March 31, 1959 S. BOYLE ET AL 2,879,510

ELECTRIC FASTENER DRIVING MACHINES

Filed Nov. 30, 1956 3 Sheets-Sheet 1

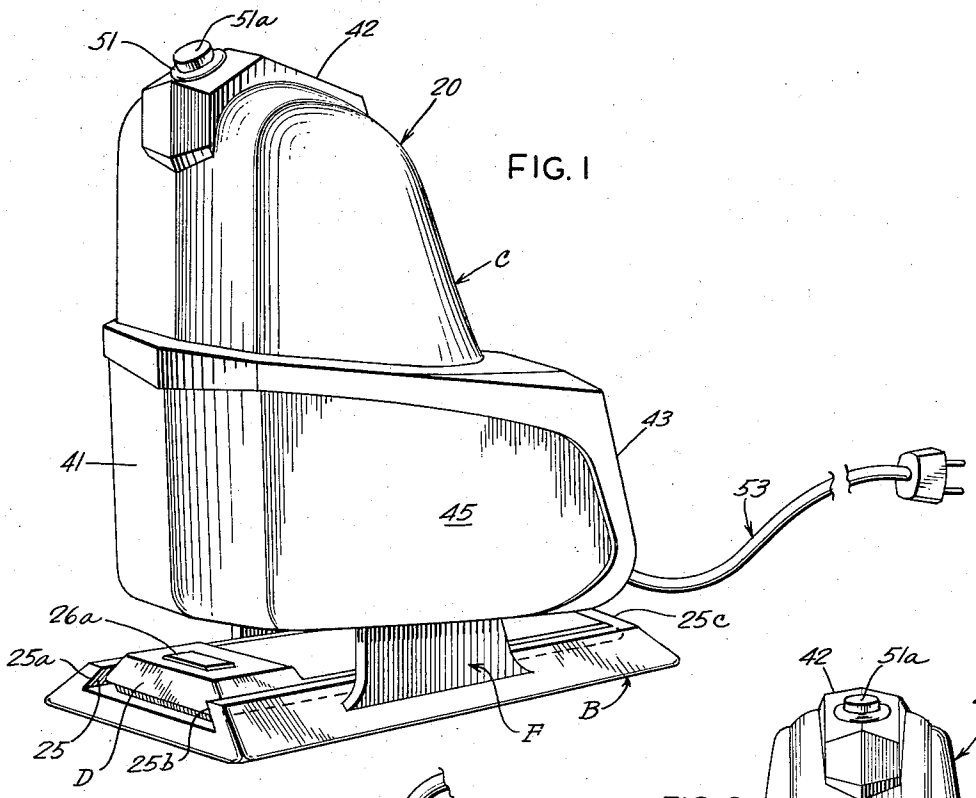


FIG. 1

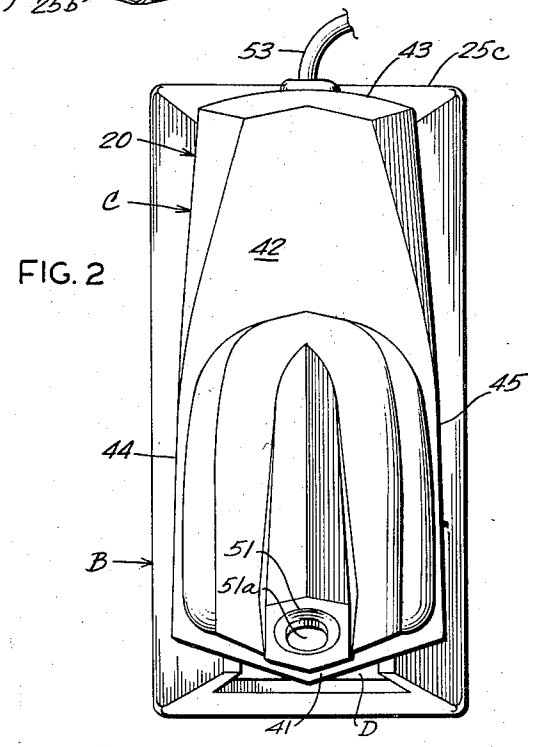


FIG. 2

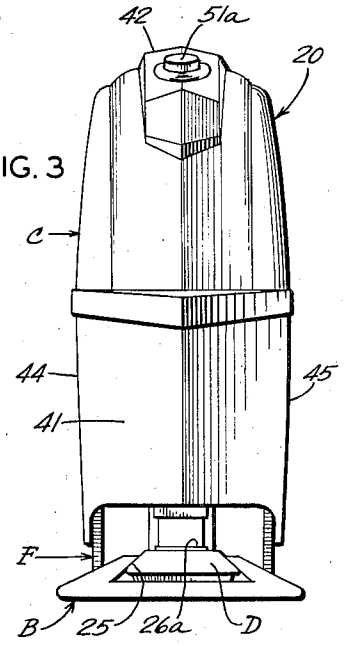


FIG. 3

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ELECTRIC FASTENER DRIVING MACHINES

