Sept. 26, 1939. A. BALMA 2,174,219

STAPLING PLIERS

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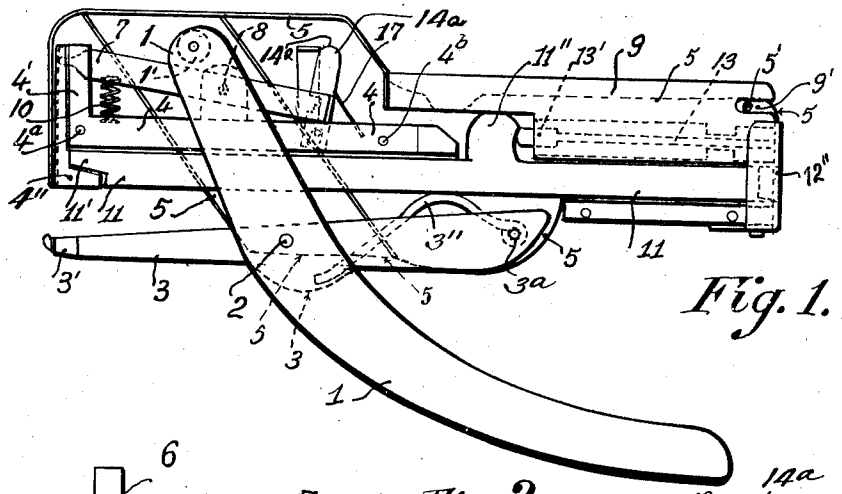


Fig. 1.

