J. GELZENLICHTER.

AUTOMATIC HAND TACKER.

APPLICATION FILED JUNE 12, 1905.

957,946.

Patented May 17, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

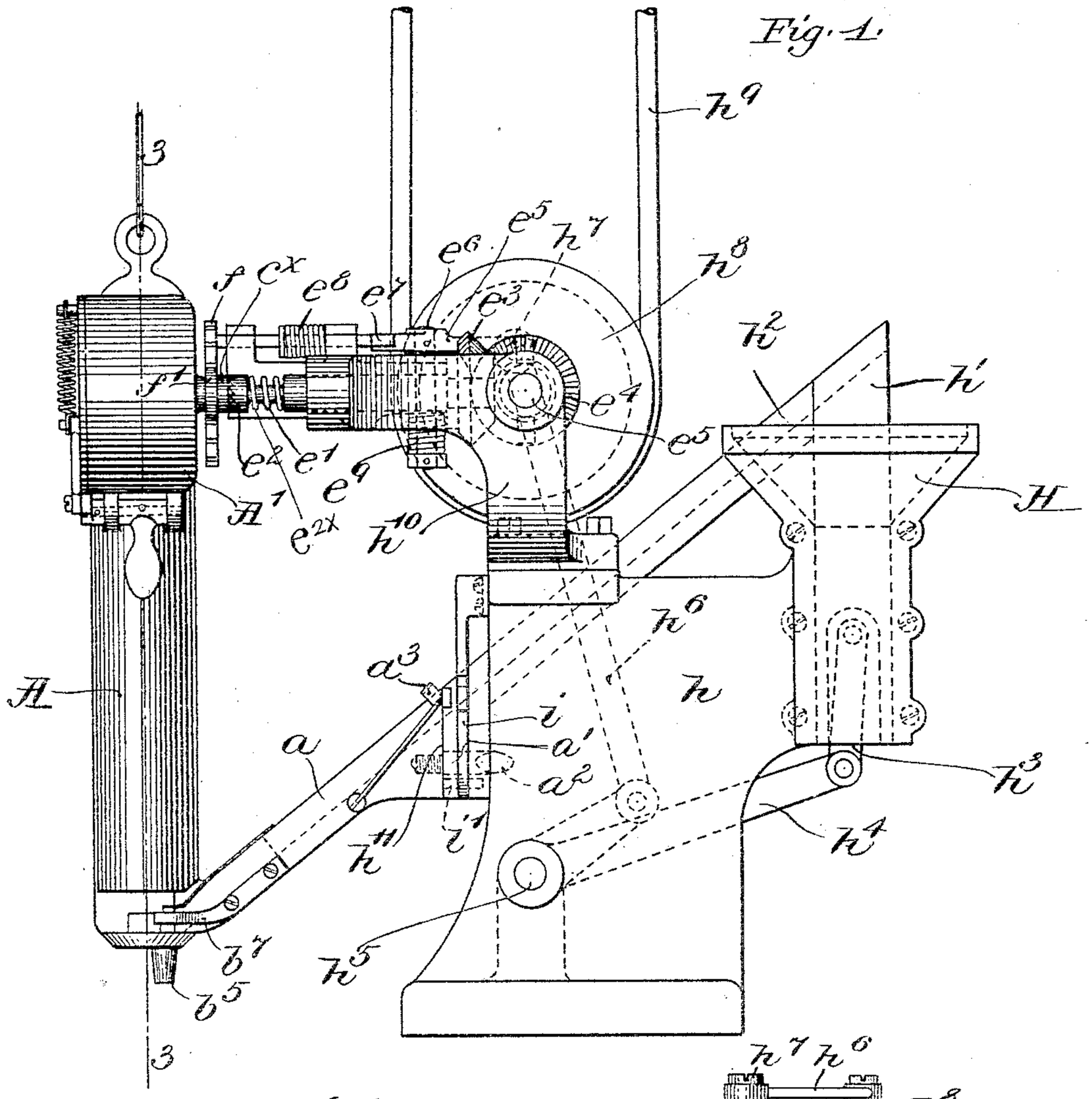
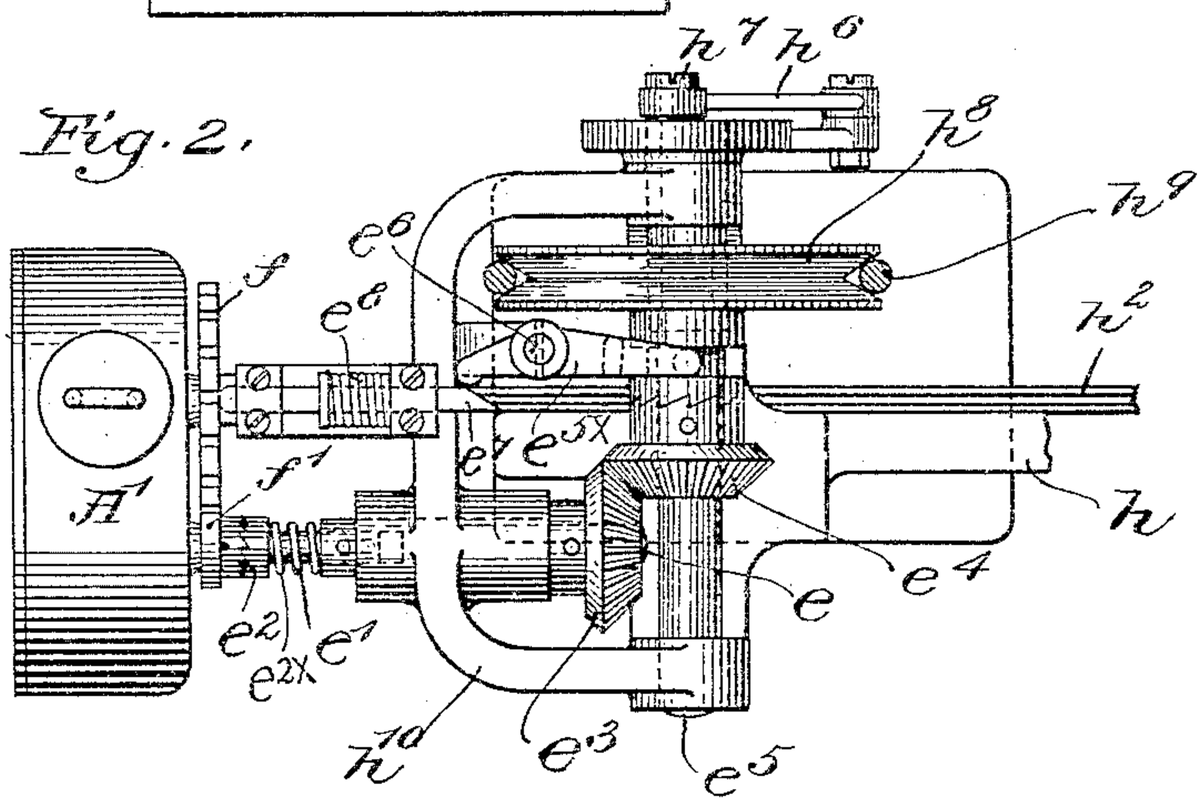


