Aug. 7, 1945. R. VANCURA 2,381,192

STAPLING DEVICE

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Fig. 1

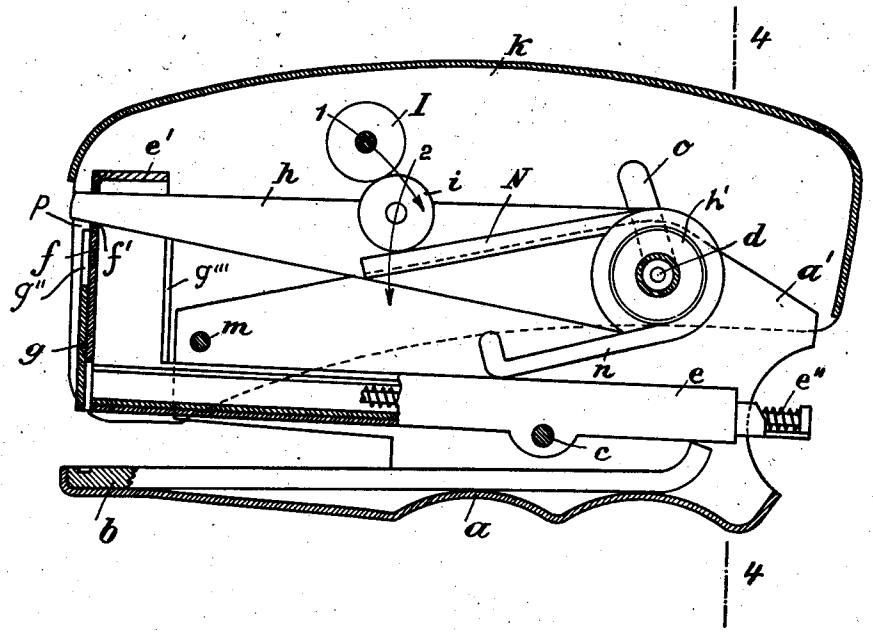
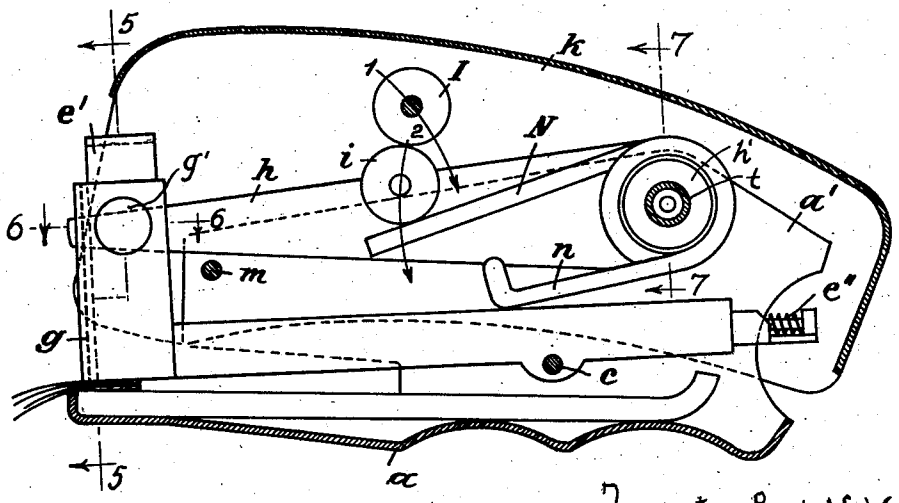


