

Feb. 22, 1938.

H. J. SPENCER

2,109,203

STAPLING MECHANISM

Filed May 19, 1934

4 Sheets-Sheet 1

Fig. 1.

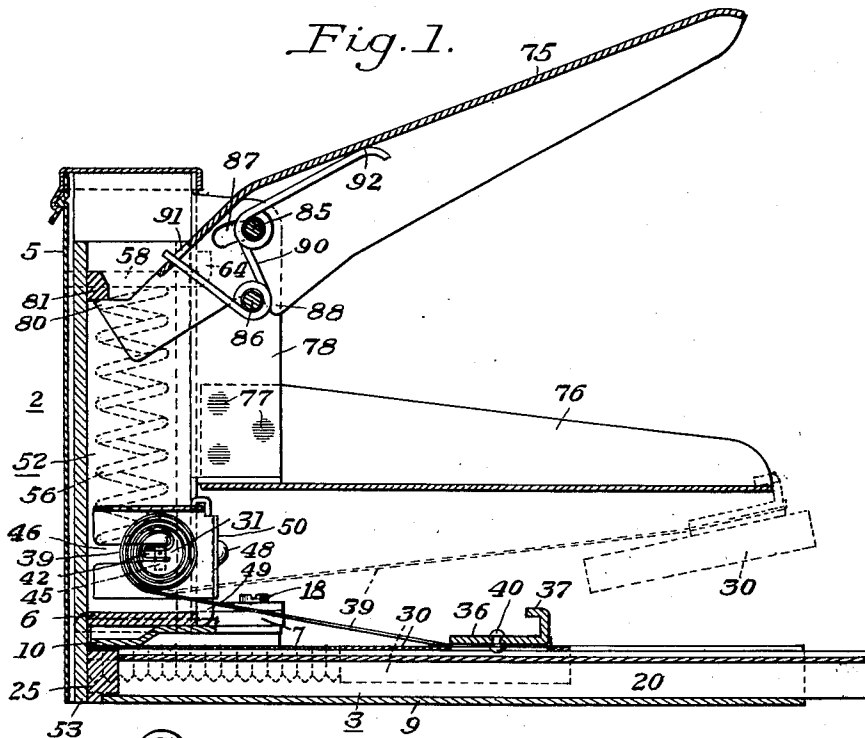


Fig. 2.

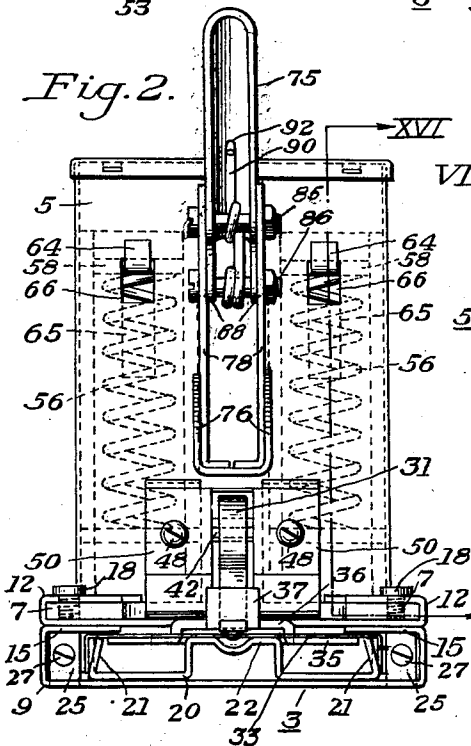
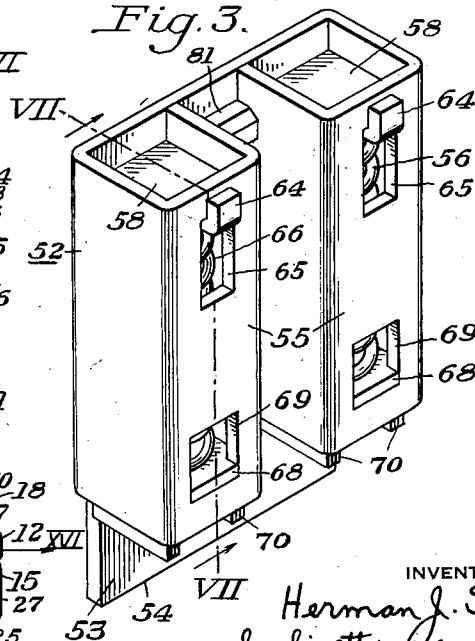


Fig. 3.



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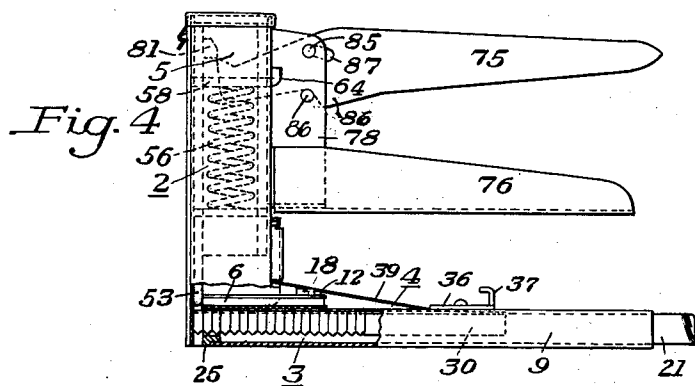


Fig. 5.