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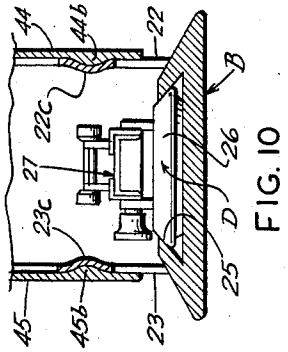


FIG. 10

FIG. 4

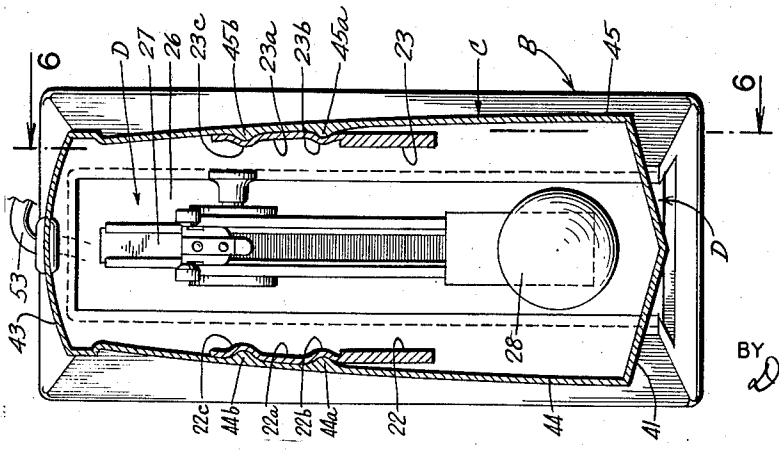


FIG. 5

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ELECTRIC FASTENER DRIVING MACHINES

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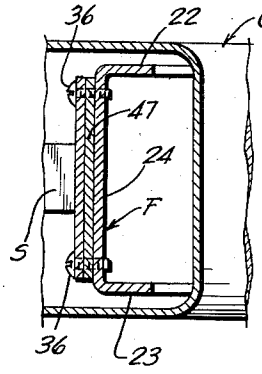
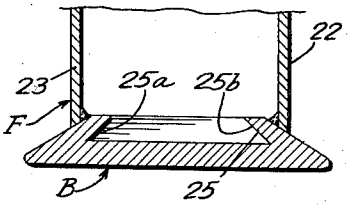


