June 10, 1941. I. SKREBBA, GEB. STÜHLINGER 2,245,506

STAPLING APPARATUS

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Fig. 1

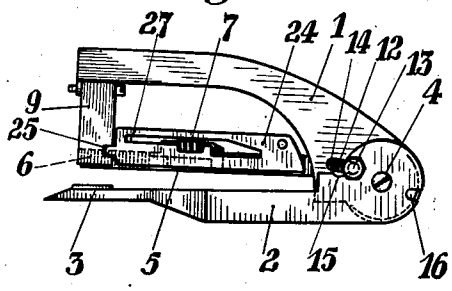


Fig. 8

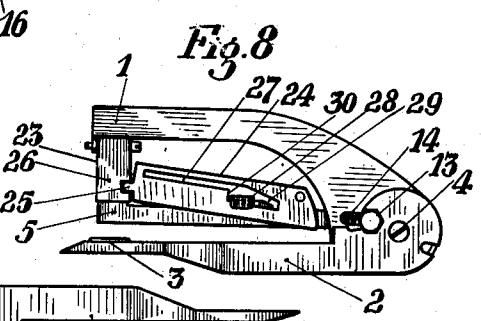


Fig. 3

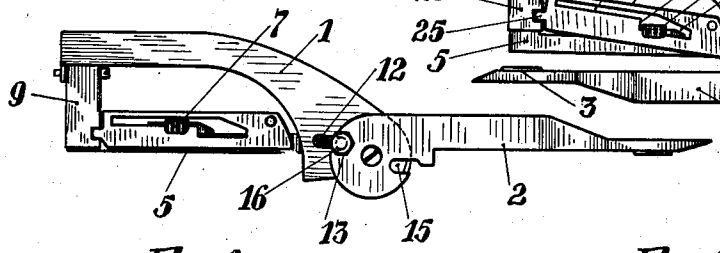


Fig. 4

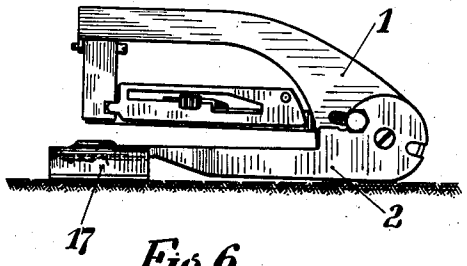


Fig. 5

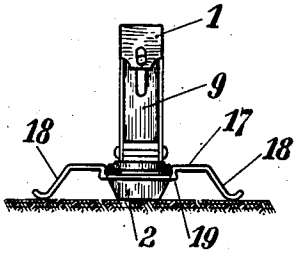


Fig. 6

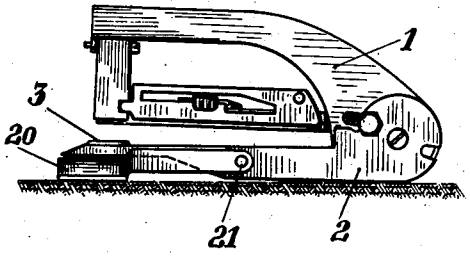
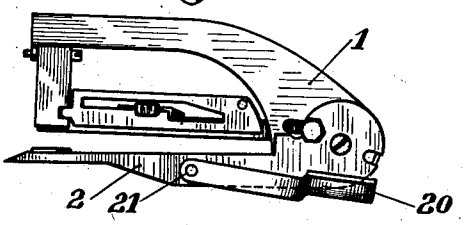


Fig. 7



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STAPLING APPARATUS

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Fig. 1a.

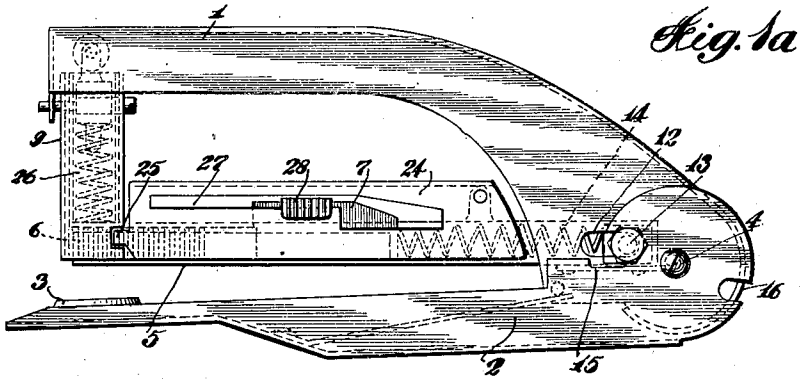


Fig. 2.