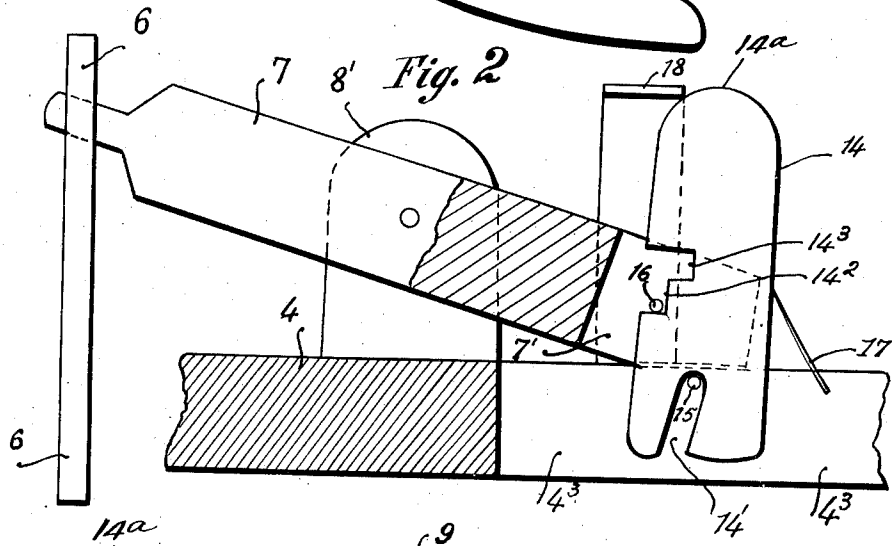


Fig. 2

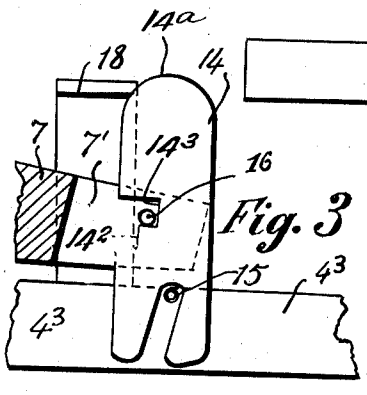


Fig. 3

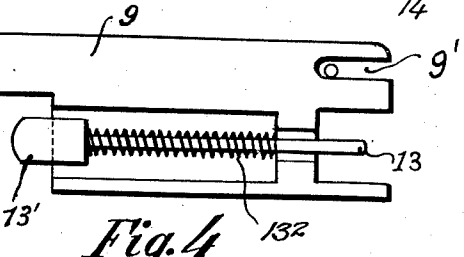


Fig. 4

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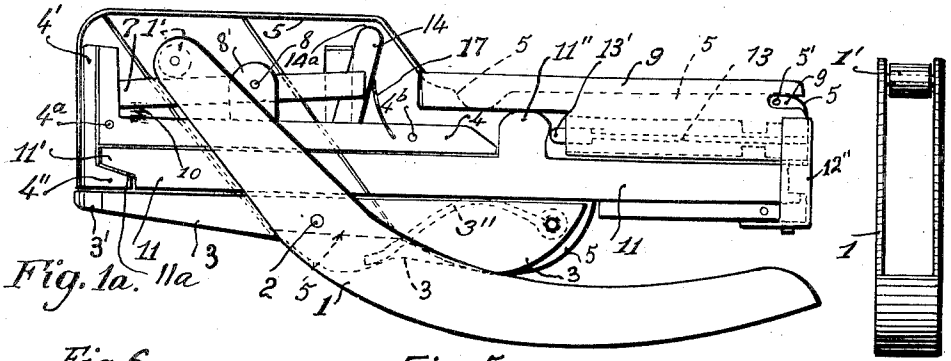


Fig. 1a.

Fig. 11.