FIG. 8

FIG. 9



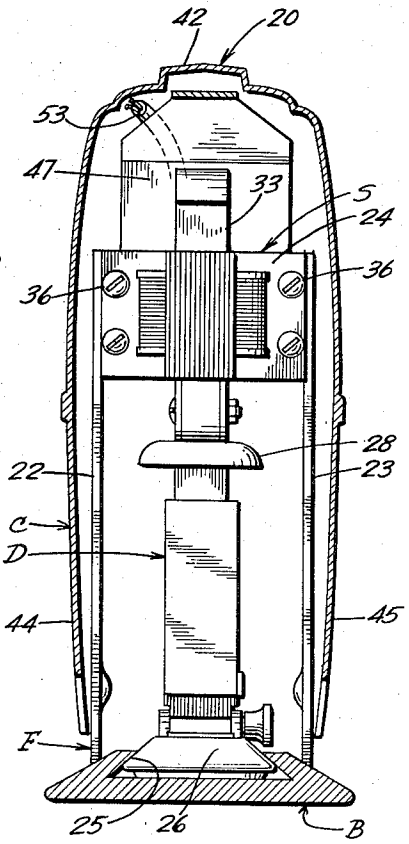


FIG. 7

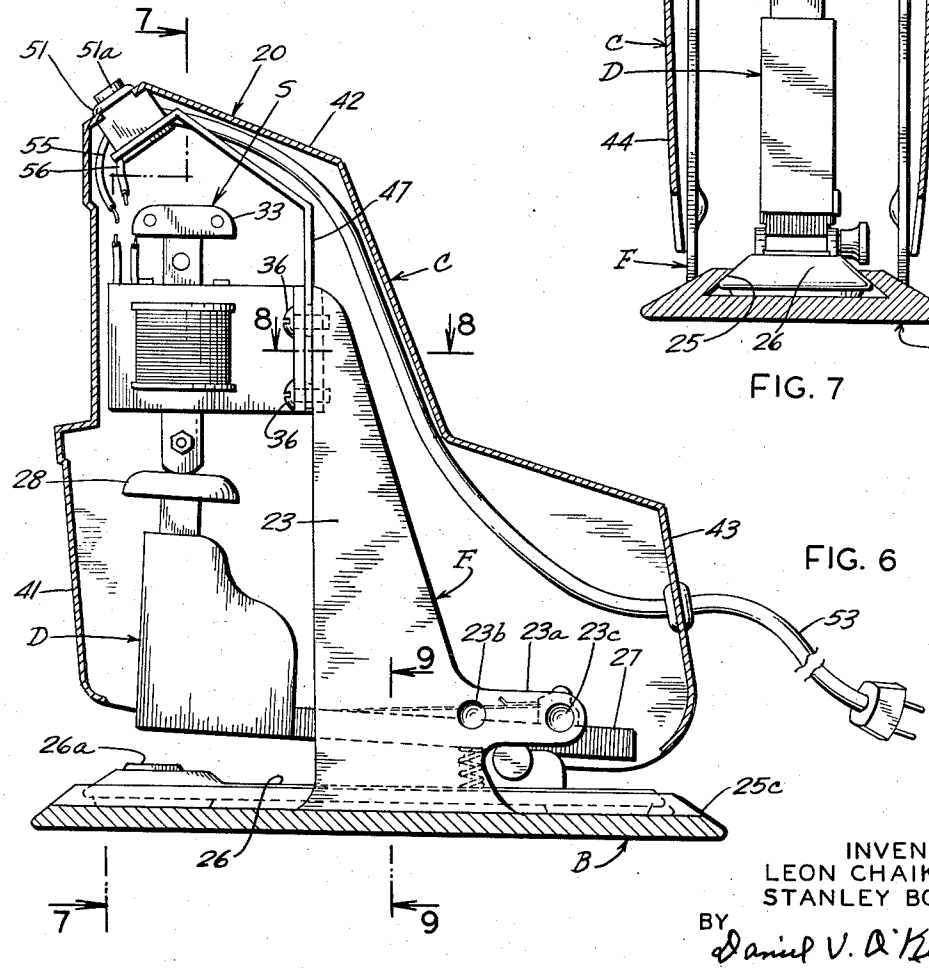


FIG. 6

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2,879,510

ELECTRIC FASTENER DRIVING MACHINES

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Application November 30, 1956, Serial No. 625,311

4 Claims. (Cl. 1—3)

This invention relates to electric fastener driving machines and, more specifically, to machines which are particularly well adapted for driving staples and the like.