Fig. 2



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Fig 6

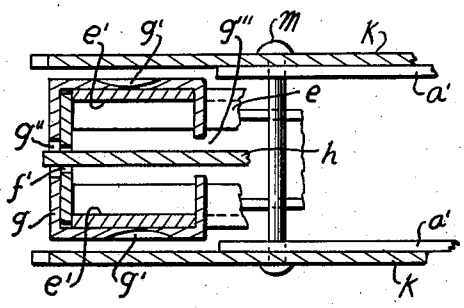


Fig 3

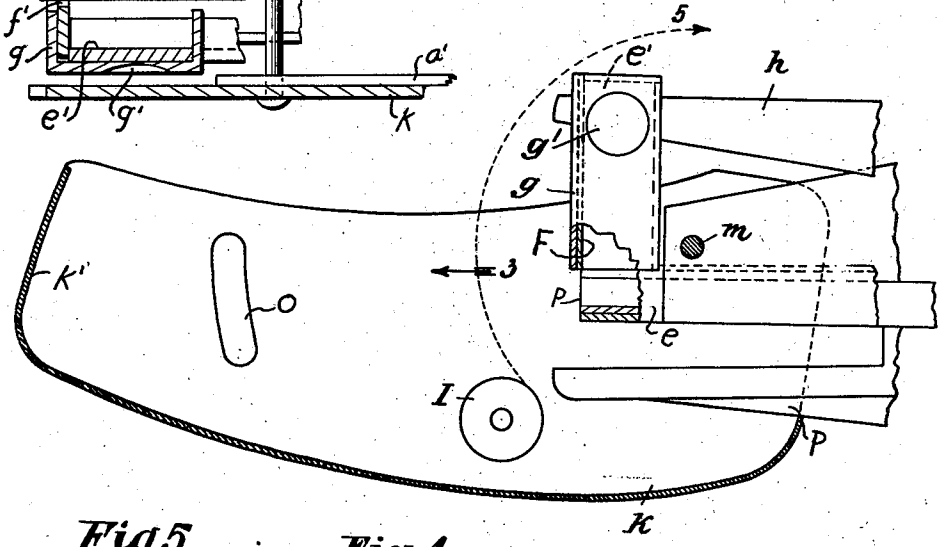


Fig 5

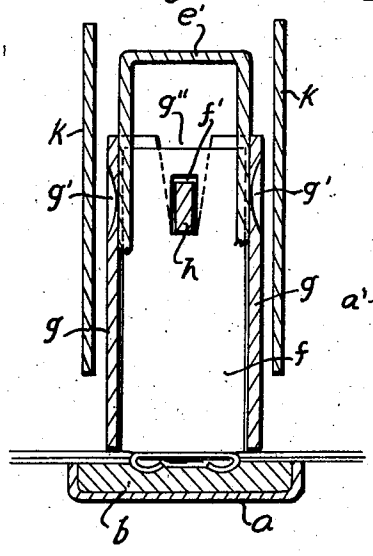


Fig 4

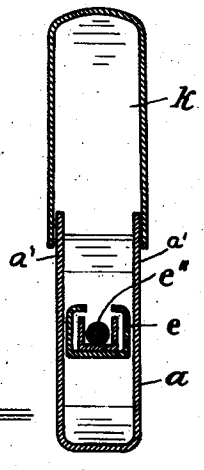
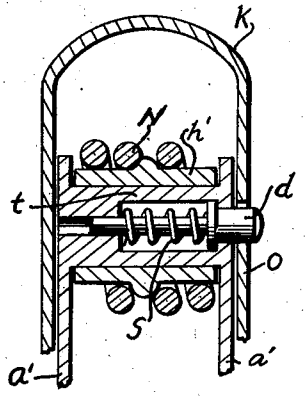


Fig 7



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Patented Aug. 7, 1945 2,381,192

UNITED STATES PATENT OFFICE

2,381,192

STAPLING DEVICE

Rudolf Vancura, Vienna, Germany; vested in the Alien Property Custodian

Application November 1, 1938, Serial No. 238,144
In Germany July 9, 1938

6 Claims. (Cl. 1—49)

This invention relates to stapling devices, more particularly of the jaw type. Stapling devices of this description have become known in which there is articulately connected to the lower portion of the device a cap by means of which the upper portion, which is pivotally mounted on the lower portion, is pressed against the lower portion and against the matter to be stapled, and by means of which the driver is forced down. The invention resides in the fact that the cap is so shaped, at its front or rear portion, that it is possible to move the cap about its axis of rotation into a position opposite the front side of the device. The advantages obtained in this manner will be set forth in due course.

A form of construction of a jaw type stapling device embodying the present invention is shown, by way of example, in the accompanying drawings in which the device is shown on an enlarged scale.

Fig. 1 is an elevation, partly in section, of the machine in the normal position of rest;

Fig. 2 is a similar elevation showing the machine in operation, i. e. in stapling position;

Fig. 3 is a similar but partial elevation with the cap in open position;

Fig. 4 is a section taken on the line 4—4 of Fig. 1;

Fig. 5 is a vertical section through the plunger, partly in elevation and taken along line 5—5 in Fig. 2;

Fig. 6 is a cross section of the plunger, taken along line 6—6 in Fig. 2;

Fig. 7 is a vertical section through the axis of the pivot pin of the actuating lever, taken along line 7—7 in Fig. 2.