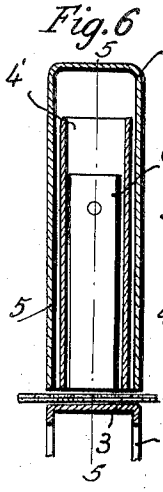


Fig. 6

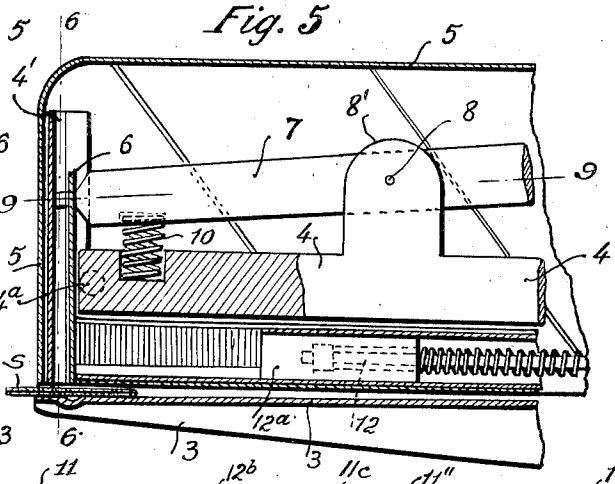


Fig. 5

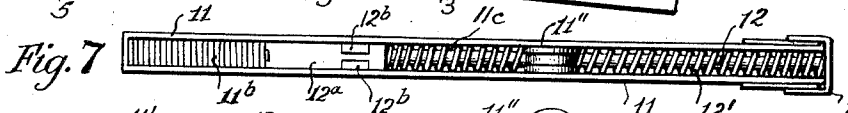


Fig. 7

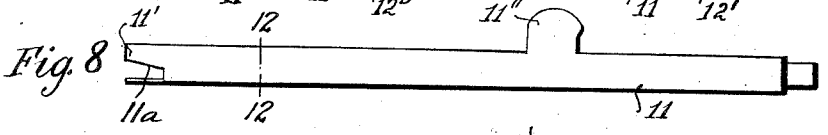


Fig. 8

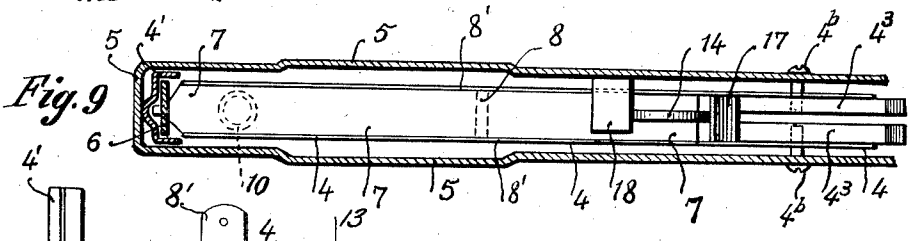


Fig. 9

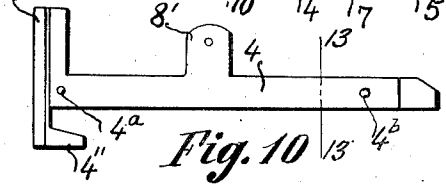


Fig. 10

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Fig. 2a.

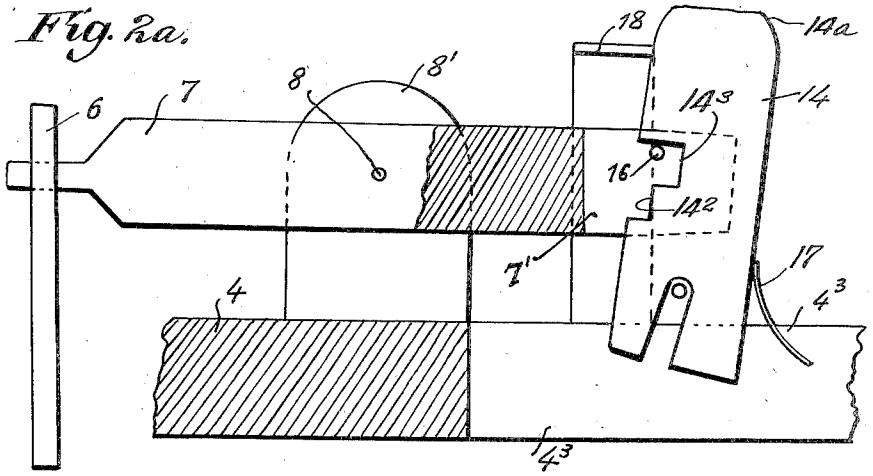


Fig. 14

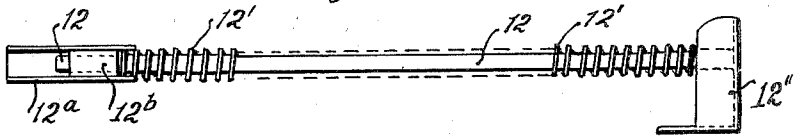


Fig. 12

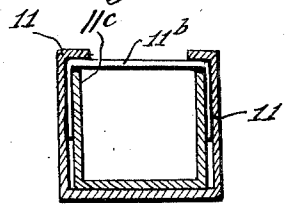
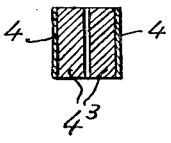


Fig. 13



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UNITED STATES PATENT OFFICE

2,174,219

STAPLING PLIERS

Aldo Balma, Voghera, Italy

Application March 18, 1936, Serial No. 69,457
In Italy April 15, 1935

9 Claims. (Cl. 1—49)

My invention relates to a pincher stapler for fastening or clinching together, by means of metallic or similar staples, sheets of paper, cardboard, Celluloid, textile and other materials.

Staplers of the pincher type generally known to the art operate by having a driver positioned in a driveway, the driver being operated by a series of levers to detach a staple from a holding magazine and to clinch said staple onto sheets of paper and the like. Such staplers have disadvantages in that a heaping up of the staples adjacent the driver sometimes occurs, and thus causes a jamming of the stapler to render it inoperative. Another disadvantage of the previously known staplers is that when a jam or blocking of the magazine occurs said magazine could not be readily removed to effect a cleaning thereof.

It is an object of my invention to provide means to prevent the stapler from becoming jammed, and further, should jamming occur, to provide means by which the magazine may be readily removed and easily cleaned.

