreed that the Government would rescind the prohibition on posting technical data about firearms on the internet.<sup>167</sup> However, right before the settlement was finalized, twenty-four state attorneys general and gun control groups sought emergency injunctive relief to prevent the CAD files from being posted online.<sup>168</sup> Jacob Blackman, counsel for Defense

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on constitutionally protected speech); Berkowitz, *supra* note 133, at 63; Blackman, *supra* note 102, at 1.

<sup>164</sup> See *Def. Distributed*, 121 F. Supp. 3d at 689; Berkowitz, *supra* note 133, at 63; Blackman, *supra* note 102, at 1.

<sup>165</sup> See *Def. Distributed v. U.S. Dep't of State*, 838 F.3d 451, 460 (5th Cir. 2016), *cert denied*, 138 S. Ct. 638 (2018); Blackman, *supra* note 102, at 1.

<sup>166</sup> See Scheduling Order at 1, *Def. Distributed v. U.S. Dep't of State*, 121 F. Supp. 3d 680 (W.D. Tex. 2015) (No. 15-CV-00372-RP), <https://bit.ly/3cGERVn>; Blackman, *supra* note 102, at 1. The core of the settlement was the issue of expanding the United States Munitions List (USML) under the ITAR. The USML describes what constitutes a defense article that is prohibited from being exported outside the United States. See Blackman, *supra* note 102, at 8, 15 (“[T]he settlement agreement required the State Department ‘to acknowledge[e] and agree[] that the temporary modification of USML . . . permits any . . . person . . . includ[ing] [Defense Distributed]’s customers . . . to access, discuss, use, reproduce, or otherwise benefit from the [Defense Distributed Files].”); 22 C.F.R. § 121.1(a)(2) (2020) (noting that “technical data directly related to the manufacture or production of a defense article” falls under the purview of the USML). The export of technical data, including blueprints, is currently on the USML. See 22 C.F.R. §121.1(a) (2020).

<sup>167</sup> See Settlement Agreement, *Def. Distributed v. U.S. Dep't of State*, 121 F. Supp. 3d at 2 (W.D. Tex. 2015) (No. 15-CV-00372-RP). The settlement agreement between the State Department and Defense Distributed would have required the State Department to exclude the CAD files as a prohibited defense article under the category of technical data on the USML. See Blackman, *supra* note 102, at 15.

<sup>168</sup> See Joint Emergency Motion for Temporary Restraining Order and for Preliminary Injunction by Proposed Intervenors The Brady Campaign to Prevent Gun Violence, Everytown for Gun Safety Action Fund, Inc. & Giffords Law Center, *Def. Distributed v. U.S. Dep't of State*, 122 F. Supp. 3d (W.D. Tex. 2015) (No. 15-CV-00372-RP), Doc. 97 [hereinafter *Joint Emergency Motion for Temporary Restraining Order and for Preliminary Injunction*]; CEASE AND DESIST LETTER, OFFICE OF THE ATTY GEN. OF N.J. (2018), (giving notice to Defense Distributed that if they do not comply with the cease and desist order, then the state of New Jersey will initiate legal proceedings against them); Plaintiffs’ Motion for Temporary Restraining Order and Preliminary Injunction, *Pennsylvania v. Def. Distributed*, No. 2:18-CV-03208-PD (E.D. Pa. 2018), [<https://perma.cc/28U9-3CH6>] (requesting a temporary restraining order from the court to enjoin Defense Distributed from making their blueprints for firearms available over the internet in Pennsylvania); Emergency Motion for Temporary Restraining Order, *Washington v. U.S. Dep't of State*, 318 F. Supp. 3d 1247 (W.D. Wash. 2018) (Case 2:18-cv-01115), Doc. 2, <https://bit.ly/2zsgZqb> (arguing that the State Department without notice “reversed a longtime position” to allow code for guns to be published on the internet);