Fig. 8.

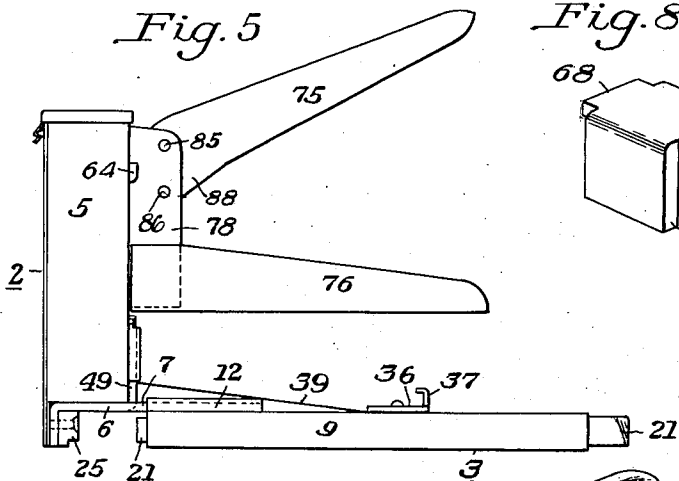
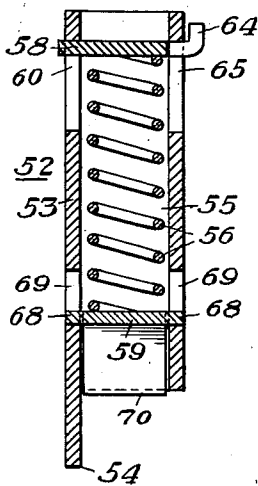
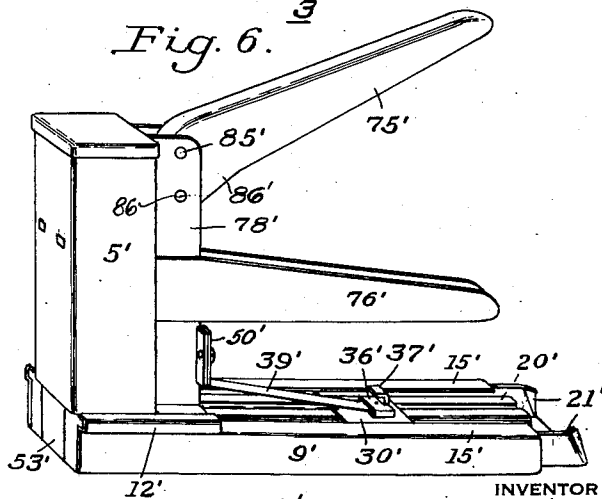


Fig. 7.

Fig. 6.



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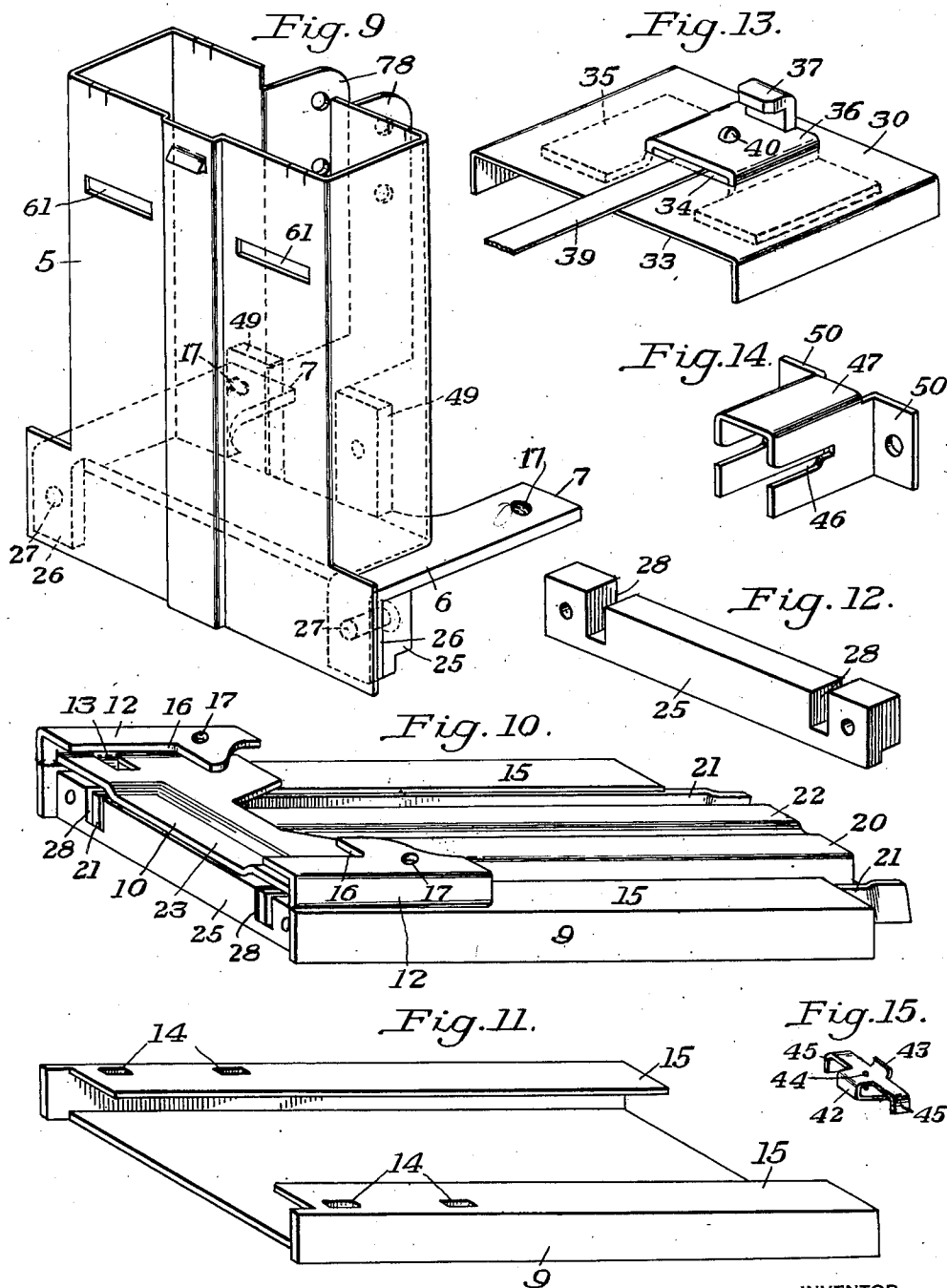
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4 Sheets-Sheet 3