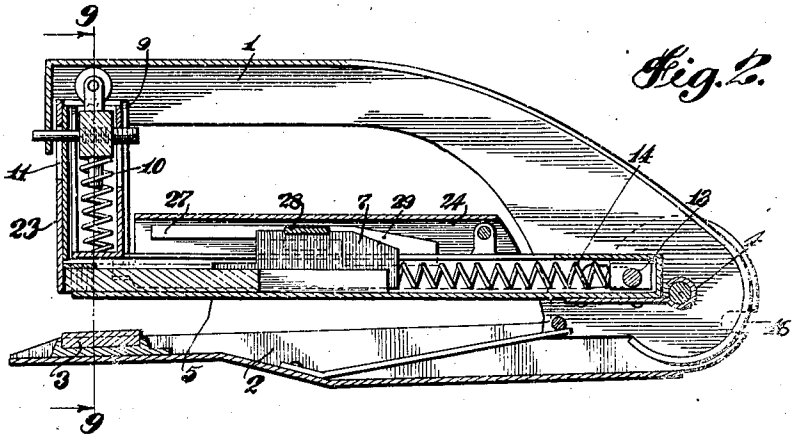
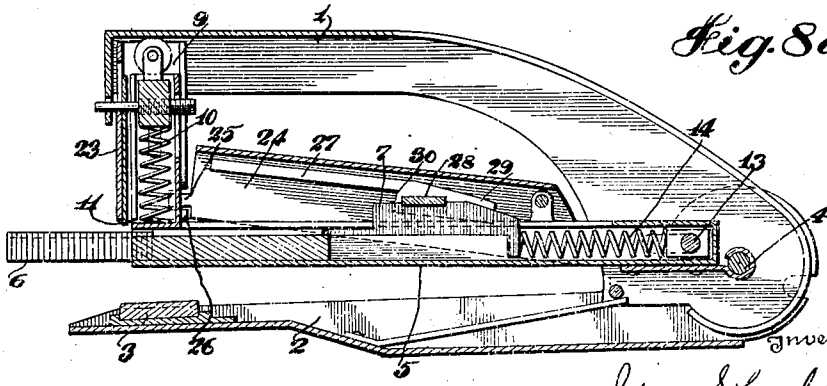


Fig. 8a.



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Fig. 9.

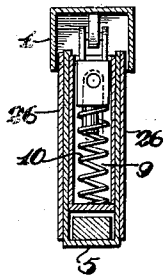


Fig. 10.

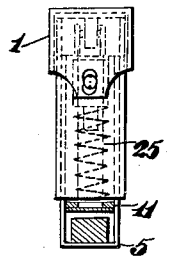
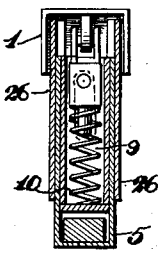


Fig. 11.



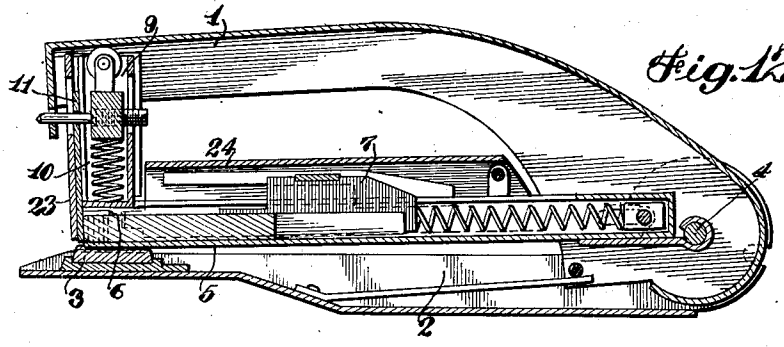


Fig. 12.

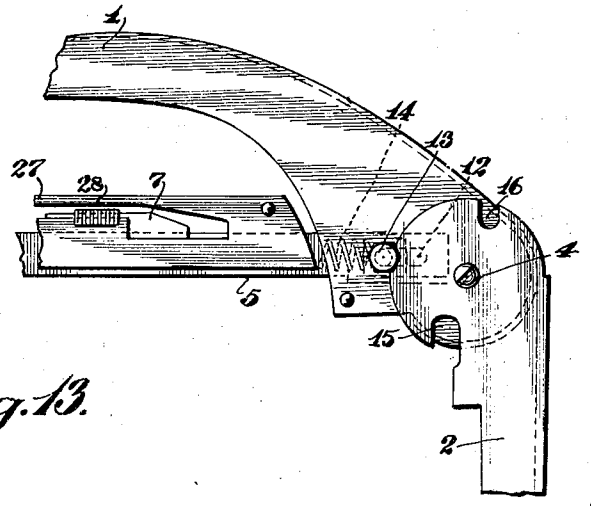


Fig. 13.