Distributed, was able to block three (one each in Pennsylvania, New Jersey, and Texas) out of the four temporary restraining orders (“TRO”) but was unsuccessful in blocking the fourth one filed in Washington state.<sup>169</sup> Washington issued a global injunction that prevented the State Department from fulfilling its obligations under the settlement agreement with Defense Distributed.<sup>170</sup> Essentially, the State Department was not allowed to permit the sharing of technical data concerning firearms under the International Traffic in Arms Regulations (“ITAR”).<sup>171</sup> However, the Ninth Circuit on April 27, 2021, vacated the judgment and remanded with instructions to dismiss the ban on exporting CAD files containing blueprints to 3D print firearms.<sup>172</sup>

The states and gun control groups cited several reasons for filing the TROs in response to the settlement agreement and to prevent the sharing of CAD files.<sup>173</sup> Those reasons included public safety, negligence, the violation of New Jersey nuisance laws, the violation of the Tenth Amendment, and the violation of the Administrative Procedure Act.<sup>174</sup> The responses from the states and gun control advocacy groups show there is concern

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Blackman, *supra* note 102, at 1–2, 16 (highlighting the “blitz” against Defense Distributed from many states).

<sup>169</sup> See Blackman, *supra* note 102, at 16, 27; Temporary Restraining Order at 7, *Washington v. U.S. Dep’t of State*, 318 F. Supp. 3d 1247 (W.D. Wash. 2018) (No. 18-CV-01115-RSL), Doc. 23, (stating that the status quo has been preserved and that the “federal government defendants . . . are enjoined” from expanding the USML).

<sup>170</sup> See Temporary Restraining Order, *supra* note 169, at 6–7; Blackman, *supra* note 102, at 26–27.

<sup>171</sup> See Temporary Restraining Order, *supra* note 169, at 6 n.2; Blackman, *supra* note 102, at 27. In response to the Ninth Circuit, President Joe Biden and the Justice Department released proposed Rule 2021R-05 that would amend the definition of “frame or receiver” to include gun kits that would allow individuals to build their own guns. See Bureau of Alcohol, Tobacco, Firearms and Explosives, Summary of Proposed Rule 2021R-05 Definition of “Frame or Receiver” (May 24, 2021), <https://www.atf.gov/rules-and-regulations/definition-frame-or-receiver/summary>; Definition of “Frame or Receiver” and Identification of Firearms, 86 Fed. Reg. 27720, 27725–27726 (proposed May 21, 2021). This would require those guns created through gun kits to have a serial number and for retailers to conduct background checks on the potential purchaser before selling the gun kit. See Matt Zapotosky, *Justice Dept. Details Proposed Restrictions on ‘Ghost Guns,’* WASH. POST (May 7, 2021, 6:16 PM), [https://www.washingtonpost.com/national-security/biden-ghost-guns/2021/05/07/0d20ef86-af74-11eb-acd3-24b44a57093a\\_story.html](https://www.washingtonpost.com/national-security/biden-ghost-guns/2021/05/07/0d20ef86-af74-11eb-acd3-24b44a57093a_story.html).

<sup>172</sup> See *State v. United States Dep’t of State*, 996 F.3d 552, 556–57 (9th Cir. 2021).

<sup>173</sup> See Blackman, *supra* note 102, at 16, 22.

<sup>174</sup> See Verified Complaint from the Office of the Attorney General of New Jersey to Superior Court of New Jersey on July 30, 2018, *Grewal v. Def. Distributed*, No. ESX-C-131-18 (N.J. Super. Ct. Ch. Div. 2018) [hereinafter *Verified Complaint*]; *Joint Emergency Motion for Temporary Restraining Order and for Preliminary Injunction*, *supra* note 168; Blackman, *supra* note 102, at 16, 22.

over the use and proliferation of 3D-printed guns.<sup>175</sup> These concerns stem from unique safety issues posed by 3D-printed firearms that are not typically encountered with traditional metal firearms.