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STAPLING MECHANISM

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Fig. 16.

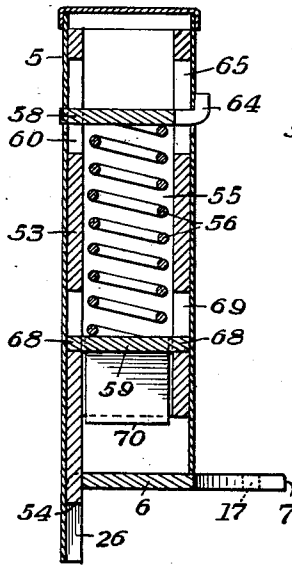


Fig.17.

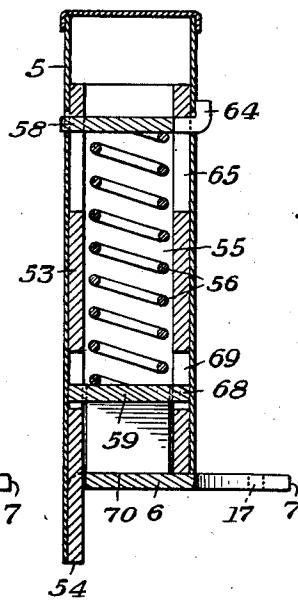


Fig. 19.

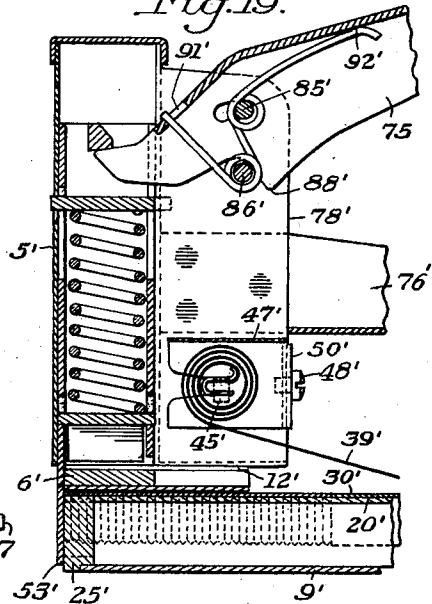
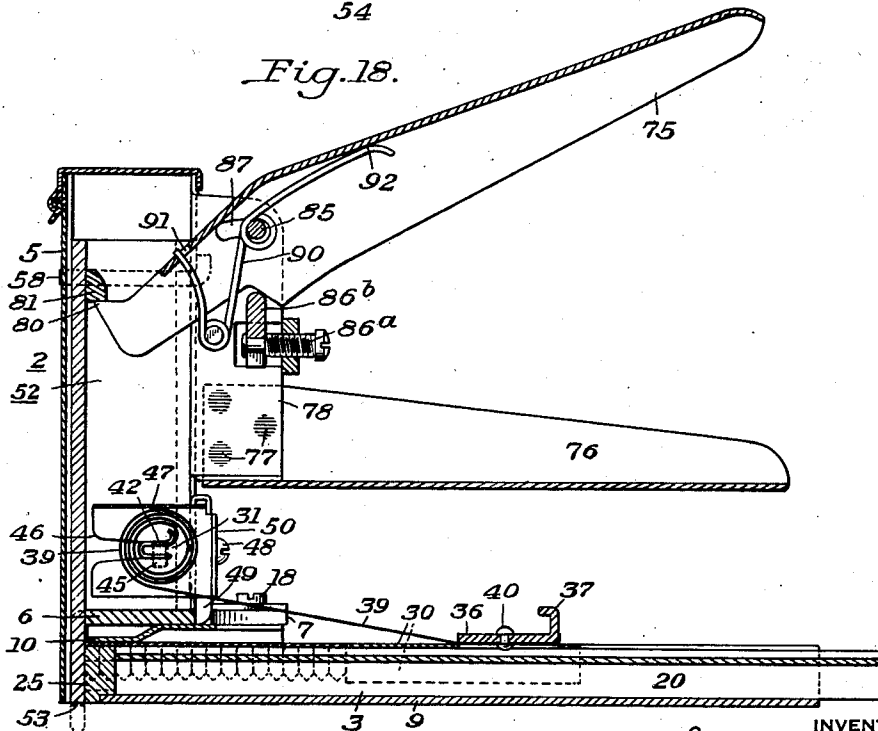


Fig. 18.