Fig. 2.



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Atty's.

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2 SHEETS—SHEET 2.

Fig. 3.

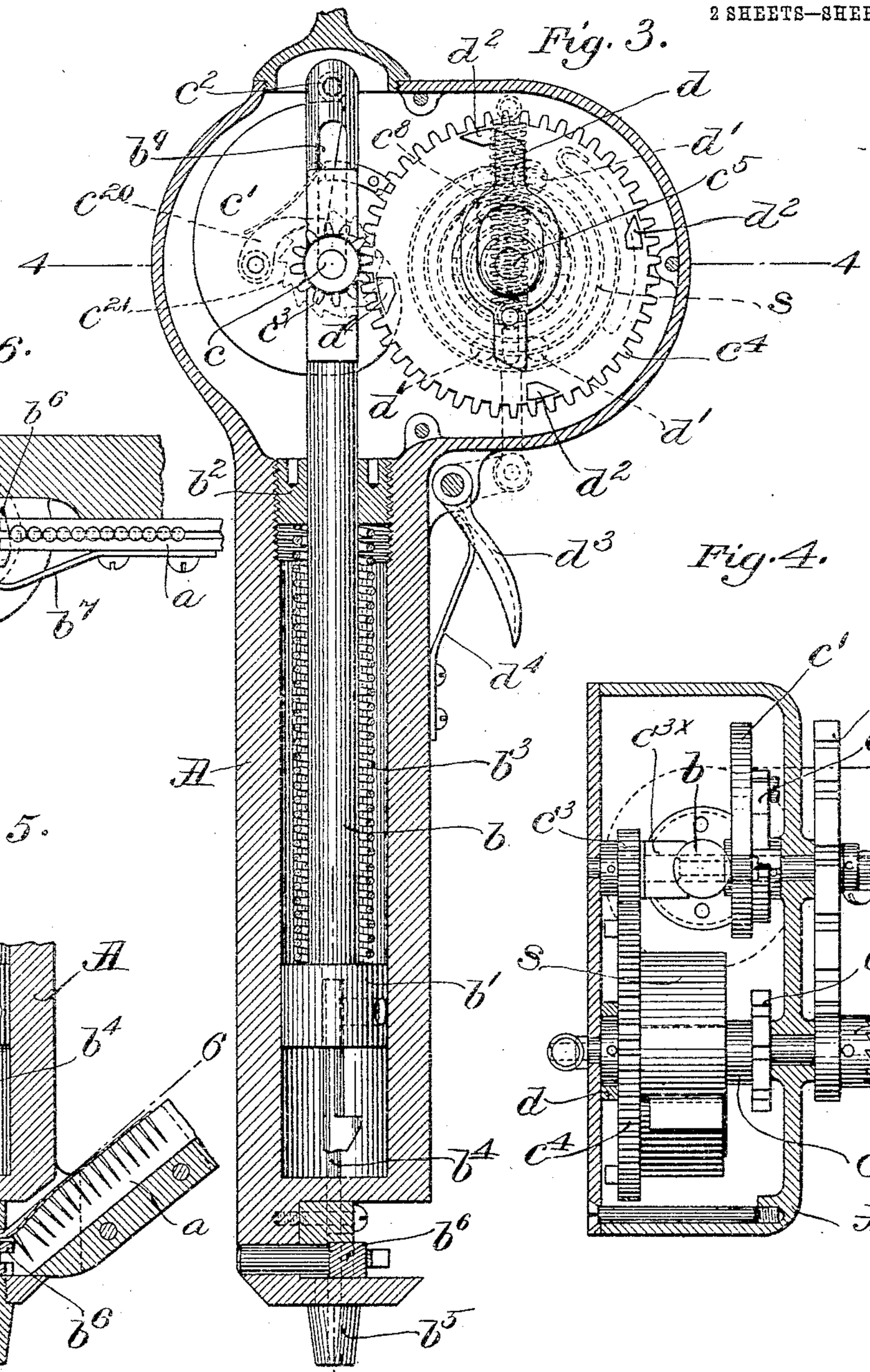
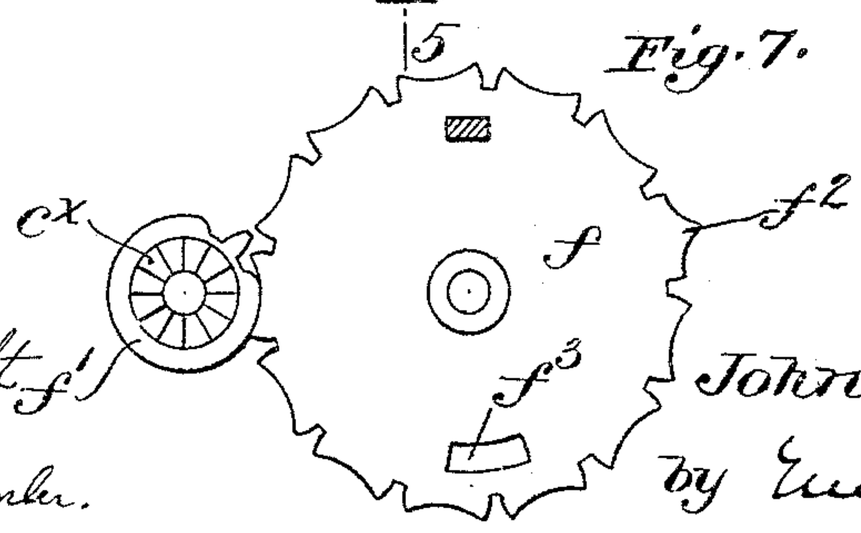


Fig. 6.

Fig. 4.

Fig. 5.

Fig. 7.



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UNITED STATES PATENT OFFICE.

JOHN GELZENLICHTER, OF LYNN, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO MANUFACTURERS MACHINE COMPANY, OF MONTCLAIR, NEW JERSEY, A CORPORATION OF NEW JERSEY.

AUTOMATIC HAND-TACKER.

957,946. Specification of Letters Patent. **Patented May 17, 1910.**

Application filed June 12, 1905. Serial No. 264,795.

To all whom it may concern:

Be it known that I, JOHN GELZENLICHTER, a citizen of the United States, residing at Lynn, in the county of Essex and Commonwealth of Massachusetts, have invented an Improvement in Automatic Hand-Tackers, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to portable or hand tackers for driving tacks or other fastenings employed in lasting boots and shoes or for any other purpose for which it may be adapted.

In the lasting of boots and shoes it is common to last the sides thereof by hand, employing for the purpose the well known lasting pincers. The operator ordinarily pulls up, or over, the upper with these pincers and, with the thumb of his other hand, holds it in position while he releases the pincers, takes a tack from his mouth and points it in the stock and drives it with a blow from the pincers that are provided with a hammer head for the purpose. He thus loses the time required for holding the upper, fastening a tack in position and driving it by hand, and the result has been that hand lasting, which in itself possesses many advantages, has been largely displaced by machinery, which frequently produces inferior work.