## V. PROBLEMS UNIQUE TO 3D PRINTED FIREARMS

3D-printed firearms pose novel safety issues that warrant regulatory action to restrict the printing and manufacturing of 3D gun CAD files, which will in turn restrict the ability to 3D print firearms. However, some would argue that 3D-printed firearms do not need to be regulated. One argument is that 3D-printed firearms do not need to be regulated because they do not always work.<sup>176</sup> Another argument is if an individual truly wants to obtain a gun, not through the proper channels, there are ways to do that without going through the trouble of 3D printing a gun.<sup>177</sup> Additionally, an individual has a right to build a gun without completing a background check or obtaining a serial number by purchasing an 80% lower receiver and building the gun themselves.<sup>178</sup> A 3D-printed gun is arguably just an advanced form of modern gunsmithing.<sup>179</sup>

Though gunsmithing is legal, and thus arguably 3D-printed firearms should be legal, the current issues with gun regulations

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<sup>175</sup> See *Verified Complaint*, *supra* note, 174 at 2 (describing how the application for a TRO to prevent the posting of the CAD files is based on a violation of New Jersey nuisance laws and was considered negligent); *Joint Emergency Motion for Temporary Restraining Order and for Preliminary Injunction*, *supra* note 168 (stating how the TRO filed by the gun control groups was based on how if the CAD files were posted there would be a violation of the Tenth Amendment and the Administrative Procedure Act).

<sup>176</sup> See Aysha M. *supra* note 140; Aamer Madhani & Andrew Wolfson, *3D Printed Guns Might Be Inevitable. But Are They a Practical Weapon Choice For Criminals?*, USA TODAY (Aug. 2, 2018, 6:53 AM), <https://www.usatoday.com/story/news/2018/08/01/3-d-guns-serious-threat-u-s-communities/883626002/> (explaining how 3D print experts do not believe that 3D printed firearms are a practical weapon).

<sup>177</sup> See Jacobs & Haberman, *supra* note 16, at 143 (explaining how criminals can buy a gun on the black market or if individuals wish to avoid a background check they can make a gun using traditional gunsmithing methods).

<sup>178</sup> See Patrick J. Kiger, *What Are Ghost Guns and Why Are They So Dangerous?*, HOWSTUFFWORKS (June 8, 2020), <https://science.howstuffworks.com/ghost-guns.htm> (explaining how ghost guns are assembled through gun kits or by individual milling or drilling an unfinished receiver which does not require a background check or serial number); *What is ATF Doing in Regards to People Making Their Own Firearms?*, *supra* note 17; Letter from B. Todd Jones, *supra* note 19.

<sup>179</sup> See Jacobs and Haberman, *supra* note 16, at 140.

in the country are only exacerbated by 3D-printed firearms.<sup>180</sup> Furthermore, 3D-printed firearms create unique safety problems previously not faced and consequently warrant regulations.

*A. The Exacerbation of Current Flaws in Gun Regulations*

i. Circumventing Background Checks

Before the ability to 3D print firearms, individuals who wanted to evade background checks could easily do so by purchasing a gun through another individual, stealing a gun, purchasing the gun through the black market, or building a gun using traditional gunsmithing methods.<sup>181</sup> However, 3D-printed firearms would allow individuals to acquire a gun and evade a background check even more easily.<sup>182</sup> While gunsmithing using traditional methods requires a certain level of skill,<sup>183</sup> a 3D-printed firearm does not require much experience or expertise in 3D printing to create a functioning firearm.<sup>184</sup> Additionally, 3D printers are becoming more affordable, providing greater access to the required tools needed to 3D print a gun.<sup>185</sup> So while circumventing background checks is not a novel issue created by 3D-printed firearms, it is an issue that is exacerbated by the ability to 3D print a firearm.

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<sup>180</sup> See Jacobs and Haberman, *supra* note 16, at 137 (“3D firearms printing is the most recent chapter in the long history of American gunsmithing.”); Blackman, *supra* note 102, at 7 (explaining how there is no federal law that expressly prohibits posting CAD files on the internet concerning how to 3D print a firearm).

<sup>181</sup> See Jacobs and Haberman, *supra* note 16, at 143.

<sup>182</sup> *Id.*

<sup>183</sup> See *Interview with a Gunsmith*, JOB SHADOW, <https://jobshadow.com/interview-with-a-gunsmith/>. Ben Worthen, a gunsmith, describes how the necessary skills to be a successful gunsmith include the ability to assess a firearm for irregularities as well as be proficient in metalwork, woodwork, fabrication and parts fitting.

<sup>184</sup> See Berkowitz, *supra* note 133, at 77 (“Unlike traditional firearms, which require specialized knowledge to make, 3D printed guns may be created by completely inexperienced individuals.”).

