

Dec. 23, 1947.

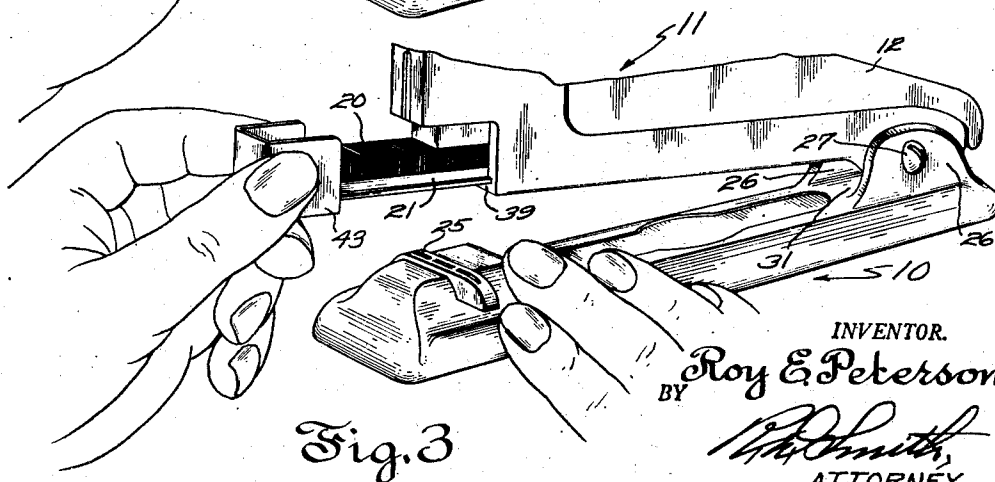
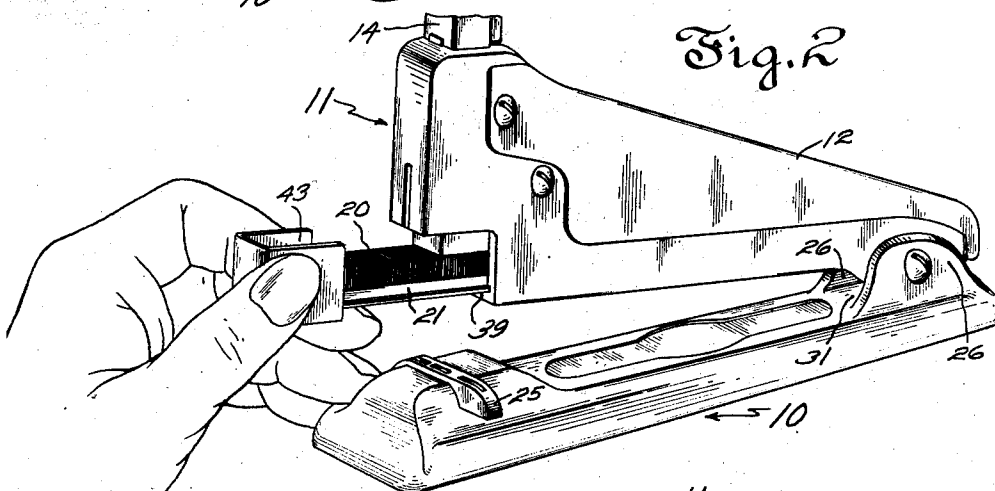
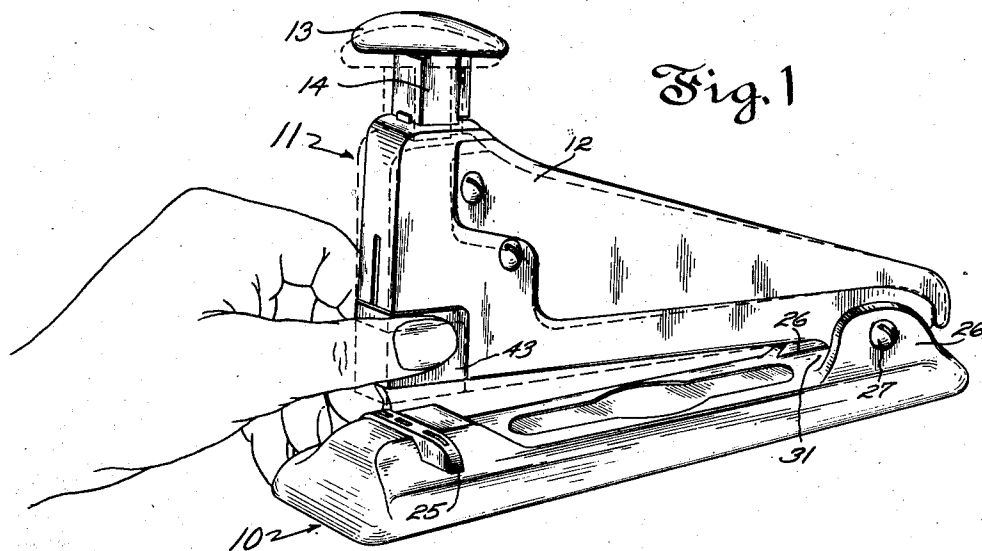
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2,433,155