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2,245,506

STAPLING APPARATUS

Ida Skrebba, geb. Stühlinger, Lahr in Baden, Germany

Application February 13, 1936, Serial No. 63,815
In Germany February 19, 1935

6 Claims. (Cl. 1—49)

This invention has for an object to provide an apparatus which can be used as portable stapling pliers, a fixed apparatus and as a nailing machine. This stapling apparatus or device distinguishes itself from known devices by a special arrangement of the two branches of the apparatus or pliers which are in the form of elementary one-arm levers pivotally connected together to allow the user to operate them to staple or nail, as desired.

By this arrangement of the two branches in the form of elementary one-arm levers, there is obtained a portable apparatus which can be held in one hand, the device having a large depth or length of the jaws or branches, in such a manner that not only is it possible to staple or fasten together the edges of sheets, as with known staplers, but it is also possible to insert the staples far from the edges of the sheets, as with fixed machines or apparatus.

Another advantage is that the portable apparatus or stapler may be easily transformed into a fixed or non-portable apparatus by the adjusting of a very simple device carried by one of the jaws.

Lastly, the two branches or arms can be placed in prolongation of one another, owing to their one-arm lever form. In this position, one of the branches forms the handle and the other the head of a stapling apparatus, for instance, for inserting staples in wooden cases, small cases, etc., where the staples are inserted straight without clamping.

The apparatus according to the invention, as it is used, employs preferably staples of U-form. Those staples are introduced in a similarly shaped channel forming a part of one of the branches of the apparatus. The staples are pushed towards the hammer by a spring actuated follower slidable in said channel. The follower successively positions the staples in a space outside of one end of the channel which is formed at this point by a plate extending at right angles to the channel and spaced slightly therefrom. The plate can be removed to permit access to the channel for reloading the apparatus when the supply of staples runs out.

The appended drawings show by way of an example a preferred form of the invention.

In said drawings:

Fig. 1 is a side view of the apparatus serving as a portable stapler.

Fig. 1*a* is an enlarged view similar to Fig. 1 but showing the portions concealed in Fig. 1 in dotted lines.

Fig. 2 is a longitudinal vertical section of the apparatus.

Fig. 3 is a side view of the same apparatus with the parts positioned for driving the staples as nails or tacks.

Fig. 4 is a side view of the apparatus of Figure 1 combined with a removable base to form an apparatus capable of operating on a flat base.

Fig. 5 is a front view of Figure 4.

Fig. 6 is a side view of a modified form of the structure of Figure 4.

Fig. 7 is a side view of said modified form of Fig. 6 with the parts positioned differently.

Fig. 8 is a longitudinal vertical sectional view showing the parts in the reloading position.

Fig. 8*a* is an enlarged vertical longitudinal section of the form shown in Fig. 8.

Fig. 9 is a detail section on the line 9—9 of Fig. 2.

Fig. 10 is a detail front end elevation of Fig. 2.

Fig. 11 is a view similar to Fig. 9 but taken on the line 11—11 of Fig. 8*a*.

Fig. 12 is a view similar to Fig. 8*a* but with the upper arm depressed.

Fig. 13 is a fragmentary detail showing the member 2 arranged at right angles to its normal position.

Referring specifically to the drawings, 1 is the pressure element in the form of a rockable lever, acting as a branch or arm of the stapler. Said lever 1 is connected through a pivot 4 to another lever 2 comprising the second branch of the stapler and which includes the usual anvil 3 on which the staple bends itself after it has been driven through the material.

The staple carrier is designated by 5 and is carried between said two levers by the lever 1 and pivot 4. The carrier 5 comprises the usual U-shaped channel for slidably mounting U-shaped staples. The carrier 5 mounts also a spring actuated follower 7 which is slidably received in the channel and which, under the influence of the spring 14, forces the staples out one by one at the open front end of the channel.

The carrier 5 may be directly mounted on the pivot 4 or it can be pivotally mounted on the lever 1 near pivot 4.

In the example shown, the carrier 5 terminates at its front end with a hollow vertical head 9 in which the staple driver or hammer 11 is slidably mounted. Downward pressure on the lever 1 slides the hammer 11 downwardly against the action of a spring 10. As the lower end of the hammer 11 passes the staple channel, it severs a staple from the strip, forces it through the

material and clinches it on the anvil 3 in the usual manner.