To facilitate the lasting and reduce the cost thereof machines have been employed that are fitted with wiping or lasting devices that engage the upper and lay it over and upon the sole and, while it is there held by the lasting device, the operator, by means of a hand tacker that he carries in one hand and a mall that he holds in the other, follows around the edge of the infolded upper and tacks the same in position. This requires the use of both hands and prevents the operator from manipulating the upper in any manner during the tacking operation. It is frequently desirable, not only for greater speed, but also for obtaining more satisfactory work, to employ a tack driver that can be carried in and operated by one hand, leaving the other free to manipulate the leather and draw it over the last and lay it in one or another direction as may be necessary properly to fit the upper to the last, and for this purpose drivers have been provided that are driven from some stationary source of power, as by a flexible shaft, or by a pneumatic tube, or by a flexible electric conductor. None of these machines however, so far as known to me, have gone into commercial use, largely, so far as I can ascertain, because the flexible power connection, whatever it may be, between the tacker and the stationary source of power, interferes with the free manipulation and positioning of the tacker to such an extent that satisfactory work cannot be had.

Recognizing the demand for a tacker that can be carried and manipulated by one hand, and recognizing also that such a tacker must be wholly free from interference by any connections leading to any stationary source of power, my present invention comprehends a tacker that is provided with stored power which may be drawn upon as required for the driving of the tacks and thus may be carried and manipulated wholly by one hand and with the unmost freedom of manipulation and presentation.

In carrying out my invention I employ a spring of any suitable type and which may be wound or tensioned to a sufficient extent to permit of the driving of a number of tacks in succession. It is not essential that the device have the capacity for driving successively all the tacks required to encircle the shoe because in lasting any shoe, it is frequently necessary to suspend the tacking in order that the upper may be properly adjusted therefor. In practice therefore, a device that will drive from twenty to thirty tacks will ordinarily be sufficient, provided convenient means be at hand for renewing the stored power quickly and in readiness for a further tack driving period.

I prefer to employ for the driving, a powerful spring of the clock type, which may be wound quickly and which by the aid of proper mechanism may operate to give off its power intermittently for the driving of the required number of tacks in

succession. Such a spring need not be of excessive weight and admits of the use of convenient mechanical devices for quickly winding it during the frequent periods of disuse of the machine in the process of lasting.

It is already common to provide hand tackers with raceways of sufficient length to hold the required number of tacks for a number of successive driving operations of the tacker, and means have been provided for quickly presenting this tacker to a holding apparatus that will renew the supply of tacks in the interim between the periods of use of the tacker. In working out my invention I have found it convenient to employ such a raceway and tack holding mechanism, providing in connection therewith, suitable spring winding or power renewing means that may be engaged simultaneously with the engagement of the tack supplying means so that the tack supply may be renewed, and the power stored at one and the same time. The parts may be so proportioned that by the time the stored power or the tack supply has been exhausted, the other also will be ready for renewal, the two being renewed at the same time. Obviously, however, it is a mere matter of convenience to associate the tack renewing and power renewing means for simultaneous operation, for many of the advantages of my invention may be had without this simultaneous action.

My invention will be best understood from a description of one embodiment thereof which I have herein selected for the purposes of illustration, and which is shown in the accompanying drawings.

In the drawings, Figure 1 in side elevation shows a loader and tacker illustrating my invention, the tacker being in loading and winding position relative to the loader; Fig. 2 is a top or plan view of Fig. 1, the hopper and mechanism contained therein being broken away or removed; Fig. 3, a vertical section through the tacker proper; Fig. 4 a horizontal section on the dotted line 4—4, Fig. 3; Fig. 5, a vertical sectional detail through the lower end of the tacker, Fig. 3, the section being taken on the dotted line 5—5, Fig. 6, a cross section on the irregular dotted line 6—6, Fig. 5; and Fig. 7, a detail illustrating the form of stop motion employed in the device, Fig. 3.

In the embodiment of my invention selected for illustration herein and shown in the drawings, referring first to Figs. 1 and 2, the tacks or fastenings in bulk are placed in a hopper, H, mounted upon a suitable standard, h, shown as adapted to rest upon a bed secured to a bench or to and upon the top of a column, as may be desired. Within the hopper is arranged a vertical reciprocable lifter h', having a movement from below the hopper bottom to an elevation such that it may deliver its tacks to the upper end of the downwardly inclined stationary raceway h^2, mounted in the standard h. This tack lifter may be reciprocated by any suitable mechanism, I having herein shown for the purpose a link h^3, connecting said lifter with the free end of a lever h^4, fulcrumed at h^5 in the standard and actuated by a connecting rod h^6 joined to it or to a separate arm upon its fulcrum shaft, and in turn operated by a crank pin h^7 upon or connected with a pulley h^8 driven by a belt h^9 from any suitable power shaft. The pulley h^8 may be journaled in bearings in the standard h, or preferably in a bracket h^{10} removably attached thereto.