STAPLER WITH AUTOMATIC SLIDE LOCK

Filed Dec. 6, 1944

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

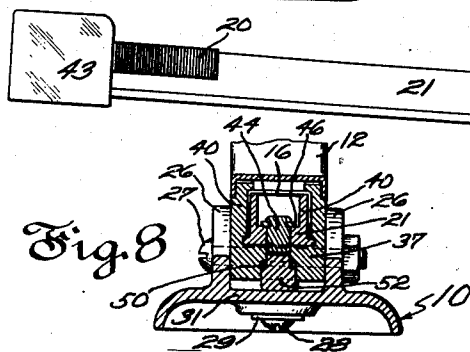
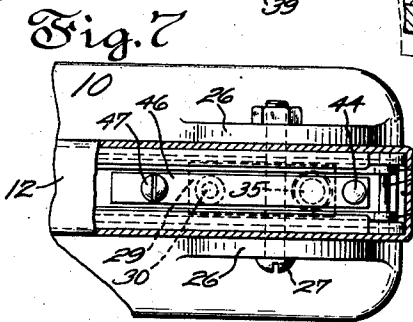
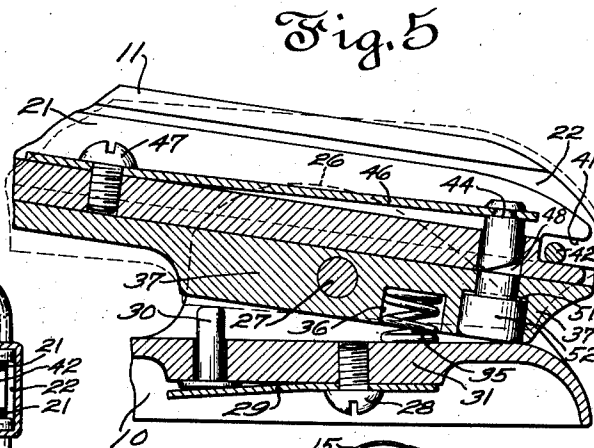
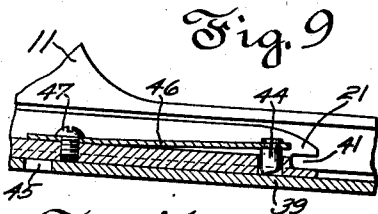
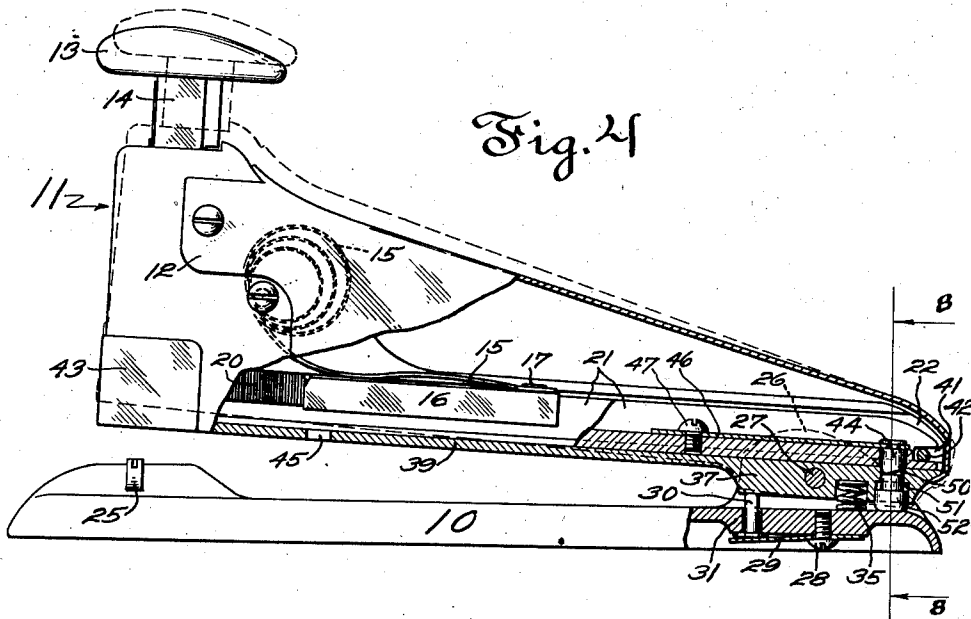