Another object is to provide a movable anvil arm which is operated by the means which subsequently also moves the staple driver so that a rapid and secure clinching of the staple may be obtained.

The prevention of the jamming of the stapler is accomplished by providing means coacting with the driver and the pincher arms so that the driving operation must be completed before the arms can be expanded into position for a second clinching operation. Concommitant with the contraction of the arms for a clinching operation the anvil arm is caused to move toward the driver in order to clinch the staple moved into position by the driver.

To make the magazine accessible for ready removal and cleaning, it is retained in position by a removable block located rearwardly on the stapler and secured thereto by a pin and spring mechanism that renders it readily detachable from said stapler.

These and other objects and features of the invention are set forth more fully in the following description, and in the accompanying drawings, in which:

Fig. 1 is a side elevational view of my pincher type stapler, with part of the outside casing removed, and showing the pinchers in open position;

Fig. 1*a* is a similar view with the device in closed position;

Fig. 2 is a side elevational view showing the means for preventing the driver from jamming the staples in full open position;

Fig. 2*a* shows the same parts in completely closed or clinching position;

Fig. 3 shows a partial similar view with the means set in intermediate position;

Fig. 4 is a side view, shown partly in section, of the locking block for the removable magazine;

Fig. 5 is an enlarged sectional view of the front part of the stapler showing the driving mechanism;

Fig. 6 is a sectional view on the line 6—6 of Fig. 5;

Fig. 7 is a plan sectional view showing the staple magazine;

Fig. 8 is a side elevational view of the magazine;

Fig. 9 is a plan sectional view along the line 9—9 of Fig. 5;

Fig. 10 is a side elevational view of the T-shaped piece for holding the driver;

Fig. 11 is a front view of the lower pincher arm or lever showing its bifurcation;

Fig. 12 is a cross sectional view on the line 12—12 of Fig. 8;

Fig. 13 is a cross sectional view on the line 13—13 of Fig. 10; and

Fig. 14 is a side view of the spring thrust mechanism of the magazine.

As seen in Figs. 1 and 1*a*, the stapler comprises two arms arranged in the manner of a pair of pinchers. One arm contains the driver and magazine mechanism, while the other arm is a simple lever as shown at 1. An anvil arm 3 is pivoted at 3*a* to the wall of the casing 5, while the bifurcated portion of lever 1 and the anvil arm 3 are pivoted together at 2. The anvil arm 3 forms the lower clinching jaw of the pinchers and is provided at one end with a die 3' for clinching a staple. At the other end of the anvil arm is a spring 3'' which bears against the magazine arm to keep the jaws of the pincher in a normally opened position. The upper end of the bifurcated arm 1 is closed by a roller 1' for a purpose hereinafter described.

The upper or magazine arm has a magazine 11 for holding the staples, and a driver 6 for driving them through sheets of material S, Figs. 5 and 6, and clinching the same by the die 3' on the lower arm. Driver 6 is held by a T-shaped member 4, Fig. 10, which has at one end a vertically extending part forming a driver channel portion 4' for the driver 6. A foot 4'' projects from the lower end of the channel portion 4' which aids in positioning the magazine 11 at a notch 11*a*

shown below the end 11'. The forward portion of the magazine arm is enclosed by the casing 5 to which the member 4 is secured by screws or rivets 4a and 4b. Member 4 has also a vertical projection 8' to which a rocking lever 7 is secured by means of pin 8. The forward portion of lever 7 engages driver 6 and holds the driver in normally opened position by means of spring 10, which extends between lever 7 and member 4. Lever 7 also extends through the bifurcated end of the arm 1 and bears against the roller 1'.

Rearwardly of the pin 8 the lever 7 has its end portion slotted at 7' and said slot is intersected by a pin 16 carried by the lever 7. Below the slotted end of lever 7, the member 4 is slotted at 4^3, (Figs. 2, 2a and 3), and has therein a pin 15. A plate 14 having its lower end slotted at 14' is inserted in slot 4^3 with the pin 15 in slot 14'. The forward edge of plate 14 has notches 14^2 and 14^3 which form steps for engaging pin 16 in varying positions of the lever 7. A stop 18 limits forward movement of the curved upper edge 14a of plate 14. Spring 17 secured to the member 4 bears against plate 14 to force it forwardly.