It is a primary object of our invention to afford a novel electrically operated stapling machine which is fast-acting and efficient in operation.

Another object of our invention is to afford a novel electrically operated stapling machine which is quickly and easily operated in a simple manner.

Another object of our invention is to afford a novel electrically operated and controlled device whereby mechanism for operating a standard stapler may be operated by directly applied force.

A further object of our invention is to enable an electrically operated stapler to be effectively balanced against undesirable bouncing during the operation thereof.

Another object is to afford a novel electrically operated stapling machine of the aforementioned type which will not jam.

Yet another object is to afford a novel electrically operated stapler of the aforementioned type which is relatively small and compact, light in weight and affords a pleasing outward appearance.

Another object of our invention is to afford a novel electrically operated fastener driving machine embodying a cover and a stapler constituted and arranged in a novel and expeditious manner.

Another object is to afford a novel electrically operated machine of the aforementioned type wherein the cover, when closed, effectively encloses the stapler and operating mchanism, and may be quickly and easily moved to open position to thereby effectively expose the stapler and operating mechanism.

A further object is to afford a novel machine of the aforementioned type wherein, when the cover is disposed in open position, the stapler is readily accessible for servicing, filling with staples, and the like.

Another object of our invention is to afford a novel machine of the aforementioned type wherein, when the cover is disposed in open position, the stapler is readily removable from the device.

Yet another object of our invention is to afford a novel electric stapling machine which may be used in a novel and expeditious manner with staplers now on the market.

Another object of our invention is to afford a novel electric fastener driving machine which is reliable and efficient in operation and may be readily and economically produced commercially.

Other and further objects of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawings which, by way of illustration, show a preferred embodiment of the present invention and the principles thereof and what we now consider to be the best mode in which we have contemplated applying these principles. Other embodiments of the invention embodying the same or equivalent principles may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims.

In the drawings:

Fig. 1 is a front perspective view of an electric fastener driving machine embodying the principles of our invention;

Fig. 2 is a top plan view of the machine shown in Fig. 1;

Fig. 3 is a front elevational view of the machine shown in Fig. 1;

Fig. 4 is a side elevational view of the machine shown in Fig. 1;

Fig. 5 is a sectional view taken substantially along the line 5—5 in Fig. 4;

Fig. 6 is a sectional view taken substantially along the line 6—6 in Fig. 5;

Fig. 7 is a sectional view taken substantially along the line 7—7 in Fig. 6;

Fig. 8 is a detail sectional view taken substantially along the line 8—8 in Fig. 6;

Fig. 9 is a detail sectional view taken substantially along the line 9—9 in Fig. 6, with certain parts removed; and

Fig. 10 is a detail sectional view taken substantially along the line 10—10 in Fig. 4.

An electric fastener driving machine **20** for driving staples, and embodying the principles of our invention, is shown in the drawings to illustrate the preferred embodiment of our invention. The machine **20** embodies, in general, Figs. 4 and 6, an elongated base B having a fastener driving device, in the form of a stapler D, of the type commonly available on the market, mounted on the base B, and with a cover C removably mounted on a supporting frame F which projects upwardly from the base B. A solenoid S is mounted on the frame F above the stapler D to actuate the latter, as will be discussed in greater detail presently.

The base B is preferably a substantially flat, rectangular shaped member and may be made of any suitable material such as, for example, steel, aluminum, or the like. It has a longitudinally extending groove or slot **25** formed in the upper face thereof, the side walls **25***a* and **25***b* of the slot projecting upwardly and inwardly to afford overhanging side flanges, Figs. 1 and 7. The slot **25** is open at the front end thereof, but is closed by an abutment member or rear wall **25***c* at the rear end thereof, Figs. 1 and 6.

The frame F, Figs. 6 and 7, embodies two substantially parallel upright side members **22** and **23**, Figs. 5, 6 and 7, which project upwardly from the base B and are interconnected at their upper end portions by a transverse member **24**. The frame F may be made of any suitable material such as, for example, steel, and is preferably permanently secured to the base B by suitable means such as welding. Each of the side members **22** and **23** has a rearwardly projecting arm **22***a* and **23***a*, respectively, Figs. 5 and 6.