Fig. 6

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2,433,155

STAPLER WITH AUTOMATIC SLIDE LOCK

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mesne assignments, to Hotchkiss Realty Corpo-
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ware

Application December 6, 1944, Serial No. 566,865

13 Claims. (Cl. 1-3)

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This invention relates to portable stapling im-
plements particularly suited for office use as on
a desk for fastening together sheets of paper.

Paper fastening staplers intended for desk use
commonly include a base carrying a stapler
clinchng anvil and a pivotally connected stapling
head overhanging the base. The head can usu-
ally be swung upward enough beyond a normally
poised position above the anvil to admit to the
space between the anvil and the staple delivering
end of the head any unusually thick work to be
stapled.

It has been proposed to provide such a stapling
head with a staple storing chamber or maga-
zine into and out of which a staple carrying slide
may be shifted in endwise direction longitudinally
of the head for loading the slide with a charge
of staples. The staples are then automatically
fed therealong to the front of the stapling head
where they are driven into the work. It has fur-
ther been proposed to make such slide withdraw-
able from this front or staple delivering end of
the stapling head in which case fastening means
such as a manually releasable catch are needed
to prevent the staple slide from accidentally work-
ing outward from fully retracted working posi-
tion within the magazine. Such slide retaining
devices as have heretofore been proposed have
required individual manipulation of a separate
control element for releasing the staple slide so
that it can be withdrawn endwise from the maga-
zine for reloading.

An object of the present improvements is to
provide locking means for such a staple carry-
ing slide which require no individual manipula-
tion of a separate control element for unlocking
the slide, but which will react to mere upward
swinging movement of the stapling head beyond
its aforesaid normally poised position above the
base in a manner to unlock or release the staple
slide for withdrawal and reloading. This must
be accomplished in a way that will not cause
the locking means to be affected when the stapling
head is pushed downward from said normally
poised position to engage the work being stapled.

A related objective is to enable a locked-in
staple slide to be unlocked and withdrawn from
the staple magazine by single handed manipula-
tion of the implement.

A further object is to make use of a single
catch not only to hold the slide fully retracted
within the stapling head but also so to limit the
maximum normal extent of withdrawal of the
slide that complete separation of the slide from
the stapling head is prevented.

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Another object is to conceal from sight and to
protect from accidental disturbance all working
parts of the slide locking and unlocking mecha-
nism.

A still further object is to make the locking
mechanism so simple as to require the addition
of only two working parts to the regular struc-
ture of the base and head of the implement.

These and further objects of the present im-
provements will appear in greater particular in
the following description of a satisfactory embod-
iment of the invention which has reference to the
appended drawings wherein:

Fig. 1 is a perspective view of a desk stapler
incorporating the invention showing the user's
hand placed in position for single handed with-
drawal of the staple slide from the magazine.