<sup>185</sup> See *Voxelab Polaris 2K Color LCD Resin 3D Printer*, *supra* note 154 (showing a beginner 3D printer can be delivered and purchased through Amazon for less than \$150).

## ii. The Issue of Serial Numbers

Serial numbers are required on guns purchased from an FFL.<sup>186</sup> Though criminals commonly remove serial numbers, and individuals who build guns using traditional methods are not required to have serial numbers, a 3D-printed firearm could be printed without a serial number and would only compound the issue of individuals evading tracing methods.<sup>187</sup> Tracing does end after the firearm's first purchaser, and though relatively few crimes are solved through tracing the serial number of a firearm, 3D printed firearms already pose unique crime scene analysis issues that would only be made worse if in addition to those issues the firearm does not contain a serial number.<sup>188</sup> Consequently, 3D-printed firearms must be regulated.

### *B. Unique Safety Issues Caused by 3D Printed Firearms*

#### i. Difficulties in Assessing Crime Scenes

3D-printed guns have already begun to pose problems for crime scene investigators as their use becomes more popular.<sup>189</sup> In a typical analysis of a crime scene involving a gun, analysts normally look for “(1) striations on a fired bullet that can be matched to a gun because of barrel rifling; (2) patterns of GSR that vary depending on proximity of the weapon to the target; . . . [and (3)] finger prints on the weapon and casing (although unlikely to obtain).”<sup>190</sup> However, these pieces of evidence become complicated to obtain when the gun is 3D printed.<sup>191</sup>

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<sup>186</sup> See Letter from B. Todd Jones, *supra* note 19; 18 U.S.C. § 923.

<sup>187</sup> See Jacobs and Haberman, *supra* note 16, at 144.

<sup>188</sup> See *id.*

<sup>189</sup> See Michelle Taylor, *Forensic Analysis of 3D printed Firearms: Beyond Traditional Traceology*, FORENSIC (Mar. 10, 2020), <https://www.forensicmag.com/561677-Forensic-Analysis-of-3D-printed-Firearms-Beyond-Traditional-Traceology/> (discussing to what extent ballistic evidence differs between a 3D printed firearm and a traditional one, as well as if existing analysis methods for crime scenes can be applied to 3D printed firearms).

<sup>190</sup> See FORENSIC ANALYSIS OF GUNSHOT RESIDUE, 3D PRINTED FIREARMS, AND

In a conventional metal gun, there are spiral ridges in the barrel that leave identifying marks on bullets when shot, whereas, in contrast, a 3D-printed firearm's barrel leaves no identifying marks.<sup>192</sup> Furthermore, a metal gun, when fired, can leave behind gunshot residue from the barrel to provide clues on the shooting distance, where a bullet fired from a 3D-printed firearm sprays chemical residue.<sup>193</sup> It is unclear, however, whether this chemical residue can be used in determining shooting distance.<sup>194</sup>

A metal gun, when fired, does not leave behind fragments or shavings, whereas a 3D-printed gun leaves behind plastic flakes on the bullets or on the ground below where the gun was fired in most cases.<sup>195</sup> Analysts are looking into whether this is a viable evidence option for forensic analysts to track down the shooter of a 3D-printed firearm.<sup>196</sup> The hope is to eventually create a database of polymers where analysts can track down the store the polymer could have potentially been purchased from to create the 3D-printed firearm.<sup>197</sup>

On a conventional metal gun, fingerprints can be lifted to help identify the individual who fired the gun.<sup>198</sup> In contrast, on a 3D-printed gun, the texture of the plastic makes it difficult to lift complete fingerprints.<sup>199</sup> Additionally, chemicals used to lift fingerprints can react with the plastic and cause the fingerprints that might have been on the gun to become unrecoverable.<sup>200</sup> A 3D-printed firearm, since it is composed of plastic, can even be

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GUNSHOT INJURIES: CURRENT RESEARCH AND FUTURE PERSPECTIVES 62 (Oscar Black and James Cizdziel eds., 2019) (explaining how 3D-printed firearms do not leave the same evidence at a crime scene that a traditional metal firearm does meaning traditional crime scene forensic methods might not be effective).