Magazine 11 comprises an elongated member having a notched forward end 11a for engaging the foot 4'' of member 4' secured upon the end of member 4 appearing in Fig. 10. Magazine 11 is channel-shaped in section and contains therein a rod 12, Fig. 7, on which a spring 12' is mounted and connected with a channel-shaped piece 12a for propelling staples 11b, Fig. 7, again, toward the driver 6, the staples being supported upon an inner channel track 11c. The channel shaped member 12a has an interior part 12b receiving the forward end of the rod 12. The rear end of the rod is provided with a magazine closure member 12''. On the upper side of member 11 is a knob 11'' which functions as a stop for the magazine-securing block 9.

The magazine 11 may be easily inserted and withdrawn from its position in the arm of the stapler, and a removable block 9 is provided to hold the magazine in working position. This block, Fig. 4, may be conveniently formed of a moldable resin. A slot 9' in the upper part of the rear end of the block engages a pin 5' of the rear end of the casing in order to prevent rearward movement of the block. Below the slot 9' is a recess which connects with a chamber in the body of the block. A pin 13 is contained in the recess and chamber and is held in extended position by spring 13^2 as particularly disclosed in Fig. 4. Pin 13 is finished on one end with a head 13', which is adapted to bear against knob 11'' on the magazine 11. When block 9 is in operating position, pin 13 prevents the magazine from moving rearwardly from the arm. It is apparent that the block can be removed by merely pulling it upwardly from the arm.

My pincher stapler operates in the following manner. To load the magazine the block 9 is pulled upwardly from its position and removed from the arm. Magazine 11 can then be slid rearwardly from the arm and loaded with staples 11b in an obvious manner. Another and simpler way of loading the magazine is to lower cap 12'' and remove it from the magazine.

After the loaded magazine and the block or cap 12'' have been replaced, the sheets of material S are inserted between the foot 4'' and die 3'. The two arms of the pincher are then contracted from the position of Fig. 1 to that of Fig. 1a. As arm 1 moves toward the other arm, anvil arm 3 with die 3' is first moved upwardly and presses the sheets of material firmly against the foot 4''. Subsequently roller 1' bears downwardly on lever 7, which then causes driver 6 to push the foremost staple in the magazine through the material S, the staple being clinched upon die 3'.

To prevent stoppages resulting from incomplete stapling and a superimposing of staples one upon another, the mechanism of plate 14 is arranged to compel a complete stapling operation before the next staple can be driven. As lever 7 moves the driver 6 downwardly, its rearward end moves upwardly, Figs. 2, 2a and 3. As shown in detail in Fig. 2, before the clinching operation begins the plate 14 is in normal position, being held against stop 18 by spring 17, and with the pin 16 resting in step 14^2. When the rearward end of the lever has moved upwardly a small distance the pin 16 moves from step 14^2 to rest on the tread of step 14^3 as shown in Fig. 3. At this point the stapling operation has not been completed, and because pin 16 rests on the tread of step 14^3 the pin cannot move downwardly so as to allow the lever 7 to come into position for another stapling movement. To complete the stapling, the pin 16 continues to rise until, as shown in Fig. 2a, reaches its highest position at the time the driver 6 has completed the driving of a staple. As shown, the pin 16 has lifted the plate 14 by bearing against the upper edge of step 14^3, the plate 14 at the same time being moved rearwardly by reason of its curved edge 14a which slides along stop 18. Pin 16 now lies directly above lower step 14^2, and plate 14 is prevented from moving either forwardly or downwardly by the frictional engagement of the plate 14 against stop 18 by reason of the spring 17. The driving operation being complete, in the return movement of the operating parts, spring 10 first elevates lever 7 and when it has reached its full elevated position to lift the driver clear of the staple channel in the staple magazine, spring 3'' operates to return the handle 1 and the anvil arm 3 to their normal positions. The rear end of lever 7 in moving downwardly causes the pin 16 to engage the tread of step 14^2, and thus moves the plate 14 into normal position.