The stapler D is of a standard type, commonly available on the market, and embodies, in general, Figs. 5 and 6, the usual base **26**, and a track **27** along which staples may be fed forwardly into position to be driven by a plunger **28** against an anvil **26***a* on the forward end portion of the base **26**. The base **26** is preferably substantially rectangular in shape and is of such size that it fits snugly, but with a sliding fit, within the slot **25**, and when disposed in abutting engagement with the rear wall **25***c*, terminates at its forward end in inwardly spaced relation to the front end of the base B, Figs. 1 and 6.

The solenoid S embodies a plunger 33 which is vertically slidable, and is normally disposed in raised position as shown in Fig. 6, being normally held in such position by the stapler D. The solenoid S, Figs. 6 and 8, is secured to the front face of the transverse member 24 of the frame F, by suitable means such as screws 36, in such position that the plunger 33 is disposed directly above the plunger 28 of the stapler D, when the latter is disposed in normal operating position, so that during a stapling operation of the device D, and when the sheets of paper, or the like, to be stapled are clamped between the anvil 26*a* and the plunger 28, the plunger 33 is disposed directly above the plunger 28, in axial alignment therewith. We have found that this arrangement of parts affords a maximum efficiency of operation, and a minimum of bouncing or vibration, and that binding of parts cannot occur.

The cover C embodies a front wall 41, a top wall 42, a rear wall 43, and two side walls 44 and 45, Figs. 6 and 7. When it is mounted in normal closed position on the base B, the walls 41—45 are disposed in spaced relation to the solenoid S and the stapler D, and the lower edges of the walls 41—45 are preferably disposed in upwardly spaced relation to the base B, Figs. 5, 6 and 7.

Two recesses or dimples 22*b* and 22*c*, and 23*b* and 23*c*, are formed in the rear end portions of the rear legs 22*a* and 23*a* of the frame F, respectively, and two inwardly projecting bosses or projections 44*a* and 44*b*, and 45*a* and 45*b*, which are complementary in shape to the dimples 22*b*, 22*c*, 23*b* and 23*c*, respectively, are formed on the rear end portions of the side walls 44 and 45, respectively, of the cover C in position to engage in the dimples 22*b*, 22*c*, 23*b* and 23*c*, when the cover C is disposed in the aforementioned closed position to thereby releasably support the cover C in closed position.

As best seen in Figs. 1, 2, 6 and 7, the cover C is substantially L-shaped, the front end portion thereof extending substantially above the rear end portion thereof. With this construction, the cover C fits relatively close to the stapler D, on all sides thereof, and affords an attractive appearance and a relatively small, compact machine which may be readily carried and handled.

An elongated mounting bracket 47 is mounted on the supporting frame F in upwardly and forwardly projecting relation thereto, Figs. 6 and 7. The lower end of the bracket 47 is disposed between the solenoid S and the transverse member 24 of the supporting frame F, and is secured therebetween by the bolts 36, Figs. 6 and 8. The upper end portion of the bracket 47 projects upwardly and forwardly from the transverse member 24 in closely underlying, but spaced, relation to the cover C, and terminates at its front and upper end in spaced relation to the front wall 41 of the cover C, Figs. 6 and 7.

A switch 51 of any suitable type commonly available on the market, and having a suitable manually operable actuating member such as a push button 51*a*, Figs. 1, 4 and 6, is mounted in the upper end portion of the bracket 47 adjacent to the junction of the top wall 42 with the front wall 41 of the cover C, Fig. 6. The push button 51*a* projects upwardly from the top wall 42 so that it is disposed in readily accessible position for actuating the switch 51.