<sup>191</sup> See Carolyn Wilke, *3-D Printed 'Ghost Guns' Pose New Challenges for Crime-scene Investigators*, SCIENCE NEWS (Sept. 24, 2019, 10:00 AM), <https://www.sciencenews.org/article/3Dprinted-guns-plasticballistics-crime> (discussing the need for new methods in examining crime scenes in order solve crimes conducted using 3D printed firearms).

<sup>192</sup> See *id.*

<sup>193</sup> *Id.*

<sup>194</sup> See *id.*

<sup>195</sup> *Id.*

<sup>196</sup> See FORENSIC ANALYSIS OF GUNSHOT RESIDUE, 3D PRINTED FIREARMS, AND GUNSHOT INJURIES: CURRENT RESEARCH AND FUTURE PERSPECTIVES, *supra* note 190, at 70.

<sup>197</sup> See *id.*

<sup>198</sup> See Wilke, *supra* note 191.

<sup>199</sup> See *id.*

<sup>200</sup> See *id.*

dissolved in solvents, whereas a metal gun cannot.<sup>201</sup> Until more research is conducted on 3D-printed firearm tracing, crimes committed using 3D-printed firearms will be difficult or nearly impossible to solve.<sup>202</sup>

## ii. Issues with Metal Detectors

The issue of evading metal detectors is a problem that has once again come to the forefront of media attention due to 3D-printed firearms.<sup>203</sup> Concern over plastic firearms with the introduction of the Glock in the 1980s led to the passing of the Undetectable Firearms Act, which made it illegal for a firearm to possess less than 3.7 ounces of metal and is codified under the GCA as 18 U.S.C. § 922(p).<sup>204</sup> The Glock's lower receiver is composed entirely of plastic and caused concerns about a metal detector's ability to detect the firearm.<sup>205</sup> However, 3D-printed firearms can easily bypass this requirement, as seen with *The Mail on Sunday* experiment.<sup>206</sup> Wilson purposely designed The Liberator to include a metal firing pin and a metal plate in the handle that would allow the firearm to meet the 3.7 ounces of metal requirement.<sup>207</sup> The metal firing pin is typically a common nail

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<sup>201</sup> See *id.*

<sup>202</sup> See *id.* ("If a plastic gun were used to commit a crime, tracking down the weapon's maker and shooter would not be easy.").

<sup>203</sup> See Gina Martinez, *3D Printed Guns Are Unchecked and Untraceable. And a Judge Blocked Them at the Last Minute*, TIME (July 31, 2018, 9:03 PM), <https://time.com/5344265/3d-printed-guns-legal/> (explaining how Avery Gardiner, co-president of the Brady Campaign to End Gun Violence is worried about the ability for 3D printed firearms to pass through metal detectors undetected as 3D printers become more popular).

<sup>204</sup> See 18 U.S.C. § 922(p); Joshua Prince & Rick Vasquez, *Undetectable Firearms and 3D Printing*, PRINCE LAW OFFICES BLOG (Aug. 17, 2018), <https://blog.princelaw.com/2018/08/17/undetectable-firearms-and-3d-printing/> (stating how the Glock was one of the first firearms to have a plastic receiver and led to the Undetectable Firearms Act).

<sup>205</sup> See *How The Glock Became America's Weapon Of Choice*, NPR (Jan. 24, 2012, 10:47 AM), <https://www.npr.org/2012/01/24/145640473/how-the-glock-became-americas-weapon-of-choice> (discussing the Glock's popularity as a firearm is partly due to its plastic body which made the firearm lightweight and able to withstand extreme temperature changes).

<sup>206</sup> See Murphy & Myers, *supra* note 1.

<sup>207</sup> See *id.* (stating how the metal firing pin can easily be removed from the firearm and thus undetectable by metal detectors); Jacobs and Haberman, *supra* note 16, at 142 (stating that Wilson's inclusion of metal in the Liberator's design made it comply with the 3.7 ounces of metal requirement).



that could easily be removed from the gun to bypass security measures at airports or train stations, and the metal plate in the handle is not necessary to fire the gun.<sup>208</sup> Consequently, an individual can easily bypass the 3.7 ounces of metal requirement.