Fig. 2 is a view similar to Fig. 1 showing a single
hand of the user in the act of withdrawing the
staple slide unaided by the user's other hand.

Fig. 3 is a fragmentary view showing an alter-
native method of two-handed manipulation of the
instrument for withdrawing the staple slide from
the magazine.

Fig. 4 is a view of my improved stapler in side
elevation showing parts thereof broken away or
in longitudinal central section.

Fig. 5 is an enlarged view of the hinge construc-
tion showing the slide locking parts as positioned
by lifting the stapler head to release the staple
slide for withdrawal from the magazine.

Fig. 6 shows the staple slide of Fig. 4 with-
drawn from the magazine to its farthest normal
extent.

Fig. 7 is a fragmentary plan view of the rear
end of the stapler showing certain parts broken
away.

Fig. 8 is a rear end view of the stapler showing
the locking parts for the staple slide in section on
the plane 8-8 in Fig. 4 looking in the direction
of the arrows.

Fig. 9 is a fragmentary view of some of the
parts in Fig. 6 differently positioned.

Major sections of my improved stapler may be
constructed mainly as heretofore proposed and
may comprise two hinged together arm-like struc-
tures, one of which (as a whole) will be referred
to as the base 10 and the other of which (as a
whole) will be referred to as the stapling head

11. Certain staple driving and automatic staple
feeding mechanism is assumed to be housed with-
in the casing 12 of the stapling head which may
be operated in usual manner by pushing down on
the hand knob 13 of a staple driving plunger 14.

This actuates staple driving parts inside of head

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11 that may be like any of those fully disclosed in United States Patents Nos. 2,117,741, 2,240,911 or 2,251,833. Also inside of head 11, and made accessible by removing cover 12, there is a loosely coiled staple feeding band spring 15 which constantly urges forward or toward the left in Fig. 4 a staple feeding impeller or follower 16 to which the free end of spring 15 is attached by rivet 17. This type of staple feeder is proposed in both of the above said Patents 2,117,741 and 2,251,833. Stop 53 limits advance of follower 16.

As in the aforesaid Patent 2,251,833 both the follower 16 and the staples 20 are guidingly supported by the track-like top edges of a staple slide 21 and are automatically advanced therealong toward the left in Fig. 4. The present invention has to do mainly with novel means hereinafter described for fastening and releasing slide 21 so that it can be retained dependably in the staple storing magazine chamber 22 and yet easily released at will for withdrawal to an exposed position for reloading it with a fresh charge of staples.

The base 10 carries the usual staple clinching anvil 25 at its front end and at its rear end presents two laterally spaced upstanding lugs 26 supporting the hinge bolt 27 and affording lateral retaining thrust for stapling head 10 whose rear end portion pivotally rocks therebetween on hinge bolt 27.

In the hollow of the base there is retained under the head of screw 28 a resilient support for the stapling head including a downward yieldable leaf spring 29 whose free end constantly bears upward on the head of lifter plunger 30 whose shank slides freely through a hole in the top wall 31 of the base. Thus plunger 30 normally bears the weight of the staple driving end of stapling head 11 and holds it poised sufficiently above anvil 25 to admit a normal thickness of work to be stapled. To bias the staple driving end of the head downward and yieldingly to resist clockwise swinging of the stapling head 11 a short spring coil 35 shown in Figs. 4 and 5 is lodged under compression between base 10 and the head 11 in a downward opening recess 36 in the thickened floor wall 37 of the stapling head.

The magazine 22 is defined in part by a U-shaped channel 40 which comprises the bottom portion of the hollow frame of the stapling head and whose cross sectional shape includes the floor wall 37 as shown in Fig. 8. This channel extends from the front to the rear of the stapling head and guides the slide 21 longitudinally of the stapling head. The rear extremity of the slide has a rearward opening notch 41 which engages with a stay pin 42 fixed crosswise in channel 40. Thus pin 42 prevents the rear end of slide 21 from rising. The front end of the slide is equipped with a square cornered flat surfaced draw head 43 which serves as a handle member and forms the staple driving corner of the stapling head structure when the slide is fully inserted in the magazine as shown in Figs. 1, 4 and 5.