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UNITED STATES PATENT OFFICE

2,109,203

STAPLING MECHANISM

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Application May 19, 1934, Serial No. 726,505

25 Claims. (Cl. 1—49)

This invention relates to stapling mechanism, and more particularly to a mechanism for driving wide staples.

In the accompanying drawings which illustrate my invention,

Fig. 1 is a view principally in central vertical section of one embodiment of my invention;

Fig. 2 is a view in end elevation of the mechanism shown in Fig. 1;

Fig. 3 is a perspective view of the plunger;

Fig. 4 is a side view, principally in elevation, of the mechanism shown in Fig. 1, the lever being in partly lowered position and the plunger on the point of being released for its driving stroke, the housing being partially broken away to illustrate the feed of the staples;

Fig. 5 is an exploded view of the mechanism of Fig. 1, the base assembly being partially separated from the plunger assembly by partial withdrawal of lugs of the plunger assembly from telescopic engagement with parts on the housing of the feeding means;

Fig. 6 is a perspective view of a mechanism for driving narrower staples using a driving plunger similar to the one shown in Figs. 1 and 7 but actuated by but a single spring;

Fig. 7 is a sectional view through one of the springs and spring housings of the plunger of Fig. 3, being taken on line VII—VII;

Fig. 8 is a perspective view of a spring stool;

Fig. 9 is a perspective view of the plunger housing;

Fig. 10 is a perspective view of the base assembly with the follower removed;

Fig. 11 is a perspective view of the housing of the feeding means;

Fig. 12 is a perspective view of the cutter bar;

Fig. 13 is a perspective view of the follower with a fragment of the coil feeder spring attached thereto;

Fig. 14 is a perspective view of the yoke mounting for the feeder spring device;

Fig. 15 is a perspective view of the spring clip which is received in slots in the yoke.

Fig. 16 is a sectional view similar to Fig. 7 but including also the plunger housing and a portion of the base assembly so as to illustrate the parts when the plunger is just about to be released for its driving stroke;

Fig. 17 is a similar view illustrating the parts during cushioning of the driving stroke;

Fig. 18 is a view similar to Fig. 1 showing a modification in which an adjustable abutment is provided for varying the extent of upward stroke of the plunger.

Fig. 19 is a vertical longitudinal section through the stapling mechanism shown in Fig. 6 but showing the plunger in the act of being raised or retracted.

The mechanism operates in general by the compression of a spring during the retracting of the plunger away from the work, the force of the spring when released impelling the plunger against a staple and driving the latter into the object which is to receive it.

As illustrated in Figs. 1, 4 and 5, the mechanism includes a plunger assembly (indicated in general by the numeral 2) and a base assembly (indicated in general by the numeral 3), the latter including means 4 for feeding staples. These two assemblies have telescoping parts providing a slidable mounting of one on the other, the purpose being to permit ready attachment and detachment of the assemblies. More particularly, as illustrated in Figs. 5 and 9, the plunger assembly includes a plunger housing 5 whose bed plate 6 has projections 7, one at each side. On top of the housing 9 for the staple feeding means 4 is fixed the apron 10. At each side of the apron is a telescopic holder or pocket 12 for slidably receiving a projection or lug 7. As indicated in Figs. 10 and 11 the apron 10 may be secured in registering position on top of the housing 9 by lugs 13 struck from the plate from which the apron is made, these lugs being received in openings 14 in the in-turned flanges 15 of the housing 9. The edges of the plate of which the apron 10 is made may be bent inwardly to provide the pockets 12, this being the construction shown in Figs. 2 and 10. As a preliminary step, portions of the edges of the plate are cut out at 16 so that when these edges are intumed, they fit around the plunger housing. Screw holes 17 are also provided in these edges so that when the projections 7 have been received in the sockets 12, screws 18 may be tightened to clamp the two assemblies together.

The feeding means 4 within the housing 9 includes a staple guide 20 in the form of a channel having up-turned flanges 21. The outer ends of the flanges 21 are deflected slightly toward each other as indicated in Figs. 2 and 10 to facilitate loading staples into the feeding means. A rib 22 extends longitudinally of the channel; and the tops of the flanges 21 and the rib 22 support the staples as they are fed along within the housing 9. The flanges 15 overlie the border portions of the staples so as to retain them in line; and as they are fed into operative position beneath the plunger, their accurate positioning is

further insured by a depression 23 (see Figs. 1 and 10) in the apron 10.