The two levers 1 and 2 of the stapler are free to move one towards the other to achieve a stapling operation until the carrier 5 contacts with the anvil 3, after which, the lever 1 can still be moved towards lever 2 by the compression of spring 10. On the other hand, movement of the two levers to spread them apart is normally limited in the following manner:

A slot 12 is formed in a lever 1 transversely thereof adjacent the pivot 4, and a spindle 13 is lodged transversely in said slot. A spring 14 tends to urge said spindle constantly toward the pivot 4. The spindle 13 protrudes on both sides of lever 1 and engages in a notch 15 provided in the rounded end or head of the lever 2.

The rounded head of lever 2 has formed therein another notch 16 which is diametrically opposed to the notch 15. If the spindle 13 is moved in its slot in a direction to compress the spring 14, the spindle 13 is moved out of the slot 15 and it is possible to completely open the levers 1 and 2 to bring said spindle into position for entry into the second notch 16.

In this position (Figure 3), the lever 2 is in line with lever 1 and is held rigid in said position by the spindle 13 and notch 16. The apparatus is thus changed into a device for driving staples straight into boxes or cases without any clinching. Of course while the spindle 13 with the spring 14 and notches 15—16 are regarded as a preferred structure for accomplishing this purpose, it is obvious that they may be replaced by other equivalent devices for fulfilling the same functions without departure from the spirit of the invention.

The operation of the apparatus, in the position shown in Figure 1 can be easily understood. The material to be stapled is slid between the two levers 1—2, or rather more precisely between carrier 5 and lever 2. Then, holding the apparatus in the hand, the levers are moved one towards the other by exerting a strong pressure of the hand on lever 1.

To staple or tack cases, etc., the apparatus is placed in the position shown (Figure 3), and is then grasped in the hand by lever 2. With the other hand, the necessary pressure to actuate the staple driver 11 is exerted on lever 1 to drive the staple into the case.

In Figures 4 and 5, the lever 2 is supplemented by a base 17 which is formed in this instance by a rigid metal plate curved at the ends to form two flaps or legs 18 and having the middle part folded to form a dovetail channel 19 in which the lever 2 is slidingly fitted. The apparatus thus completed is steadfast and remains vertical on a table or other support. It then works as an ordinary stapler. To increase the steadfastness of the connection between the base 17 and the lever 2, holes for receiving reinforcing elements may be provided in lever 2 to seat studs or clamps for the base 17.

In the modification of Figures 6 and 7, the base is in the form of a stirrup-like member 20 and is mounted on a pivot 21 carried by lever 2. Said base 20 is, thus, a non-removable part of the apparatus. When said base 20 must be used, it is brought into the position shown in Fig. 6, under the anvil 3. When the base 20 is not needed, it is swung into the position shown in Fig. 7, back against the rear portion of lever 2.

It will be understood that other forms of removable or displaceable bases or feet could also be used without departing from the spirit of the invention. For instance, they may take the form of an extensible stirrup or flap mounted on a hinge, etc.

As mentioned before, the channel 5 is filled with U-shaped staples, either loose or in strips, which are expelled one at a time by the follower 7 to a position beneath the hammer 11 in the hollow head 9 of the staple carrier 5.

Normally, said hollow head 9 is closed on its front face by means of a vertical plate 23 against which the staples abut as they are expelled from the channel of the carrier 5 and before the hammer 11 has operated. To reload the carrier 5 when the load of staples runs out, it is necessary to lift said plate 23. This plate is connected to a U-shaped part 24 which is carried above the carrier 5. In the example shown, said connection is carried out by two projections 25 formed on the front end of the part 24 and which are engaged in corresponding notches formed in side wings 26 of the plate 23, the plate 23 being, thus, in this instance, but not necessarily, of U-shaped form and being slidably mounted on the hollow head 9. Two elongated ports or slots 27 are provided in the sides of the part 24. The follower 7 is provided with a transverse head 28, the end portions of which are slidably fitted and guided in the ports or slots 27 of the part 24.

Under the action of the spring 14, the head 28 thus moves in said slots 27 and any vertical movements of the part 24 relative to the carrier 5 are prevented. The plate 23 is thus locked in its channel closing position.