Referring to the drawings, the stapling device according to the invention, which is in the form of a flat pocket stapling appliance of the jaw type, consists of a lower portion or anvil arm *a* with the upsetting clinching plate or anvil *b* at the outer end and an upper portion pivoted to the lower portion at *c*. This upper portion comprises essentially the guideway, channel or magazine *e* for the coherent strip of staples, this guideway being bent vertically upwards at the outer end to form an inverted U-shaped portion *e'*. Between the front edge of this portion *e'* of the staple guideway and the surrounding cover plate or sleeve *g* there travels the plunger or driver *f*. The cover plate *g* extends downward as far as to cover the outlet of the horizontal staple channel (Figs. 1–2). In the two upwardly extending side walls *a'* of the member *a* there is further pivotally mounted on the hollow pivot *t* (Fig. 7) the actuating lever *h*. The free end of lever *h* projects through hole *f'* in driver *f* (Figs. 1, 5 and 6). Roller I is carried to cap *k* and may be made to bear against lever *h* or, as in this case, against a roller *i* carried by lever *h*. The cap embraces with its side walls from above the lower portion of the stapling device (Fig. 4) or rather its side walls *a'* together with the other constituent parts. The cap is slightly rocked around the pivot *m* in a known manner by pressure exerted by the hand in which the stapling device is gripped, with the result that the actuating lever *h* is also moved.

In order that the lever *h* shall be automatically returned into its position of rest after actuation, the lug or roller *i* thereon bears from above against the one straight end N of a helical spring wrapped around the hub *h'* of lever *h*, said hub being journalled upon the pivot pin *t*. The other straight end *n* of said spring bears from above against the staple guideway *e*.

By swinging down the lever *h* a downward force is exerted upon the spring end N and, through the spring end *n*, is transmitted to the staple guide *e* swinging the latter downward, around the pivot *c*, until said guide is arrested by the resistance of the matter to be stapled (Fig. 2). On the further swinging down of the lever *h* the end N of the spring is lowered towards the now stationary end *n* (Fig. 2) with corresponding increase of the tension of the spring, and the stapling operation is thereby effected. On cessation of the pressure exerted upon the cap *k* the lever *h* and all the other elements of the device are returned into their initial positions by the spring arm N (Fig. 1).

According to the invention the cap *k*, at the front end is slotted at P so that it becomes possible to swing the cap *k* round, about its axis *m*—through about 180°—into a position in front of the forward end of the device.

When the cap *k* has thus been swung round (Fig. 3) the upper part of the device, together with the various elements thereof, are uncovered and made fully accessible for cleaning and lubricating purposes and the like.

In the position of Fig. 3 the cap *k* not only gives access to the working parts of the device but also serves as a protecting cap or shield against accidents. For if in the known devices the mistake be made of forgetting to remove or relieve from spring pressure the constantly spring pressed staple pusher or feeder *e''* before raising the cover plate *g* any portion of the strip

of staples left in the feed channel will be shot out forcibly by said pusher at the front end of said channel and is liable to injure the user of the device. In the present case, however, any staples thrown out in this manner in the direction indicated by the arrow 3 in Fig. 3 are caught by the end wall *k'* of the turned down cap. Said end wall thus acts as a vertical baffle, shield or interceptor standing opposite the mouth or exit of the magazine *e* at such a distance as not to interfere with free access to the working parts.

The cover plate *g* (Figs. 1, 5, 6) is preferably slidably mounted on the vertical portion *e'* for the purpose of making possible the removal of any staples that may happen to become stuck or jammed. The part *g* has the form of a tube or sleeve of square cross section (Fig. 6) snugly fitted upon the parts *e'* and provided with a relatively short slot *g''* (Figs. 1 and 5) in its outer vertical wall and with a slot *g'''* (Figs. 1 and 6) extending completely from the top to the bottom of the inner vertical wall. Finger holds, in the form of recesses *g'* for lifting the part *g* are provided on its side or rear walls, so that the finger holds are accessible only after the cap has been swung into position in front of the device (Fig. 3) when said cap is capable of serving as a protecting cap for ejected staples as described above. The cover plate *g* can then be lifted from its normal position (Fig. 1) into the raised position (Fig. 3) in which it exposes the exit of the magazine.

The height of the cover plate *g* is such that said plate in its raised position (Fig. 3) does not extend above the upper edge of the vertical portion *e'* and, therefore, does not prevent the swinging back, as indicated by arrow 5, of the cap *k* and roller I from the position shown in Fig. 3 to the position shown in Fig. 1. In the latter the forward end of the horizontal staple channel *e*, for the moment, is not covered by the plate *g* being still in the raised position of Fig. 3. The staple channel is thus open at point *p* for inspection and cleaning. Finally, by pressure exerted on the cap, the plate *g*, by means of the lever *h*, is lowered into its normal position (Fig. 1).