The normal limit to which the slide 21 may be withdrawn from the magazine 22 is determined, as shown in Fig. 6, by the unidirectional interlocking engagement of a trippable detent device comprising a shiftable catch or spring biased latch stud 44 with a niche or aperture 45 in the bottom wall of magazine channel 40 of head 11. Thus aperture 45 affords a keeper shoulder engageable by latch stud 44 which latter projects downward and movably through an aperture 48 in the slide 21 and is fixedly riveted on the rear end of a leaf spring

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46 whose front end is fixedly anchored to a top surface of the bottom wall of slide 21 by a screw 47 having threaded engagement with the latter. Whenever slide 21 occupies any position intermediate its positions shown in Figs. 4 and 6, leaf spring 46 is caused to flex upward to permit the bottom end of latch stud 44 to wipe along the floor wall 39 of the magazine channel. In this construction no means are readily observable by the casual user that would enable the slide 21 actually to be separated from the stapling head, yet for mechanical inspection and repair it is simple to reach under and press upward against the bottom end of latch stud 44 with some simple tool as suggested by the arrow X in Fig. 6, whereby the slide can purposely be freed for complete separation from the stapling head.

Figs. 4 and 5 show a further function of the latch stud 44 new with these improvements in which this stud serves as a trippable detent device for fastening or locking the slide 21 positively in its fully inserted position in the magazine. This is accomplished by stud 44 being shiftable into and out of interlocking engagement with the top end of a niche or hole 53 that extends vertically through the thickened floor wall 37 of the stapling head when the stud aperture in slide 21 registers with hole 50. This hole hence also serves as a keeper shoulder for latch stud 44 spaced from keeper 45 and has a counterbore 51 at its bottom end in which is freely slidable the enlarged foot end of a latch tripping plunger 52 whose reduced shank is freely slidable in the hole 50. When the stapling head 11 is yieldably upheld by the lifter plunger 30 in its normal position shown in full lines in Fig. 4, the tripping plunger 52 whose foot constantly rests upon base 10 is low enough in relation to the top end of hole 50 to permit latch stud 44 to enter such hole and lockingly engage therewith and thereby positively prevent any movement of slide 21 forward or to the left in Fig. 4. However, upon lifting the stapling head from its full line position in Fig. 4 to its broken line relatively higher position (or from its broken line position in Figs. 1 and 5 to its full line position) the consequent approaching movement of the rear extremity of the stapling head 11 to the base 10 causes tripping plunger 52 to be forced to the top end of hole 50 and thereby to thrust upward on latch stud 44 against the resistance of leaf spring 46. This is because tripping member 52 projects interceptingly into the path of movement of fastening means 44 and being supported by the base 10 automatically shifts latch stud 44 out of engagement with its keeper shoulder provided by hole 50 and frees slide 21 for manual withdrawal from the magazine. It will be noted that tripping member 52 is loose with respect to both base 10 and the spring latch 44. Thus the parts which function as above include mechanism operative-ly associating detent device 44 with base 10 which mechanism is bodily movable with head 11 in a course to encounter thrust derived from base 10 for disengaging the detent device and thereby causing it to release slide 21.

In normal use of the stapling implement for fastening together sheets of paper, the work is inserted between the anvil 25 and the overhanging stapling head 11 in Fig. 4 when the latter occupies its full line position in Fig. 4. Staples are driven through the work and clinched against the anvil 25 in usual fashion by pressing downward on knob 13. This first causes spring 29 to yield to the downward thrust on lifter plunger

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30 which permits slide head 43 to be carried with stapling head 11 into contact with the work. Continued downward pressure on knob 13 forces staple driving plunger 14 downward relative to head 11 against the resistance of a spring in stapling head 11 (not herein shown but which may be like that shown in Patent 2,117,741) which constantly urges plunger 14 upward relative to the stapling head. The downward stroke of plunger 14 in usual manner drives one of the staples 20 through the work to be fastened and clinches it against anvil 25. Immediately upon releasing knob 13 the plunger 14 and the stapling head 11 are both automatically restored to their full line position in Fig. 4, which it will be understood is the same normally poised position of the head that is shown by broken lines in Fig. 1.