With the switch 51 so disposed in our novel stapling machine, it will be seen that it is readily accessible for operation either by the left or right hand of an operator, and from any side of the machine 20. Also, it will be seen that with this arrangement of parts, actuation of the push-button 51*a* will not tip or move the machine 20, but, in fact, tends to enhance its stability by pressing the machine 20 more firmly against its underlying supporting surface. In addition, the switch 51 is disposed in such position that there is no danger to the operator in actuating the same, and there is no danger of it becoming covered by the paper, or the like, to be stapled.

One side of the switch 51 is connected to a suitable power cord 53 by which the machine 20 may be connected to a suitable source of electric power, not shown, such as the usual wall socket to be found in office buildings, residences, and the like. The other side of the switch 51 is connected to the solenoid S by suitable electrical conductors such as wires 55 and 56, Fig. 6.

In the assembly and operation of our novel electric fastener driving machine 20, the cover C may be manually removed from the base B by holding the latter down and pulling upwardly on the cover C. A stapler, such as the stapler D, may be mounted on the base B by sliding the stapler D rearwardly into the slot 25, between the side members 22 and 23 of the frame F, into abutting engagement with the rear wall 25*c*. When in this position, the upper end of the plunger 28 of the stapler D is preferably disposed in abutting engagement to the lower end of the plunger 31 of the solenoid S, which is held in raised position by the stapler D. With the stapler D in this position, and with the cover member C disposed in the aforementioned position, the stapler D may be loaded with staples, the staples being mounted on the track 27.

The cover member C may then be mounted in the closed position shown in Figs. 4, 6 and 7, in which position the bosses 44*a*, 44*b*, 45*a* and 45*b* on the cover member C engage in the dimples 22*b*, 22*c*, 23*b* and 23*c* on the frame F, Fig. 5, to thereby firmly but releasably hold the cover C in closed position.

With the cover C disposed in closed position, papers, or the like, which are to be stapled with our novel machine 20 may be fed rearwardly between the front end portion of the cover C and the front end portion of the base B into position between the plunger 28 and the anvil 26*a* of the stapler D. When the papers to be stapled have thus been positioned on the anvil 26*a*, the button 51*a* of the switch 51 may be manually depressed to thereby energize the solenoid S and cause the plunger 33 to be moved downwardly against the urging of the stapler D. This downward movement of the plunger 33 of the solenoid S is effective to drive the plunger 28 downwardly to thereby drive a staple from the stapler D through the papers resting on the anvil 26*a*. The button 51*a* of the switch 51 may then be released to thereby deenergize the solenoid S and free the plunger 33 to again be raised to normal position by the stapler D. This stapling operation may be repeated as many times as desired, the button 51*a* of the switch 51 being manually depressed to actuate our machine 20 for each stapling operation.

If at any time it is desired to refill the stapling machine D, this may be readily accomplished by manually removing the cover C from the base B. It will be seen that when the cover C is thus removed, the stapler D and the other operating parts of our novel machine 20 are readily accessible from above. If for any reason it is desired to remove the stapler D from the base B, this may be readily accomplished by sliding the stapler D forwardly through the slot 25 from its normal position between the side members 22 and 23 of the frame F.

It will be seen that with the machine 20 constructed in this manner, we have afforded a substantially L-shaped machine which is relatively compact and small in size, so that it may be readily handled and carried. Also, it will be seen that it affords a small attractive machine which may be readily mounted on the usual office desk, or the like.

In addition, we have afforded a machine which is stable in operation, and may be readily actuated.

Also, it will be seen that we have afforded a novel electric fastener driving machine which is simple and efficient in operation and which may be readily and economically produced commercially.

Thus, while we have illustrated and described the preferred embodiments of our invention, it is to be understood that these are capable of variation and modification, and we therefore do not wish to be limited to the precise details set forth, but desire to avail ourselves of such

changes and alterations as fall within the purview of the following claims.