The tack delivering mechanism here described operates upon the principle of the mechanism shown in United States patent to Crisp and Copeland, No. 455,174, issued June 30, 1891, this mechanism having proven suitable for this purpose in more or less extended use. Obviously, however, any other suitable or desired tack loading mechanism or means for delivering tacks to a loading chute may be employed.

The downwardly inclined stationary raceway h^2, terminates at its lower end, just beyond the front face of the standard h, in a substantially vertical face at h^{11} adapted to receive and furnish lateral support to a correspondingly faced end of a raceway a, attached to and forming a part of the removable hand tacker A. The supporting end face of the tacker raceway a is provided with a horizontally extended plug a', shown in dotted lines in Fig. 1, adapted to be inserted in a recess therefor in the face h^{11} of the stationary raceway, the said plug in said recess serving to support the raceway a and in part, the tacker A, with the stationary and removable raceways h^2 and a in alinement, so that tacks previously loaded into the stationary raceway, may slide in a body down into and to fill the removable raceway a for the purpose of removal of the tacker for use. As here shown, the plug a' is not relied upon to furnish the entire support to the tacker during the period of loading, but obviously, said plug may be so shaped and proportioned as to furnish entire support for the tacker; in fact, my invention is not restricted to any particular kind or type of supporting means for the tacker so long as when supported it is in proper position for its raceway to be loaded as hereinbefore stated.

To support the tacks in the stationary raceway during the periods of removal of the hand tacker, I have provided the lower end of the said stationary raceway with a gate i, standing across the raceway and fulcrumed at its lower end at i', so that it may be swung to one side to free the tacks and

permit them to slide downward into the tacker raceway. To throw this gate to one side automatically when the tacker raceway is positioned for loading, I have beveled the end of the plug a' as indicated at a^2 so that, as said plug is inserted in its recess, its inclined face by engaging the guide will throw the same to one side so that the tacks are freed vertically simultaneously with the positioning of the tacker for loading.

The tacker raceway itself is provided at its end with a spring actuated closure a^3, that is pressed normally upon the top of the tacker raceway, to prevent the tacks therein from being spilled out when the tacker is in use. When the tacker is applied to the loader as indicated in Fig. 1, this closure engages a portion of the face of the stationary raceway and is elevated away from the line of travel of the tacks so that the latter may slide freely into the tacker raceway. Removal of the tacker permits this closure to snap down upon the upper end of the tacker raceway and lock the contained tacks against removal except as they are used.

The tacker itself, is best shown in Figs. 3 to 7 inclusive, to which reference may now be had. It comprises a body A which, for lightness, may be made of aluminum, and is formed to receive the vertical sliding spindle b, provided at its lower end with a head b' that fits the bore of the body A so as to guide the spindle in its vertical movements. The spindle is also guided near its upper end in a plug b^2 screwed into the body and therefore adjustable as to position, and between this plug and the spindle head is interposed a driving spring b^3, of a strength sufficient to drive a tack into the work upon which the tacker is to operate.

The mechanism for picking off the tacks from the raceway and driving them singly may be of any of the well known types. As here shown, the spindle head is provided with a driver bar b^4, which reciprocates vertically in a throat b^5, and the tacks are picked off from the raceway and moved into position in the throat below the driver by a sliding picker b^6, moved in one direction by a spring b^7, and in the opposite direction by a bevel pointed pin b^8, also mounted upon the spindle head. When the spindle is depressed, the bevel pointed pin b^8 engages the picker b^6 and throws it back to permit the lowest tack in the series in the raceway to gravitate or be pushed into the space adjacent the throat and upon upward movement of the driver bar preparatory to driving the new tack, the picker is thrown inward by its spring and picks off this lowermost tack and moves it positively into the throat beneath the driver bar ready to be driven. As the driver bar descends, this picker is thrown back before the tack is engaged for driving.