When the stapler including its base 10 is picked up by means of knob 13 in the usual way for carrying it about, the base 10 will be maintained in its relationship to the full line position of head 11 that is shown in Fig. 4. This is because the vertical expansive force of spring 35 at the right of hinge bolt 27 sets up a force moment tending to turn base clockwise about hinge bolt 27 at least equal to the turning moment in the opposite direction that is due to the weight of that part of base 10 which lies at the left of hinge bolt 27. Thus spring 35 serves as stop means to limit the swinging separation of base from head so that the latter may serve as handle by which to lift the entire implement and carry it about without the base falling away from the stapling head.

Nevertheless, by one-handed method of manipulation as is pictured in Figs. 1 and 2 the power of spring 35 may be overcome by bearing down against base 10 with the smaller three fingers of the hand while the index finger and thumb grasps each side of the slide head 43 and lifts the stapling head 11 from its broken line position in Fig. 1 to its full line position in Fig. 1 (represented by broken lines in Fig. 4). This forces the heel extremity of the thickened floor wall 37 of the stapling head down into movement limiting abutting contact with the top wall 31 of the base and at the same time causes the tripping plunger 52 to occupy the whole of the length of hole 50 thereby displacing the latch stud 44 from locking engagement with said hole 50. Thereupon in the full line position of the head 11 in Fig. 1 a forward pull by the thumb and index finger on the slide head 43 will haul the latter forward and outward from the magazine 22 to any desired extent up to and including the position of parts shown in Fig. 6 where this same latch stud 44 automatically snaps into locking engagement with aperture 45 because constantly urged downward by leaf spring 46.

Staples may now be loaded on the exposed length of slide 21 and the slide then pushed back into its fully retracted position in the magazine indicated in Figs. 1, 4 and 5. The beveled bottom end of latch stud 44 causes it automatically to cam upward out of aperture 45 against the resistance of spring 46 responsive to rearward travel of the slide 21. Spring 46 will cause the latch stud 44 automatically to re-enter and interlock with the hole 50 in the floor of the stapling head when the latter occupies its normal poised position shown in full lines in Fig. 4.

Fig. 3 represents an optional way of manipulating the implement for removing the staple slide in which the base 10 is held downward by the fingers of one hand while the other hand is used to pull out the staple slide for reloading. For some of

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the purposes of the invention the tripping stud 52 or some mechanical equivalent therefor need not be loose in relation to base 10 but could be fixed thereto.

5 The following claims are directed to and intended to cover all obvious equivalents and substitute for the parts and arrangements herein explicitly disclosed which fairly come within the terms of the claims as used to define the invention.

I claim:

1. A stapling implement including in combination with a base and a depressible stapling head pivotally connected to said base to swing between normal and relatively high positions overhanging the same, a magazine in said head in which to store staples, a staple carrying slide guided for lengthwise movement outward and inward of said magazine for receiving and storing a load of staples, and a detent device operative to fasten said slide against movement outward from said magazine when said head is in said normal position, together with mechanism so operatively associating said detent device with said base that upward swinging movement of said head above its said normal position relative to said base releases said slide from said detent device.

2. A stapling implement including in combination with a base and a depressible stapling head pivotally connected to said base to swing between normal and relatively high positions overhanging the same, a magazine in said head in which to store staples, a staple carrying slide guided for lengthwise movement outward and inward of said magazine for receiving and storing a load of staples, a trippable detent operative to fasten said slide against movement outward from said magazine when said head is in said normal position, said detent being bodily movable in unison with said head in a course to encounter thrust derived from said base thereby to be tripped when said head occupies one of its said relatively high positions whereby said detent is disenabled to fasten said slide, together with a resiliently positioned support normally sustaining the said stapling head yieldably poised in its said normal position spaced sufficiently above the said base to permit the insertion between said base and head of work to be stapled.