We claim:

1. A fastener driving machine comprising an elongated base, an inverted dish-shaped cover member, means on opposite sides of said base removably mounting said cover member in spaced relation over said base, a solenoid including an elongated plunger, means, including said first mentioned means, supporting said solenoid within said cover and above said base in spaced relation to said base with said plunger disposed in vertically extending relation, said plunger being movable vertically downwardly from a normal raised position to an actuated lowered position upon energization of said solenoid, a stapler device having an upright reciprocable elongated actuating plunger, said device being mounted on said base and slidable longitudinally thereof between said base and said first mentioned plunger, when said first mentioned plunger is disposed in said normal position, into and out of a normal position wherein said actuating plunger is disposed directly below said first mentioned plunger in position to be actuated by the latter upon said downward movement thereof, abutment means on said base in position to abuttingly engage said device to thereby limit movement of said device relative to said base, and switch means connected to said solenoid for controlling the energization of the latter.

2. A fastener driving machine comprising an elongated base, an inverted dish-shaped cover member, means projecting upwardly on opposite longitudinal sides of said base removably supporting said cover member in spaced relation over said base, a solenoid including an elongated plunger mounted on and supported by said means within said cover and above said base in spaced relation to said base with said plunger disposed in vertically extending relation, said plunger being movable vertically downwardly from a normal raised position to an actuated lowered position upon energization of said solenoid, a stapler device including an anvil and an upright reciprocable elongated actuating plunger movable toward and away from said anvil, said device being mounted on said base and slidable longitudinally thereof between said base and said first mentioned plunger, when said first mentioned plunger is disposed in said normal position, into and out of a normal position wherein said actuating plunger is disposed directly below said first mentioned plunger in position to be actuated by the latter upon said downward movement thereof, abutment means on said base normally engaging said device in position to limit movement of said device longitudinally of said base, and switch means connected to said solenoid for controlling the energization of the latter.

3. A fastener driving machine comprising an elongated base, an inverted dish-shaped cover member, means projecting upwardly on opposite longitudinal sides of said base removably supporting said cover member in spaced relation over said base, a solenoid including an elongated plunger mounted on and supported by said means within said cover and above said base in spaced relation to said base with said plunger disposed in vertically extending relation, said plunger being movable vertically downwardly from a normal raised position to an actuated

lowered position upon energization of said solenoid, a stapler device including an anvil, an upright reciprocable elongated actuating plunger disposed above and movable toward and away from said anvil, and a flat-topped head mounted on said plunger and movable therewith, said device being mounted on said base and slidable longitudinally thereof between said base and said first mentioned plunger, when said first mentioned plunger is disposed in said normal position, into and out of a normal position wherein said head is disposed directly below said first mentioned plunger in position to be pressed downwardly by the latter upon said downward movement of said first mentioned plunger to thereby move said actuating plunger toward said anvil, abutment means on the upper face of said base and normally engaged with said device to thereby limit movement of the latter longitudinally of said base, and means including a manually operable switch connected to said solenoid for controlling the energization of the latter.

4. A fastener driving machine comprising an elongated base, an inverted dish-shaped substantially L-shaped cover member, two elongated arms projecting upwardly from opposite longitudinal sides of said base into the upper end portion of said cover, means on the lower edge portion of said cover member removably mounting the latter in spaced relation over said base, a solenoid including an elongated plunger mounted on and supported by said arms within said cover member and above said base in spaced relation to said base with said plunger disposed in vertically extending relation, said plunger being movable vertically downwardly from a normal raised position to an actuated lowered position upon energization of said solenoid, a stapler device including an elongated base having an upwardly facing anvil thereon, and an elongated actuating plunger movable toward and away from said anvil, said device being mounted on said first mentioned base and slidable longitudinally thereof between said arms and between said base and said first mentioned plunger, when said first mentioned plunger is disposed in said normal position, into and out of a normal position wherein said actuating plunger is disposed directly below said first mentioned plunger in position to be actuated by the latter upon said downward movement thereof, upwardly projecting abutment means on said first mentioned base normally engaging said second mentioned base to thereby limit movement of said device relative to said first mentioned base, and means including a switch mounted in said cover and projecting upwardly from said upper end portion thereof for controlling said energization of said solenoid.

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