Furthermore, though 3D-printed firearms are now traditionally printed in one piece, 3D-printed firearms can still be printed in multiple parts.<sup>209</sup> This means that while a 3D-printed firearm might show up on an airport security scanner, if the individual hides the gun in several pieces on their person or the person of multiple people, a functioning firearm can be smuggled onto a plane or train, reassembled, and pose a safety threat, regardless of whether it can fire once or ten times.<sup>210</sup>

## VI. THE SOLUTION: TREATING COLLECTORS AS MANUFACTURERS

As evidenced by the reactions of the various state attorneys general, gun control advocacy groups, and the problems unique to or exacerbated by 3D-printed firearms, regulations on these weapons are warranted.<sup>211</sup> While the obvious answer might be to place restrictions on the gun itself, to require a user to register their 3D-printed firearm or obtain a serial number, and undergo a background check, in reality, those restrictions would be only partially effective as they only focus on the individuals using the guns, rather than the 3D printed and traditional gun industry as a whole.<sup>212</sup> Placing regulations on manufacturers allows for

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<sup>208</sup> See Josh Blackman, *The 1st Amendment, 2nd Amendment, and 3D Printed Guns*, 81 TENN. L. REV. 479, 511 (2014); Murphy & Myers, *supra* note 1, (stating how Wilson designed the Liberator to meet U.S. regulations but the metal component in the handle is not necessary to operate the firearm).

<sup>209</sup> See Berkowitz, *supra* note 133, at 59 (explaining how while further improvements to 3D printers have allowed firearms to be printed in one piece, the ability to break the firearm down into multiple parts is appealing to those trying to get a firearm past security).

<sup>210</sup> See Aysha M., *supra* note 140 (stating that even if 3D printed firearms are unpredictable they are still capable of firing once and hurting an individual due to their ability to be broken down into parts and bypass security).

<sup>211</sup> See Blackman, *supra* note 102, at 18, 22; *Joint Emergency Motion for Temporary Restraining Order and for Preliminary Injunction*, *supra* note 168.

<sup>212</sup> See Bhatia et al., *supra* note 33. Manufacturers, as “supply-side actors” make choices that determine the types of guns and ammunition that are manufactured and then sold, as well as any safety features on the guns themselves.

greater control over the types of guns produced and controls how guns are distributed.<sup>213</sup> Consequently, this Note proposes that the regulations be implemented at the level of the CAD firearm collectors. The term “collectors” refers to those who manage websites, such as GrabCAD.com, that allows CAD firearm creators to upload their designs, and then individuals can download the CAD files to 3D print a firearm.<sup>214</sup> To regulate the collectors, Congress should expand the definition of “manufacturer” under the GCA to include those who collect and share 3D firearm blueprints regardless of their intention to sell the blueprint or to merely distribute it through an open-sourced website.

Under the GCA a “manufacturer” is anyone “engaged in the business of manufacturing firearms or ammunition for purposes of sale or distribution,” and must be licensed as an FFL.<sup>215</sup> Congress should amend the term so that a manufacturer is any person “engaged in the business of manufacturing firearms or ammunition” *or engaged in the collection or distribution of 3D firearm or ammunition blueprints* for purposes of sale or distribution.<sup>216</sup> Thus, those engaged in the *collection* of 3D firearm and ammunition blueprints, individuals, or companies that operate and manage websites where a person can download a CAD file to 3D print a gun would have to become licensed as FFLs. This ensures that if an individual creates 3D firearm blueprints, but then uses an open-source website, such as GrabCAD.com, instead of sharing the CAD file themselves, the burden is placed on the individual or company managing GrabCAD.com to follow the requirements of an FFL and not the blueprint creator.<sup>217</sup>

To require the collector and distributor of the 3D-firearm blueprint to becoming federally licensed could potentially aid criminal investigators in attempting to trace 3D-printed firearms. Requiring collectors and distributors to become FFLs

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<sup>213</sup> *See id.*

<sup>214</sup> *See* Berkowitz, *supra* note 133, at 57, 59.

<sup>215</sup> 18 U.S.C. § 921(a)(10).