The slots or ports 27 are enlarged at the ends thereof adjacent the pivot 4 to provide an enlarged opening 29 and a shoulder 30. When the head 28 is brought into said enlargement 29, the depth of which is greater than that of the slots or ports 27, the U-shaped part 24 is freed for limited vertical movement to allow it to be raised as shown in Figure 8. The projections 25 remain in the notches of the side wings 26 of plate 23 and the latter is thereby raised sufficiently to clear the entrance of the channel of the carrier 5 to permit the introduction into said channel of a new load or strip of staples. In the raised position of Figure 8, the head 28 is retained in the enlargement 29 by the shoulder 30 and the spring 14 is consequently unable to push forward the follower 7. It is sufficient, when the channel has been reloaded, to lower the part 24. This raises the head 28 clear of the shoulder 30 and the apparatus is again ready to operate as the plate 23 is automatically locked in its original position as aforesaid.

It will be understood that a single slot or port 27 could be provided in the base of the U-shaped part 24. In this instance, the head 28 would then be extended above said part 24 and the port 27 would be provided in its rear portion with an enlarged portion to allow the head 28 to pass therethrough under the base of the part 24.

I claim:

1. A stapler comprising a staple carrier, a staple driver, a lever actuating said driver, an anvil, a second lever mounting said anvil, said levers comprising single armed levers and being connected together at one end by a pivot, said carrier being mounted between said levers and being freely mounted on the pivot of said levers, and coacting means at the ends of the levers adjacent said pivot, said means being adapted to limit the the opening movement of said levers, releasing means movable to permit said levers to be opened

to a position in prolongation of one another, and means for locking said levers in said prolongated position.

2. A stapler comprising a staple carrier, a staple driver, a lever actuating said driver, an anvil, a second lever mounting said anvil, said levers comprising single armed levers and being connected together at one end by a pivot, said carrier being mounted between said levers and being freely mounted on the pivot of said levers, means normally limiting the opening movement of said levers, and an enlarged base plate pivotally connected with said anvil mounting lever.

3. A stapler comprising a staple carrier, a staple driver, a lever actuating said driver, an anvil, a second lever mounting said anvil, said levers comprising single armed levers and being connected together at one end by a pivot, said carrier being mounted between said levers and being freely mounted on the pivot of said levers, means normally limiting the opening movement of said levers, and an enlarged base plate slidably connected to said anvil mounting lever.

4. In a stapler comprising a staple carrier, a staple driver, a lever actuating said driver, an anvil for clinching the staples, said staple carrier including a channel adapted to slidingly receive a plurality of staples, a spring actuated follower slidably mounted in said channel for expelling the staples at one end of said channel, a cover-plate normally closing said channel at the end through which the staples are expelled, a plate normally maintained in fixed position above said channel, connecting means between said cover-plate and said last named plate, and means whereby said last named plate can be pivoted to a predetermined extent whereby to displace said cover-plate to permit access to the entrance of said channel to permit the insertion of a supply of staples therein.

5. In a stapler comprising a staple carrier, a staple driver, a lever actuating said driver, an anvil for clinching the staples, said staple carrier including a channel adapted to slidingly receive a plurality of staples, a spring actuated follower slidably mounted in said channel for expelling the staples at one end of said channel, a cover-plate normally closing said channel at the end through which the staples are expelled, a plate normally maintained in fixed position above said channel, connecting means between said cover-plate and said last named plate, means whereby said last named plate can be pivoted to a predetermined extent whereby to displace said cover-plate to permit access to the entrance of said channel to permit the insertion of a supply of staples therein, a button carried by said follower, said last named plate having an elongated port therein slidably receiving said button, said port terminating at the end adjacent said spring in a downwardly stepped enlargement thereof, said button being receivable in said enlargement, said spring of said follower maintaining said button in said enlargement against the step thereof whereby to permit limited movement of said last named plate and said cover-plate to displace the latter from in front of said channel.

6. In a stapler comprising a staple carrier, a staple driver, a lever actuating said driver, an anvil for clinching the staples, said staple carrier including a channel adapted to slidingly receive a plurality of staples, a spring actuated follower slidably mounted in said channel for expelling the staples at one end of said channel, a cover-plate normally closing said channel at the end through which the staples are expelled, a plate normally maintained in fixed position above said channel, connecting means between said cover-plate and said last named plate, means whereby said last named plate can be pivoted to a predetermined extent whereby to displace said cover-plate to permit access to the entrance of said channel to permit the insertion of a supply of staples therein, a button carried by said follower, said last named plate having an elongated port therein slidably receiving said button, said port terminating at the end adjacent said spring in a downwardly stepped enlargement thereof, said button being receivable in said enlargement, said spring of said follower maintaining said button in said enlargement against the step thereof whereby to permit limited movement of said last named plate and said cover-plate to displace the latter from in front of said channel, a second lever mounting said anvil, said levers comprising one-arm levers connected together at one end by a pivot, and said staple carrier being located between said levers and being freely mounted on the pivot thereof.

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