Just before reaching operative position beneath the plunger the staples pass over a cutter bar 25 which is fixed to down-turned lugs 26 of the bed plate 6 by means of screws 27. Passages 28 are extended through the cutter bar to permit the depending ends of the staples to pass through. The depression 23 in the apron 10 closely overlies the top of the cutter bar 25, so that the staples are positioned closely against the top of the cutter bar as they are fed along.

The staples are urged along the guide 20 by a follower, indicated in general by the numeral 30 (see Fig. 13), which is pulled toward the plunger assembly by the tension of a feeder spring device 31, later to be described in detail. The ruggedness of the follower preferably depends on the size of the staples. In Fig. 6 is illustrated a fairly light follower which can be employed for small staples without serious difficulty with deflection of the follower. For wide staples it is unsatisfactory to merely increase the size of the follower, as the light material of which such followers are made is so readily deformed that if a follower of sufficient size to be rigid is used, its length excessively decreases the capacity of the feeding means. On the other hand, the clearance between certain portions of the feeding means is so small that it is not practical to work up a relatively heavy plate into channel-shape for use as a follower. In accordance with my invention, the follower may comprise a channel-shaped member 33 of relatively light thin material with an opening 34 therein. A stiffening plate 35 is secured to the underneath side of the member 33, as by spot welding, with a raised portion 36 let into the opening 34. This opening 34 is wide enough so that when the follower 30 moves along the guide 20, the longitudinal rib 22 is bridged by the raised portion 36 of the stiffening plate. A hook 37 on the portion 36, and preferably integral therewith, may be used for manipulating the follower 30 and for catching the follower to one of the handles of the plunger assembly, as illustrated in dotted lines in Fig. 1, thus suspending the follower when it is desired to have the pressure of the follower removed for any purpose, such as the insertion of new staples. The strip of spring steel 39, which is coiled to form the actuating member of the feeder device indicated at 31 in Fig. 1, has its end riveted at 40 to the portion 36 of the stiffening plate. The top of the rib 22 may be grooved to receive the lower end of the rivet 40 if necessary.

The feeder spring device 31 comprises the coil spring 39, the outer end of which is riveted to the follower 30 and the inner end of which is fixed in a spring clip 42. This spring clip has a curved tongue 43 for supporting the beginning of the inner coil of the spring so as to avoid so short a bend of the spring strip as to bring about a fracture at this point. The end of the strip 39 may be secured in the clip 42 at 44 in any suitable fashion, it being possible to rivet the strip to the clip, or to deform the clip so as to clamp the end of the spring strip. The clip itself has lateral lugs 45 down-turned at the ends. These lugs are receivable in slots 46 in a yoke 47 which then may be secured by screws 48 to the lower portion of the plunger housing 5 closely adjacent the base assembly. The screws 48 secure the yoke 47 to up-turned lugs 49 of the bed-plate 6 by passing through out-turned ears 50 on the end of the yoke 47 opposite the slots 46. Accordingly, the feeder

spring device is principally received within the plunger housing 5, and the strip 39 is effective for drawing the follower 30 close up to the plunger. This means that even though the follower 30 is relatively short (cutting down the capacity of the feeding means 4 but little), it can be drawn by the coil spring to a position closely adjacent the plunger so as to complete feeding of the staples.

The plunger housing 5 is shaped to receive the plunger 52 and guide the same as it reciprocates toward and from the work. The plunger is adapted to cooperate with relatively wide staples, and to shear a staple from the end of a strip of staples by cooperation with the cutter bar 25. Accordingly, the plunger proper takes the form of a metal plate 53 having a cutting edge 54. The plunger furthermore carries spring housings 55 which, as illustrated herein, are formed integral with the plate 53. The parts 53 and 55 may be formed from a single plate by bending marginal portions of this plate into the shape of the spring housings 55. Coil compression springs 56 are housed therein and abut against upper rests 58 and lower stools 59. The upper rests 58 project through slots 60 in the plate 53 and engage in openings 61 (see Fig. 9) in the plunger housing 5. Lugs 64 project from the other side of the spring rests 58 through slots 65 in the housings 55 and through openings 66 in the plunger housing 5. The spring rests 58, as thus extended at opposite sides through the plunger housing 5, engage the latter and act as abutments, affording reaction to stored energy in the springs 56 to drive the staple. The slots 60 and 65 are sufficient in extent to permit the full travel of the plunger 52; in Fig. 7, however, the rest 58 is shown pushed by the spring 56 clear to the ends of these slots because the plunger 52 is removed from the housing 5. The lower stools have forwardly and rearwardly projecting lugs 68 received in slots 69 in the housings 55. These rests 59 also have downwardly projecting feet or lugs 70 which extend slightly below the bottoms of the housings 55 when the lugs 68 are at the bottoms of the slots 69.