To lift the driving spindle against the tension of and to compress the driver spring b^3, I have slotted the upper end of the spindle, as at b^9, to span the cross shaft c, upon which is mounted the driver cam c', shown as of involute shape and engaging the roller stud c^2 on the upper end of the spindle. Rotation of this cam acts to elevate the spindle relatively slowly, thereby to compress the driver spring b^3, and when the highest point of the cam is passed, the spindle may drop under the tension of the driver spring to deliver a sharp driving blow upon and to drive the tack. To rotate this driver cam as desired, I have provided a cross shaft c, with which it is connected by a pawl, c^{20}, on the cam, and ratchet, c^{21}, on the shaft, said shaft in turn being provided with a pinion c^3 which is driven by a larger toothed wheel c^4, fast upon a parallel shaft c^5, journaled in the walls of an open chamber A′ of and at the upper end of the body A. To this wheel c^4, is attached the outer end of the actuator spring S, preferably and most conveniently of the clock spring type. The inner end of this spring is attached to the sleeve c^6, (Fig. 4) mounted upon the shaft c^5 and provided at its end with the toothed wheel c^7, normally engaged by the spring actuated pawl c^8 (Fig. 3) which restrains said sleeve and the inner end of the spring normally against rotation. Obviously, under these conditions, rotation of the spring shaft c^5 by turning the wheel c^4 and the outer end of the spring, will cause the spring to be wound.

To retain the spring in its wound condition and to free it intermittently as required for driving the tacks, any suitable let-off or release device may be employed. I have herein illustrated for the purpose a vertically sliding release bar d, arranged to slide vertically in a suitable guide-way shown as formed between the guide pins d', said release bar being slotted centrally to receive the spring shaft, relative to which it slides. Coöperating with the upper and lower ends of this release bar are a plurality (herein four) lugs d^2, on the side of the wheel c^4, one of which is always in holding engagement with the upper or lower end of the release bar. Assuming one of these lugs to be in holding engagement with the upper end of said bar, if the bar be depressed to free the engaging lug, the spring will unwind and turn its wheel c^4 through approximately 90° until another lug engages the lower end of the release bar, but obviously at the opposite side of said bar. If now said bar be raised, the lower contacting lug will be released and another 90° rotation of the spring shaft permitted, when it will be stopped by engagement of another lug with the upper end of the bar. Thus alternate upward and downward movements of the release bar, permit step by step 90° rota-

tion of the spring shaft. Every 90° rotation of the spring shaft, produces one complete rotation of the driver cam shaft to lift the driver spindle to compress its spring and release it to permit the spring to drive a tack.

I prefer to employ two springs, as here shown, one an actuator spring which furnishes the principal power of the machine, and the other a driver spring, because by so doing, the actuator spring has more time in the intervals between the driving of successive tacks, to do its work, namely, the lifting of the driver bar and the compression of the driver spring, leaving the driver spring to deliver a quick and sharp blow for driving a tack. I am thus enabled to use a smaller actuator spring, or am enabled to obtain a complete driving action of the driver with less releasing movement of said spring. Obviously, however, the actuator spring may be arranged in a manner that will be well understood by those skilled in the art, to actuate directly the driver bar so that every releasing movement of the actuator spring would directly produce a driving action or complete reciprocation of the driver bar.

To enable the operator conveniently to move the release bar, any desired means may be employed. I have herein provided the upper end of the body A with a bell crank releasing lever d^3, normally under the control of the spring d^4 and jointed to the lower end of the release bar. The finger arm of this lever is conveniently positioned for engagement by the fore finger of the operator's hand that holds the tacker, so that by alternately compressing the said finger piece against its spring and releasing it, successive tacks may be driven. I have found it convenient to cause each movement of the said finger piece in either direction to drive a tack; but if more convenient, every alternate movement, that is, only movements in one direction of the finger piece may be required for the driving of successive tacks.

To wind the actuator spring during the periods of disuse of the tacker, namely, while it is in the position for the loading of its raceway, I have mounted in the bracket h^{10} of the loader standard (Figs. 1 and 2) a horizontal winding shaft e, socketed at its outer end to receive the sliding stem e' of the ratchet-tooth faced head e^2. A spring $e^{2\times}$ is interposed between this head and the winder shaft, which presses said head normally outward, but which permits the head to be pressed inward as may be necessary for effective operative engagement as will appear. This winder shaft and its spring supported ratchet-tooth faced head e^2 are so located that they are opposed to and alined with the actuator spring shaft c^5 when the tacker is positioned for loading and the end of the actuator spring shaft (see Fig. 4) is provided with a head $c^\times$ having its face correspondingly though oppositely ratchet toothed for engagement with the spring supported head e^2.

When the loader is positioned for loading the ratchet head on the spring shaft meets fairly the spring supported ratchet head on the winder shaft and, if the opposing teeth are in position for immediate and full engagement, the spring shaft may immediately be rotated by the winder shaft. If, however, the teeth are so offset relative to each other that they do not enter into full engagement, the spring supported head will yield as necessary to permit the tacker to get into position and, as the spring supported head rotates, it will gradually move outward until it reaches full engagement with the spring shaft head, when the two will thereafter rotate in unison.