<sup>216</sup> *Id.*

<sup>217</sup> *See* Berkowitz, *supra* note 133, at 59. On GrabCAD.com there are nearly over 2,000 blueprints for guns available to download, but under the proposed change the owner and operator of GrabCAD.com would be responsible to follow the requirements of an FFL and not the blueprint creators themselves. *Id.*

compels these individuals and companies to keep records of the 3D-firearm blueprints sold or distributed, to provide a serial number for the 3D-firearm blueprint to accompany the firearm once printed, and to conduct a background check on individuals who download the CAD files either through a purchase or distribution.<sup>218</sup> Furthermore, the CAD file collectors and distributors would then be the only ones legally allowed to distribute or sell 3D-firearm blueprints under 18 U.S.C. § 922(a)(1)(A) since they would-be manufacturers.<sup>219</sup> These requirements could help trace a shooter in a crime where a 3D-printed firearm was used.<sup>220</sup> Additionally, requiring the individual or company who collects and then distributes the CAD files to conduct background checks on those attempting to download or purchase the file will help limit individuals who saw 3D-printed firearms as an affordable and easy way to circumvent a background check.

Requiring the collectors and distributors of the 3D-firearm blueprints to become FFLs, and not the creators, allows for those individuals who create CAD files as a hobby to continue to create and innovate unrestricted.<sup>221</sup> The danger of a 3D-printed firearm is that a CAD file to 3D print a gun is not subject to supply restraints since it is digital.<sup>222</sup> Thus, the burden of regulation should be put on those sharing the blueprints and not the creators. Furthermore, if a creator of a 3D-firearm blueprint creates a CAD file and then prints a gun, that would be legal and arguably just another form of gunsmithing.<sup>223</sup> An individual who

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<sup>218</sup> See 18 U.S.C. § 923(g), (i); 18 U.S.C. § 922(t).

<sup>219</sup> See 18 U.S.C. § 922(a)(1)(A).

<sup>220</sup> See Brian Freskos, *How a Gun Trace Works*, THE TRACE (Sept. 23, 2020), <https://www.thetrace.org/2016/07/how-a-gun-trace-works-atf-ffl/> (explaining how the purpose of a gun trace is “to identify the custody of a firearm through the supply chain, from manufacturer to dealer to buyer”).

<sup>221</sup> See Berkowitz, *supra* note 133, at 72 (describing how there is growing consensus that digital blueprints or the CAD files themselves are protected First Amendment speech); Blackman, *supra* note 208, at 500–01 (stating how CAD files deserve First Amendment protection because the files express information about objects that once printed are constitutionally protected free speech); *Sorrell v. IMS Health*, 564 U.S. 552, 570 (2011) (discussing how electronic communications that can be described as “information” are protected by the First Amendment).

<sup>222</sup> See Berkowitz, *supra* note 133, at 72. Since the files themselves would be protected First Amendment speech the creators of the blueprints should be free to create uninhibited by the GCA. The regulations should be placed on those collecting and then distributing the files. See Blackman, *supra* note 208, at 500–01.

<sup>223</sup> See Jacobs and Haberman, *supra* note 16, at 140 (explaining how common

builds a gun using traditional gunsmithing methods is not subject to background checks or serial number requirements under current legislation.<sup>224</sup> In this way, 3D printing a firearm for personal use is the same as building a gun using conventional gun parts.<sup>225</sup> However, putting the regulations on the 3D-firearm blueprint collectors and distributors, who were arguably already functioning similarly to a manufacturer just without restrictions, would fit into the country's gun regulatory scheme already in place.

### CONCLUSION

Though the Second Amendment protects the right to own a gun and our country's history reflects a long tradition of gunsmithing, 3D-printed firearms pose unique dangers and give individuals an easy and relatively cheap route to obtain an illegal firearm without a background check. Consequently, it is important to regulate the distribution and selling of 3D-printed firearms and to do so by classifying those who sell and distribute 3D-firearm blueprints as firearm manufacturers. This would subject these individuals and companies to the same requirements of an FFL. Though this will not prevent individuals who want a gun from obtaining one through the black market, a middle-man purchaser, or by simply building one, it will help crime scene analysts trace a 3D-printed firearm used in a crime and make it more difficult for an individual to evade a background check or serial number.