It will be understood from the above description of the plunger 52 that there are no stops against which it strikes solidly. In operation the plunger is retracted away from the work and then released, in a manner later to be described; and the compression springs 56 are compressed during the retraction of the plunger and are thereupon effective upon release of the plunger to actuate the same toward the work, the springs 56 being recompressed as the plunger nears the end of its stroke toward the work to cushion the stroke. The slots 60 and 65 should be long enough so that as the plunger 52 is raised relative to the housing 5, the housings 55 may move upwardly relative to the rests 58 which are engaged in the openings 61 and 66 in the housing 5. The slots 69 need be of but small extent, as the stools 59 engage the bottoms of these slots during retraction of the plunger away from the work, and there is movement of the lugs 68 in the slots 69 only when the feet 70 strike against the bed plate 6 toward the end of the stroke of the plunger 52 to cushion the same. The extent of movement of the plunger 52 after the lugs 70 strike the base plate 6 is but small, so that the lugs 70 need to extend but slightly below the bottoms of the housings 55. The stools 59 are not in engagement with the ends of the slots 69 when the spring rests 58 are in engagement with the ends of the slots 60 and 65 if the plunger 52 be assembled in operative rela-

tion with the housing 5; in Fig. 7, however, the plunger 52 is removed from the housing 5, and the rests and stools are free to move to the limit allowed by the respective slots.

5 When the feet or lugs 70 of the rests or stools 58 strike the bed plate 6, the ends of the springs 56 which rest on these stools, are stopped in their downward motion and therefore cease to urge the plunger 52 in its driving stroke. Fig. 7 illustrates the positions of the rests 58 and 59 in the plunger at this point. However, due to its momentum, the plunger continues in its downward movement, resulting in engagement by the upper rests 58 with the upper ends of the slots 60 and 65 in the plunger 52 so as to carry said rests 58 downward as shown in Fig. 17. These rests 58 function to compress the springs as the plunger is retracted and also act against the upper ends of the springs 56 at the end of the driving stroke recompressing said springs 56 so as to cushion said plunger. When the force of the driving stroke has become completely exhausted, the springs 56 expand until the upper rests 58 have moved upward approximately into contact with the ends of the slots 66 and 61 in the housing 5.

The above description has been applied to the plunger 52, illustrated in detail in Fig. 3, which is particularly adapted for driving wide staples. It is clear that this same principle of cushioning the stroke of the plunger may be applied to mechanism for driving narrow staples such as illustrated in Figs. 6 and 19. In such staple driving mechanism, a narrow plunger will be employed, and but one spring 56 and but one housing 55 will be required. The upper rest 58 and lower stool 59 will operate in precisely the same manner in the mechanism shown in Fig. 6 as in the wide mechanism. The cushioning of the stroke of the plunger has long been a troublesome problem in staple driving mechanisms of this type. Not only does the double use of the driving spring 56 bring about cushioning in an effective manner, but it also considerably simplifies the mechanisms in the plunger assembly.

45 The use of a pair of springs in mechanism for driving wide staples balances the forces exerted on the plunger. It moreover provides the necessary driving force without necessitating the use of one relatively stiff powerful spring. Moreover, the space between the housings 55 accommodates the feeder spring device 31 so that the latter is positioned closely adjacent the plate 53, thus lengthening the extent of inward travel of the follower 30.

55 The plunger is, in accordance with my invention, retracted away from the work by a lever 75 such as shown in Fig. 1. For convenience in gripping, a stationary handle 76 is fixed at 77 to an extension 78 of the plunger housing 5. The follower 30 when withdrawn from the guide channel 20 may be hooked to the outer end of the handle 76 as indicated in dotted lines in Fig. 1. The lever 75 has a hardened nose 80 for cooperating with a cross-bar 81 fixed between the housings 55. When the nose 80 slips out from under the cross-bar 81, the plunger 52 is released to be driven by the compression springs 56 against the staple which has been moved by the feeding means 4 over the cutter bar 25 into operative position beneath the plunger. The stroke of the plunger drives the staple ahead of the lower edge of the plate 53 into the work. The depending ends of the staple are at this time guided by the lugs 26 (see Fig. 9) extending downwardly from the bed plate 6 and preferably

formed integral therewith. As the bed plate is of heavier metal than the housing 5, this provides a rugged construction for guiding the plunger and staple as the latter is driven into the work.

5 The lever 75 may, if desired, be provided with a trigger of any suitable type such as is now customarily used, this trigger to replace the integral nose 80 shown in Fig. 1. I prefer, however, to employ the construction shown in Fig. 1 in which the conventional trigger mechanism is replaced by a pivot on which the lever 75 is slidably mounted. This pivot arrangement permits movement of the lever away from and toward the plunger 52, thus providing for release of the cross-bar 81 and for later re-engagement of the nose 80 beneath this cross-bar. In the form of slidable pivot illustrated in Fig. 1 a pin 85 is fixed in the extension 78, and a second pin or abutment 86 is mounted in the extension 78 below the 20 pin 85. The pin 85 extends through a slot 87 in the lever 75, and when a heel 88 on the lower side of the lever 75 engages the pin or abutment 86, the slidable pivot mounting afforded by these parts permits lever 75 to move away from 25 the plunger to withdraw the nose 80 from beneath the cross-bar 81.

Instead of having a fixed abutment such as the pin 86, I may employ an abutment which is adjustable toward and away from the plunger, a 30 set screw or a pair of set screws being adapted to this purpose. Fig. 18 illustrates such a construction, parts corresponding to the parts shown in Fig. 1 being given the same reference numeral. A set screw 86a is shown as engaging the abutment 86b for varying the position in which the latter engages the heel 88 for causing the lever 75 with its slot 87 to slide on the pin 85. In such case, the set screw or set screws may be adjusted inwardly or outwardly to vary the time at 40 which the nose 80 pulls out from under the cross-bar 81, thus varying the extent of upward stroke, and accordingly the force with which the staple is driven into the work.