The actuator shaft e may be driven in suitable manner; I have herein provided it with a beveled driving gear e^3, driven by a bevel gear e^4, upon a shaft e^5. The hub of this bevel gear e^4 is provided with ratchet teeth adapted for engagement by corresponding teeth upon the hub of the driving pulley h^8, hereinbefore referred to, as driving the loader mechanism. The hub of this pulley is circumferentially grooved to receive the forked end of a lever $e^{5\times}$, fulcrumed at e^6 in the supporting bracket and having its tail end positioned for engagement by the beveled end of a sliding bar e^7, mounted in the bracket and controlled by the spring e^8. When this slide bar is pressed inward it operates through the lever $e^{5\times}$ to slide the pulley h^8 and the ratchet into driving engagement with the gear e^4, thereby to drive the winder shaft to wind the actuator spring. When the slide bar is released its spring e^8 throws it forward to permit said lever $e^{5\times}$ under the action of a spring e^9 (Fig. 1) encircling its pivot pin e^6 to throw the said pulley out of engagement with the gear e^4, thereby to stop rotation of the winder shaft, notwithstanding the said pulley continues to operate and to cause its connected mechanism to continue to load tacks into the stationary raceway h^2. To control the movements of this sliding bar e^7 so as to stop the winding of the spring when the latter is fully wound, or at a predetermined point in its winding, I have provided stop mechanism illustrated in Fig. 7. It consists, as shown, of a star wheel f fast upon the end of the driver cam shaft c (see Fig. 4) and, in operative engagement with this star wheel is a cam wheel f' that is fast upon the actuator spring shaft c^5, so that every complete rotation of the spring shaft in the winding of this spring, causes a single step rotation of the star wheel f, it requir-

ing in the present instance thirteen rotations of the spring shaft to produce one complete rotation of the star wheel. The star wheel is provided at the proper point with a stop projection f^2 which, at the end of its rotative movement by locking engagement with the cam f', prevents further winding movement of the spring shaft. At a proper point on this star wheel f is formed a recess f^3 which, simultaneously with the stopping of the spring shaft against further rotation comes into position opposite the end of the sliding bar e^7 and permits the latter to spring forward and stop the winder shaft from further rotation. The pawl and ratchet connections between the driver cam and its shaft c permit this shaft to be rotated thereby rotating the star wheel during the winding of the spring without moving said cam and without disturbing the driver. Opposite rotation of the cam shaft however by and during the unwinding of the actuator spring, causes corresponding and effective rotation of the driver cam.

Referring to Fig. 4, between the pinion c^3 and the spindle, I have placed a guide block c^{3x}, which rests at one end against the pinion and has its opposite end vertically grooved to receive the side of the driver spindle to steady and support the latter at a point above the plug bearing b^2.

In the operation of the machine, the operator, while lasting a shoe, pulls over the shoe upper with one hand, and, holding the tacker in his other hand, drives the tacks into and to hold the upper wherever he pleases by simple manipulation of the finger lever d^3. This driving of the tacks is without any effort on his part beyond what is necessary to place the nose of the tacker at the point where the tack is to be driven, and the weight of the tacker merely sufficient to give it sufficient body to withstand the tack driving blow, without conscious or excessive effort upon the part of the operator after holding it against its work.

The capacity of the actuator spring is sufficient to drive as many tacks as it is desired shall be driven without interruption. This may be enough to tack both sides of a shoe, but ordinarily a plurality of these tackers would be used and one tacker would be used upon one side of a shoe, and another upon the opposite side. However this may be, whenever the intended number of tacks have been driven, the tacker is presented to the loader and is simultaneously connected for the loading of its raceway with tacks and for the winding of its actuator spring to store up the driving power for the next period of use. As herein shown, the stationary tack raceway is being loaded during the period of use of the tacker, so that when the tacker is presented to the loader, its raceway will be filled practically instantly by the entire body of tacks sliding at once into the tacker raceway, and thus everything will be renewed in such time as will permit the tacker to be ready for further use by the time the operator has manipulated the shoe ready for further tacking; but where a plurality of tackers are used, the period for loading and winding may be correspondingly enlarged.

The device described is of course superior to the ordinary hand tacker held in one hand and operated by a driver or mall in the other hand in that but a single hand is required both to present and to control the operation of the tacker, leaving the other hand free for work. It is also superior to any tacker that is in continuous connection as by a pneumatic pipe, a flexible shaft, or an electric conductor with the stationary source of power, in that there is no restraint upon or interference with the free movement manipulation or presentation of the tacker such as inevitably is produced by any form of flexible connection leading from the tacker to some stationary source of power.