A pin *d* (Fig. 7) arranged in the hollow pivot axle *t* of the lever *h* is pressed outwards by a spring *s* and projects with its one end into an arcuate slot *o* (Fig. 7) in the cap and by abutting against the lower end of said slot, normally prevents upward swinging of said cap. The slot allows the described operative stroke of the cap and lever *h*. When the pin is forced back against its spring by the finger of the operator the cap *k* is free to be swung to the position of Fig. 3.

When the cap *k* is depressed by the hand, the cap *k* telescopes over the under portion *a* of the device (Fig. 4). The working stroke will not be as long as in the plier type stapling devices which have two projecting handles. The transmission of the movement of the cap *k* to the actuating lever *h* may therefore be effected by means of a special contrivance which takes account of this circumstance. In accordance with the invention said contrivance or transmission is so devised that the movement and velocity of the lever is greatest at the start and smallest at the end of its downward stroke. Consequently, the swinging down of the upper part of the device towards the matter to be stapled takes place rapidly, while the succeeding driving down of the driver *f* is effected more slowly but with proportionately greater force. In the example shown the two rollers I and *i* are so disposed relatively to each other that their paths of movement fulfil the said condition. When the cap *k* is depressed the roller I describes an arc *l* about *m* as the center and the roller *i* an arc 2 about *d* as the center. The path of the roller I which is initially radial to the periphery of the roller *i* (see Fig. 1), becomes finally (see Fig. 2) more or less tangential to the periphery of the roller *i*. At the end of its movement, therefore, the roller *i* is moved only through a short distance but with correspondingly greater force, as mentioned above.

I claim:

1. In a device of the type indicated, the combination of an elongated anvil arm, fastener applying mechanism, an elongated staple magazine, carried by said arm, said magazine having an exit end disposed adjacent said applying mechanism, means for yieldingly urging said staples longitudinally of the magazine toward said exit end, shiftable means disposed adjacent said exit end for blocking the longitudinal movement of said staples, an elongated narrow cap, a pivot connecting said arm and said cap, said cap being movable to two positions and adapted, in one of these positions to substantially cover said mechanism and arm, and being adapted to be swung through a relatively small angle towards said arm for actuating said mechanism, and through a much greater angle away from said arm to a second position in which it is adapted to expose said mechanism and simultaneously to act as a protective shield against staples shot out accidentally from the exit end of said magazine when said blocking means is removed.

2. A device as claimed in claim 1, in which the pivot connecting said arm and said cap is located near the exit end of said magazine.

3. A device as claimed in claim 1, in which said cap is provided with a clearance slot adapated to eliminate interference, with the fastener applying mechanism in the movement of said cap to said second position.

4. A device of the type indicated comprising, in combination, an elongated anvil arm, fastener applynig mechanism carried by said arm, an elongated staple magazine carried by said arm and forming a part of said mechanism, spring means for pressing said staples longitudinally of said magazine toward said applying means, a shiftable gate for blocking and unblocking the longitudinal movement of said staples in said magazine, and an actuating member for said applying mechanism, said member being movable from a first position blocking access to said mechanism to a position substantially alined with the longitudinal axis of said magazine to permit staples to be supplied to said magazine and to act as a protective shield against staples in the magazine accidentally expelled therefrom when the blocking means in made ineffective.

5. A device as claimed in claim 1, in which said cap is provided with a slot defining the limits of oscillation of the cap about the pivot of the latter, and in which said mechanism comprises an actuating lever, a hollow pivot connecting said lever with said arm, a member arranged in said hollow pivot and adapted to project into said slot, and spring means adapted to push said member into said slot.

6. In a fastener applying implement, the combination of a staple magazine for containing a column of staples, a staple fastening mechanism operatively associated with said magazine, means

yieldingly urging said staples longitudinally of said magazine toward fastening position, a gate shiftable for maintaining and releasing the staple at one of the ends of said column in applying position, and an actuating member for said fastening mechanism, said member being movable from a first position blocking access to said mechanism to a position substantially alined with the longitudinal axis of said magazine to permit staples to be supplied to the magazine and to act as a limiting shield against staples accidentally expelled from the magazine when the gate is moved to releasing position.

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