45 As the lever 75 is swung in the opposite direction to re-engage the nose 80 beneath the cross-bar 81, the end of the lever slides on the cross-bar 81 to cause the lever to remain away from the plunger until the nose 80 has cleared the cross-bar 81, when the nose 80 may again engage beneath the cross-bar 81. A spring 90 twisted about the pins 85 and 86 is effective for automatically returning the lever 75 to the position shown in Fig. 1. One end of this spring is passed through an opening 91 in the inner portion of the 55 lever and the other end engages beneath the lever at 92. This spring 90 presses the lever toward the plunger, thus tending to keep the nose 80 engaged beneath the cross-bar 81. Moreover, the spring 90 tends to turn the lever 75 in a 60 counterclockwise direction. When the plunger 52 has been retracted and then released, the lever 75 may be let go and the spring 90 will thereupon turn the lever 75 in a counterclockwise direction. The slot 87 permits the lever to move away from the plunger far enough for the nose 80 to pass the cross-bar 81, whereupon the spring 90 pushes the lever 75 toward the plunger to re-engage the nose 80 beneath the cross-bar 81.

70 While certain advantages of my improved staple driving mechanism have been discussed in the course of the above description, other advantages will be readily apparent to those skilled in the art. I have illustrated and described the embodiment of my invention which I at present 75

prefer, but it will be understood that the invention may be otherwise embodied and practiced within the scope of the following claims.

I claim:

1. A staple driving mechanism comprising a plunger, mechanism for retracting the plunger away from the work and releasing the same for a staple driving stroke, a compression spring, and means acting on the opposite ends of the spring for compressing said spring during the retracting stroke of the plunger and for assisting in stopping the driving stroke of the plunger by recompressing said spring so as to cushion said stroke, said means connecting said spring and plunger for opposing said spring in such cushioning to further movement of the plunger.
2. A staple driving mechanism comprising a plunger, mechanism for retracting the plunger away from the work and releasing the same for a staple driving stroke, a compression spring, and rests at the opposite ends of the spring acting on the spring for compressing the same, one of said rests having a lost motion connection with the plunger and having a projection hitting just prior to the end of said driving stroke to stop further movement of said rest, the rest at the opposite end of the spring being engaged by the plunger substantially simultaneously therewith, said rest opposing the spring to further movement of the plunger.
3. A staple driving mechanism comprising a plunger, mechanism for retracting the plunger away from the work and releasing the same for a staple driving stroke, a compression spring, and means for cushioning the driving stroke of the plunger comprising a rest engageable with the striking end of the spring, and means engageable with said rest just prior to the end of said driving stroke to stop further movement of said rest and oppose the spring to further movement of the plunger.
4. A staple driving mechanism comprising a housing, a plunger reciprocable therein, mechanism for retracting the plunger away from the work and releasing the same, and resilient means for driving the plunger toward the work and for cushioning such stroke of the plunger, said resilient means comprising a spring storing energy during the retracting stroke of the plunger and actuating the plunger during the driving stroke thereof, and means connecting said spring to the plunger and housing for cushioning the driving stroke of the plunger by opposing said spring to further movement of the plunger.
5. A staple driving mechanism comprising a plunger, means for retracting the plunger away from the work and releasing the same, and resilient means for driving the plunger toward the work and for cushioning such stroke of the plunger, said resilient means comprising a compression spring acting through one of its ends for biasing said plunger toward the work and a rest for the other end of said compression spring engageable by the plunger adjacent the end of said driving stroke for cushioning the plunger.
6. A staple driving mechanism comprising a housing, a plunger reciprocable therein, mechanism for retracting the plunger away from the work and releasing the same, and resilient means for driving the plunger toward the work and for cushioning such stroke of the plunger, said resilient means comprising a compression spring and rests at the opposite ends of the spring, each rest having limited movement relative to both the plunger and the housing, one rest moving with the plunger during the retraction and driving strokes of the plunger and remaining stationary with the housing during the cushioning of the plunger.
7. A staple driving mechanism comprising a staple guide, a relatively wide plunger reciprocable transversely relative to the guide, means for retracting the plunger away from the work and releasing the same, and a plurality of compression springs for actuating the plunger toward the work, said plunger providing housings integral therewith for enclosing the actuating springs.
8. A staple driving mechanism comprising a plunger, means for biasing the plunger toward the work, a lever for retracting the plunger away from the work and releasing the same, and means for so shiftably fulcruming the lever as to permit reengagement of the lever with the plunger by movement of the lever away from and toward the plunger.
9. A staple driving mechanism comprising a plunger, means for biasing the plunger toward the work, a lever for retracting the plunger away from the work and releasing the same, a shiftable fulcrum for the lever permitting the lever to move bodily toward and away from the plunger, and a spring for urging the lever toward the plunger.
10. A staple driving mechanism comprising a plunger, means for biasing the plunger toward the work, a lever for retracting the plunger away from the work and releasing the same, means providing a fulcrum for said lever which affords relative bodily movement between the lever and its fulcrum permitting movement of the lever toward and away from the plunger, and an abutment engageable by the lever in turning on its pivot for displacing said lever relative to the plunger.
11. A staple driving mechanism comprising a plunger, resilient means for urging the plunger toward the work, a lever for retracting the plunger away from the work and releasing the same, said lever having a slot therein, and means cooperating with the slot for so fulcruming the lever that the lever is shiftably bodily toward and away from the plunger, and a spring for biasing the lever toward the plunger.
12. A staple driving mechanism comprising a plunger, a spring for urging the plunger toward the work, a lever for retracting the plunger away from the work, a pin cooperating with a slot in the lever to support the latter for bodily movement toward and away from the plunger, an abutment engageable by the lever in turning on its pivot for displacing said lever away from the plunger, and a spring biasing the lever in the opposite direction about its pivot and toward the plunger.
13. In a staple driving mechanism including a staple guide having a longitudinal rib, a follower for advancing staples along said guide, said follower comprising a channel shaped body member and a stiffening plate secured thereto and having a raised portion bridging the longitudinal rib of the staple guide, the body member having a recess receiving the raised portion of the stiffening plate.
14. In a staple driving mechanism including a staple guide, a follower for advancing staples along said guide, said follower comprising a channel shaped body member having an opening in the web of the channel and a stiffening plate secured within the channel to the web thereof, said