So far as known to me, I am the first to provide a portable tacker with a wound spring, which may be released intermittently for the intermittent operation of the driver; and I believe I am also the first to provide such a tacker with means for periodically storing this power or winding this spring during the period of recharging or reloading with tacks or fasteners, so that my invention is not limited to the particular embodiment thereof herein shown for purposes of illustration, but is susceptible of wide variation within the spirit and scope of my invention.

Claims—

1. A fastener driving apparatus comprising a portable fastener driving device provided with stored power means for operating the same, self contained stored power means for successively rendering said first named power means operable to drive fasteners in succession, and a fastener supply to supply fasteners.

2. A fastener driving apparatus comprising a portable fastener driving device provided with self-contained stored power means for operating the same, self contained stored power means for successively rendering said first named stored power means operable to drive fasteners in succession, and a fastener supply operated by said operating means to supply fasteners.

3. A fastener driving apparatus comprising in combination a portable fastener driving device provided with a source of fastener supply and a source of stored operating power, stationary fastener supplying means and power storing means.

4. A fastener driving apparatus comprising a portable fastener driving device having a source of stored operating power comprising a spring, stationary power storing means and means for coupling said device to said storing means for the storing of operating power.

5. A fastener driving apparatus comprising a portable fastener driving device having a source of stored operating power comprising a spring normally held under tension, stationary fastener supplying means and means to connect said driving device to said fastener supplying means for the supply of fasteners to be driven by said stored power.

6. A fastener driving apparatus comprising in combination a portable fastener driving means having a source of fastener supply and a source of stored operating power, stationary fastener supplying means and power storing means and means simultaneously to connect said power operating means with said supplying means and said source of fastener supply with said fastener supplying means.

7. A fastener driving apparatus comprising a portable fastener driving device having a source of stored operating power, power storing means, means to connect the same with said source of stored operating power for the storing of the latter and means effectively and automatically to disconnect said source of stored power and said power supplying means at a predetermined point.

8. A fastener driving apparatus comprising a portable fastener driving device having a source of stored operating power and a source of fastener supply, operating power storing means and fastener supplying means adapted to be connected with said power operating means and said source of fastener supply respectively and means automatically and effectively to disconnect said power supplying means and said source of stored operating power without disconnecting said fastener supplying means from said source of fastener supply.

9. A fastener driving apparatus comprising a portable fastener device comprising a driving spring and a self-contained normally wound operating spring furnishing the power for tensioning said driving spring.

10. A fastener driving apparatus comprising a portable fastener driving device having a reciprocable driver, and self-contained automatic means for slowly lifting said driver and permitting quick depression thereof to drive the fastener.

11. A portable fastener driving device comprising a reciprocable driver bar, a driving spring therefor, a cam to lift said driver bar against the action of said spring, and a normally wound operating spring operating said cam.

12. A fastener driving apparatus comprising a portable fastener driving device comprising power operated fastener driving means and a controlling device therefor adapted upon opposite movements to produce successive driving movements.

13. A fastener driving apparatus comprising a portable fastener driving device containing a reciprocable driver, its actuator, a device to control the operation of said actuator, a normally wound operating spring for governing the operation of said controlling device and a finger operated release for said operating spring combined with means for winding said spring, detachable connections between the winding means and said spring, and an automatic cut-out therefor.

14. A fastener driving apparatus comprising a portable hand operated fastener driving tool having means to operate it and provided with means for containing said operating means, said operating means comprising a reciprocatory driver, a normally tensioned device adapted upon release to drive said driver, releasing means therefor, and a self contained source of stored power to retension said device after driving.

15. In a fastener driving apparatus, the combination, with a portable fastener driving device comprising a driver, self-contained stored power operating means comprising a normally tensioned spring for causing the driving movement of said driver, and self-contained means for storing up power in said operating means, of stationary power storing means for said last named means.

16. In a fastener driving apparatus, the combination, with stationary power storing means, of a portable fastener driving device adapted to receive stored power from said means, said device being provided with means for starting the operation of said power storing means upon presentation thereto.

17. In a fastener driving apparatus, the combination, with stationary power storing means, of a portable fastener driving device adapted to receive stored power from said means, and means for discontinuing the operation of said power storing means when a predetermined amount of power has been stored.

18. In a portable fastener driving device, the combination, with a driver, a tension device for causing the driving movement of said driver, automatic self-contained means for moving said driver in opposition to said tension device and for thereafter releasing the same, and means for controlling said last named means.

19. In a device of the character described, the combination with a driver, a stored power tension device for causing driving movement of said driver, and stored power means, including a cam, for moving said driver in opposition to said tension device and for thereafter releasing the same.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

JOHN GELZENLICHTER.

Witnesses:

FREDERICK L. EMERY,

ROBERT H. KAMMLER.