3. A stapling implement including in combination with a base and a depressible stapling head pivotally connected to said base to swing between normal and relatively high positions overhanging the same, a magazine in said head in which to store staples, a staple carrying slide guided for lengthwise movement outward and inward of said magazine for receiving and storing a load of staples, a trippable detent operative to fasten said slide against movement outward from said magazine when said head is in said normal position, said detent being bodily movable in unison with said head in a course to encounter thrust derived from said base thereby to be tripped when said head occupies one of its said relatively high positions whereby said detent is disenabled to fasten said slide, a resiliently positioned support normally sustaining the said stapling head yieldably poised in its said normal position spaced sufficiently above the said base to permit the insertion between said base and head of work to be stapled, and resilient means biasing said stapling head downward into its said yieldably sustained normal position and thereby

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operative after a stapling operation to dampen upward rebound of said head above said normal position responsively to the lifting action of said resiliently positioned support.

4. A stapling implement including in combination with a base and a depressible stapling head pivotally connected to said base to swing between normal and relatively high positions overhanging the same, a magazine in said head in which to store staples, a staple carrying slide guided for lengthwise movement outward and inward of said magazine for receiving and storing a load of staples, a trippable detent operative to fasten said slide against movement outward from said magazine when said head is in said normal position, said detent being bodily movable in unison with said head in a course to encounter thrust derived from said base thereby to be tripped when said head occupies one of its said relatively high positions whereby said detent is disenabled to fasten said slide, a resiliently positioned support normally sustaining the said stapling head yieldably poised in its said normal position spaced sufficiently above the said base to permit the insertion between said base and head of work to be stapled, and cooperative stop means on said base and head limiting the degree of swinging movement of said head above its said yieldably sustained position, whereby said head may be used as a handle for lifting said base.

5. A stapling implement including in combination with a base and depressible stapling head pivotally connected to said base to swing between normal and relatively high positions overhanging the same, a magazine in said head in which to store staples, a staple carrying slide guided for lengthwise movement outward and inward of said magazine for receiving and storing a load of staples, and a trippable detent device operative to fasten said slide against movement outward from said magazine when said head is in said normal position, said device including a keeper shoulder on said head and a catch carried by said slide shiftable into and out of engagement with said shoulder to lock said slide and bodily sharing the swinging motion of said head in a course of movement to encounter thrust derived from said base thereby to be tripped by upward swinging movement of said head above its normal position relative to said base whereby said device is disenabled to fasten said slide.

6. A stapling implement including in combination with a base and depressible stapling head pivotally connected to said base to swing between normal and relatively high positions overhanging the same, a magazine in said head in which to store staples, a staple carrying slide guided for lengthwise movement outward and inward of said magazine for receiving and storing a load of staples, a trippable detent device operative to fasten said slide against movement outward from said magazine when said head is in said normal position including a niche in the structure of said head and an aperture through said slide registering with said niche when the slide is fully inserted in the head, and a shiftable catch carried by said slide projectable from said aperture to interlock with an edge of said niche and bodily sharing the swinging motion of said head in a course of movement to encounter thrust derived from said base thereby to be retracted into said aperture by upward swinging movement of said head above its normal position relative to

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said base whereby said device is disenabled to fasten said slide.

7. A stapling implement including in combination with a base and depressible stapling head pivotally connected to said base to swing between normal and relatively high positions overhanging the same, a magazine in said head in which to store staples, a staple carrying slide guided for lengthwise movement outward and inward of said magazine for receiving and storing a load of staples, a trippable detent operative to fasten said slide against movement outward from said magazine when said head is in said normal position, and a member for tripping said detent supported by said base and projecting interceptingly into the path of movement thereof as the detent moves bodily relatively to said base in unison with said head thereby to intercept said detent in a manner to cause slide releasing movement of the latter relatively to said head when said head is swung above its said normal position relative to said base.