This operation is repeated for every staple driven, the spring 12 causing the staples 11b to advance in the magazine 11. Should the arms not be contracted sufficiently to drive a staple completely, the arms cannot be expanded to attempt to drive another staple and thus cause jamming. In reloading the magazine, or in removing the same for cleaning, the block 9 can be quickly snatched from its place and the magazine removed, this also being true of cap 12''. It is therefore seen that my pincher stapler may be efficiently operated without encountering the disadvantages of jamming and cleaning existent in the devices heretofore known in the art.

Having shown and described a structure by which I may obtain the objects of my invention, I claim my invention as follows:

1. A locking plate mechanism for a pincher type stapler comprising a rocking lever pivotably supported intermediate its ends, a driver attached to one end of said lever, a slot in the rear end of said lever, a pin in said slot, a plate member in said slot and having stepped notches in its forward edge adapted to be engaged by said pin, and means for moving said rocking lever.

2. A locking plate mechanism as in claim 1,

in which there is a stop member engaging the forward edge of said plate, and a spring engaging the rear edge of said plate.

3. A securing block for holding a removable magazine in a pincher type stapler, comprising a substantially rectangularly shaped body having a notch in the upper part of the rear end thereof, an opening extending through the lower portion thereof, a movable rod supported in said opening and projecting from the forward end thereof, and spring means holding said rod in a normal projecting position.

4. A locking plate mechanism for a pincher type stapler comprising a driver, a rocking lever arm adapted to operate said driver, movable means engaging against and adapted to move said lever arm, and a movable locking plate associated with said lever arm restricting said rocking lever arm to movement in one direction only until said driver has completed its driving operation.

5. A locking plate mechanism for a pincher type stapler comprising a rocking lever pivotally supported intermediate its ends, a driver engaged by one end of said lever, there being a slot in the rear end of said lever, a pin in said slot, a movable plate member in said slot and having stepped notches in its forward edge adapted to be engaged by the pin in said lever in said slot upon movement of said rocking lever, and means for moving said rocking lever.

6. A locking plate mechanism according to claim 5, in which there is a stationary stop member engaging one edge of the plate member, and a spring engaging the opposite edge of said plate member tending to move the latter toward said stop.

7. A locking plate mechanism for a pincher type stapler comprising a rocking lever pivotally connected intermediate its ends to a T-shaped member, a driver engaged by said rocking lever at one end of said T-shaped member, there being a slot in the rear end of said rocking lever, there being also a slot in the T-shaped member beneath the slotted end of said rocking lever, a pin intersecting said slot in said rocking lever and a pin intersecting the slot in said T-shaped member, a locking plate member having a slotted lower end and a notched forward edge, said slotted lower end engaging the pin intersecting the slot in said T-shaped member, and the pin in said rocking lever engaging in said notches, and means limiting the forward and rearward movement of said plate.

8. A locking plate for a pincher type stapler comprising a substantially rectangular rocking plate having a slotted lower edge, a curved upper edge, and a series of successively deeper stepped notches in a vertical edge.

9. A locking plate mechanism for a pincher type stapler comprising a rocking lever pivotally connected intermediate its ends to a T-shaped member, a driver connected to said rocking lever at one end of said T-shaped member, there being a slot in the rear end of said rocking lever, there being also a slot in the T-shaped member beneath the slotted end of said rocking lever, a pin intersecting said slot in said rocking lever, a pin intersecting the slot in said T-shaped member, and a locking plate member having a slotted lower end and a notched forward edge, said slotted lower edge engaging the pin intersecting the slot in said T-shaped member, and the pin in said rocking lever engaging in said slots.

ALDO BALMA.