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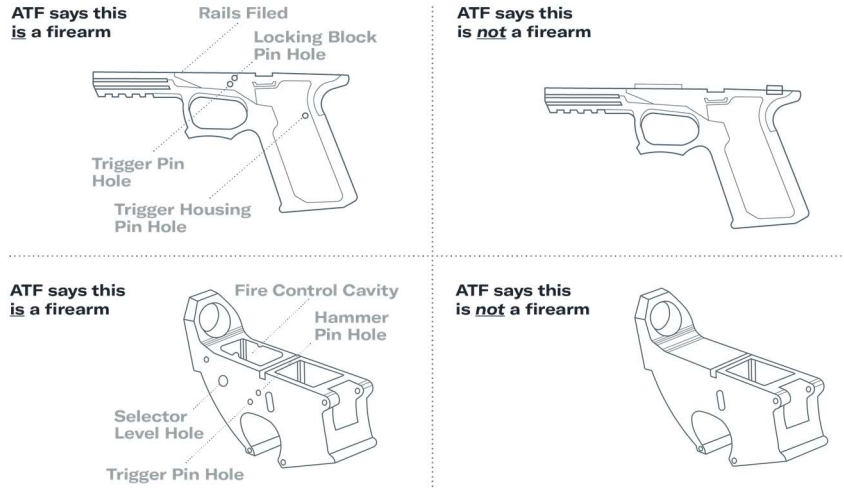
gunsmithing is in the United States and that the ability to 3D print a firearm is a "modest technological development" in gunsmithing).

<sup>224</sup> See *id.* at 143; *Are "80%" or "Unfinished" Receivers Illegal?*, *supra* note 29 (comparing an unfinished receiver with no serial number to one that is considered a firearm); Letter from B. Todd Jones, *supra* note 19 (describing how a receiver without a serial number can be assembled into a firearm).

<sup>225</sup> See Jacobs and Haberman, *supra* note 16, at 143.

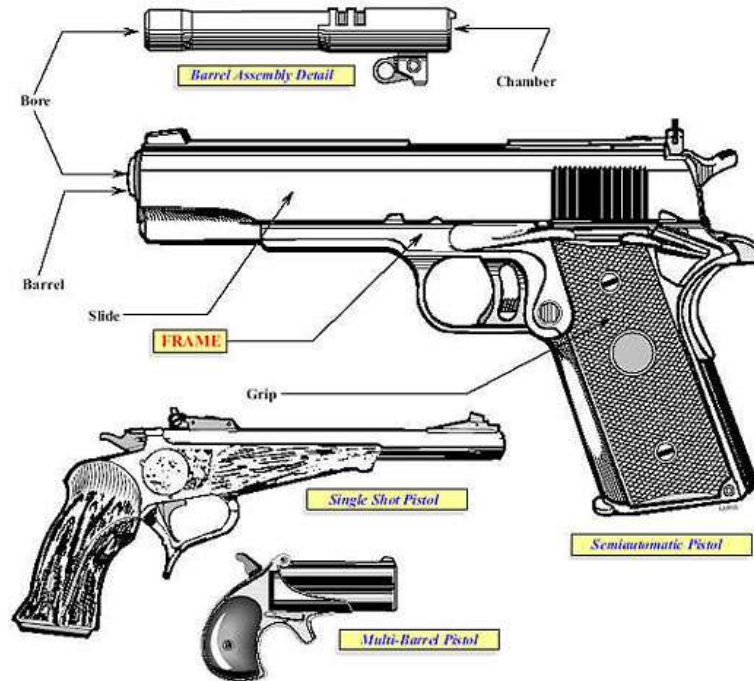
Appendix A

Figure 1<sup>226</sup>



<sup>226</sup> *Ghost Guns*, EVERYTOWN FOR GUN SAFETY, <https://everytown.org/issues/ghost-guns/> (depicting what parts of a gun are considered “gun parts” and thus regulated by the ATF).

Figure 2227



<sup>227</sup> *Firearms – Guides – Importation & Verification of Firearms – Gun Control Act Definition – Pistol*, ATF (last visited Apr. 27, 2018), <https://www.atf.gov/firearms/firearms-guides-importation-verification-firearms-gun-control-act-definition-pistol>.