stiffening plate having a raised portion received within said opening.

15. In staple driving mechanism, staple feeding means comprising a staple guide having upturned flanges and an intermediate longitudinal rib, said flanges and rib cooperating to support the staples, and a follower for advancing staples along the guide, said follower comprising a channel shaped body member stiffened by a plate secured to the under side of the web of the channel, said web having a recess receiving a portion of the stiffening plate for clearing said rib.

16. In staple driving mechanism, staple feeding means comprising a housing, a staple guide therein having upturned lateral flanges and an intermediate longitudinal rib, said flanges and rib cooperating to support the staples, and a follower for advancing staples along the guide within the housing, said follower comprising a body member channel-shaped in cross-section to overlie the guide with its flanges depending between the flanges of the guide and said housing, and a stiffening plate secured to the underside of the web of the channel, said web having a recess receiving a portion of the stiffening plate for clearing said rib.

17. A staple driving mechanism comprising a plunger, means for biasing the plunger toward the work, a lever for retracting the plunger away from the work and releasing the same, a shiftable fulcrum for the lever permitting the lever to move bodily toward and away from the plunger, said lever having a portion on one side of its fulcrum for engagement by the operator's hand and a plunger-engaging portion on the other side of its fulcrum, and means engageable by the lever in turning on its pivot for causing outward movement of the lever away from the plunger to release the latter.

18. A staple driving mechanism comprising a plunger, means for biasing the plunger toward the work, a trip lever for retracting the plunger away from the work and releasing the same, means cooperating with said lever for pivotally mounting the lever and permitting the same to shift to release the plunger, said means comprising a pin and slot connection permitting bodily shifting of the lever toward and away from the plunger, and an adjustable abutment engageable by the lever in turning on its pivot for determining the point of release of the plunger from said trip lever.

19. In a staple driving mechanism including a staple guide and a housing therefor having flanges for overlaying staples on the guide, a follower for advancing staples along said guide, said follower comprising a body member movable along the guide with its outer portions beneath said housing flanges, and a stiffening plate underlying

said body member and extending adjacent to said flanges of the housing.

20. In a staple driving mechanism including a staple guide having up-turned lateral flanges and a housing for the guide having flanges for overlaying the staples moved along the guide, a follower for advancing staples along said guide, said follower comprising a channel-shaped body member, and a stiffening plate underlying the same and extending to abut said up-turned lateral flanges.

21. In staple driving mechanism, staple feeding means comprising a sheet metal staple guide having upturned lateral flanges and an intermediate longitudinal rib, cooperating with said lateral flanges to support the staples, and a follower for advancing staples along the guide.

22. In a staple driving mechanism in combination, a plunger assembly including a plunger and a plunger housing, and means for feeding staples beneath the plunger including a staple guide, a follower cooperating therewith, a demountable yoke mounted on the plunger housing, a spring clip, a coil spring carried by said clip and operatively connected to said follower, the ends of said clip projecting from the coil spring, said yoke having slots receiving the ends of the clip by sliding movement in the direction of tension of the spring.

23. A staple driving mechanism comprising a plunger housing, a plunger reciprocable therein, said plunger including a relatively wide blade for engaging the staples to drive the same into the work and spaced spring housings integral with the plunger, means for retracting the plunger away from the work and releasing the same, compression springs in said housings, and rests for the springs acting to compress the same during the retracting of the plunger.

24. In a staple driving mechanism, a plunger stamped out of sheet metal and including a relatively wide blade with the side portions bent into enclosures adapted to house driving springs for the plunger.

25. A staple driving mechanism comprising a plunger, mechanism for retracting the plunger away from the work and releasing the same for a staple driving stroke, a compression spring, and means including rests acting on the opposite ends of the spring for compressing said spring during the retracting stroke of the plunger and for assisting in stopping the driving stroke of the plunger by recompressing the spring so as to cushion said stroke. one of said rests having a lost motion connection with the plunger and having a projection hitting just prior to the end of said driving stroke to stop further movement of said rest.

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