8. A stapling implement including in combination with a base and a depressible stapling head pivotally connected to said base to swing between normal and relatively high positions overhanging the same, a magazine in said head in which to store staples, a staple carrying slide guided for lengthwise movement outward and inward of said magazine for receiving and storing a load of staples, a trippable detent operative to fasten said slide against movement outward from said magazine when said head is in said normal position, said device including a latch carried by said slide lockingly engageable with said head thereby to fasten said slide, and a latch tripping member supported by said base and projecting interceptingly into the path of movement of said latch as the latter moves relatively to said base in unison with said head thereby to intercept said latch in a manner to cause slide releasing movement of the latter relative to said head when said head is swung above its said normal position relative to said base.

9. A stapling implement including in combination with a base and a depressible stapling head pivotally connected to said base to swing between normal and relatively high positions overhanging the same, a magazine in said head in which to store staples, a staple carrying slide guided for lengthwise movement outward and inward of said magazine for receiving and storing a load of staples, and trippable detent device operative to fasten said slide against movement outward from said magazine when said head is in said normal position, said device including a spring latch carried on said slide lockingly engageable with said head thereby to fasten said slide, and a latch tripping member loose with respect to both said spring latch and said base and movably positioned therebetween in a way to intercept said latch as the latter travels with said head relatively to said base whereby swinging of said head relatively to said base upward from its said normal position actuates said latch to unfasten said slide.

10. A stapling implement including in combination with a base and a depressible stapling head pivotally connected to said base to swing between normal and relatively high positions overhanging the same, a magazine in said head in which to store staples, a staple carrying slide guided for lengthwise movement outward and inward of said magazine for receiving and storing

a load of staples, a trippable detent operative to fasten said slide against movement outward from said magazine when said head is in said normal position, said detent being bodily movable in unison with said head in a course to encounter thrust derived from said base thereby to be tripped when said head occupies one of its said relatively high positions whereby said detent is disenabled to fasten said slide, a resiliently positioned support normally sustaining the said stapling head yieldably poised in its said normal position spaced sufficiently above the said base to permit the insertion between said base and head of work to be stapled, and resilient means biasing said stapling head downward into its said yieldably sustained normal position with enough force to counterbalance the weight of said base and thereby prevent slide releasing swinging of said base relative to said head when the whole implement including said base is picked up and carried about by means of said head.

11. A stapling implement including in combination with a base and a depressible stapling head pivotally connected to said base to swing between normal and relatively high positions overhanging the same, a magazine in said head in which to store staples, a staple carrying slide guided for lengthwise movement outward and inward of said magazine for receiving and storing a load of staples, and a trippable detent operative to fasten said slide against movement outward from said magazine when said head is in said normal position, a plurality of keepers spaced apart on said head, engageable by said detent on different occasions in a manner to fasten said slide against movement from a plurality of positions relative to said head, said detent being bodily movable in unison with said head in a course to encounter thrust derived from said base and to be tripped thereby in relation to at least one of said keepers by upward swinging movement of said head above its normal position relative to said base.

12. In a desk stapler including relatively swingable base and stapling head sections, a

staple slide longitudinally withdrawable from said head section, and releasable catch means for preventing withdrawal of said slide comprising, mutually alignable holes in said slide and head section, a latch spring anchored to said slide, a latch stud biased by said spring and projectable through one of said holes into the other hole, and a latch tripping member freely reciprocative in the said other hole between said latch stud and said base, said tripping member being long enough to engage and thrust said latch stud out of said other hole upon encountering said base during relative swinging movement of said sections.

13. A stapling implement including in combination with a base and a depressible stapling head pivotally connected to said base for swinging movement between normal and relatively high positions overhanging the same, a magazine in said head in which to store staples, a staple carrying slide guided for lengthwise movement outward and inward of said magazine for receiving and storing a load of staples, and a trippable detent operative to fasten said slide against movement outward from said magazine when said head is in said normal position, said detent being bodily movable in unison with said head in a course to encounter thrust derived from said base and to be tripped thereby when said head occupies one of its said relatively high positions whereby said detent is disenabled to fasten said slide.

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