Jan. 1, 1957 H. A. FLAMMER 2,775,763

STAPLING MACHINE

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FIG. 1

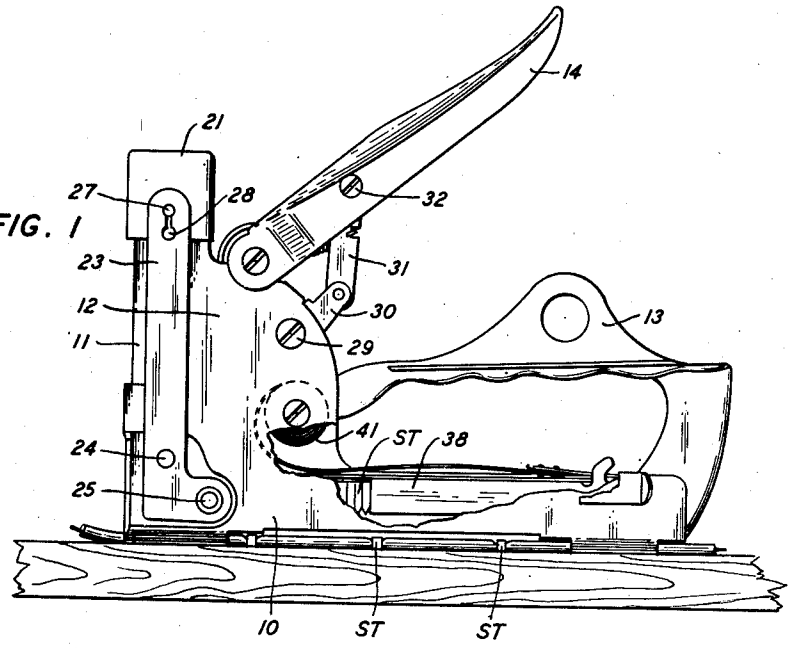

FIG. 2

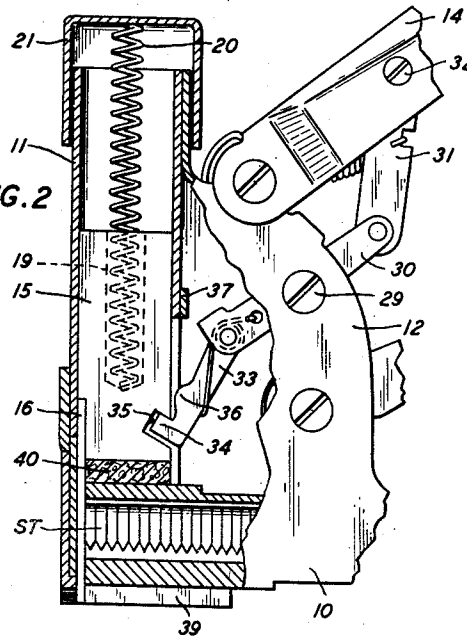

FIG. 3

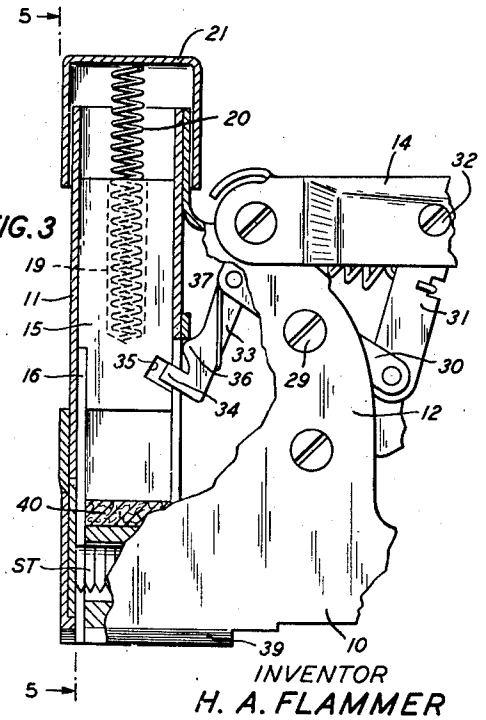

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FIG. 4

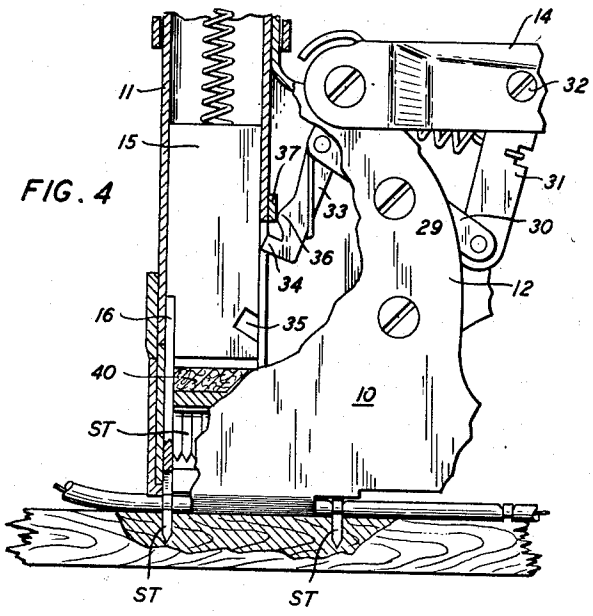


FIG. 5

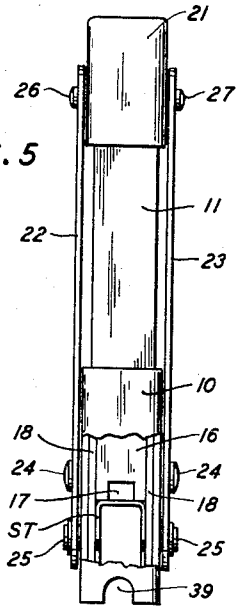


FIG. 6

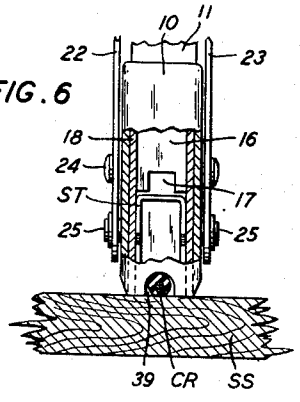


FIG. 7

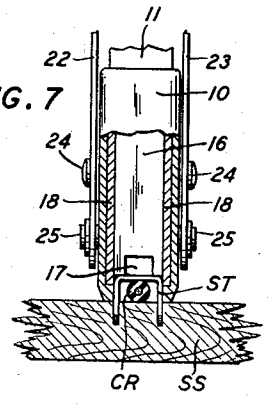


FIG. 8

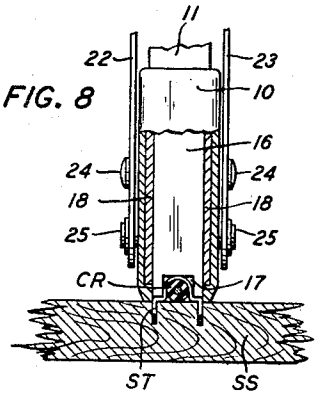


FIG. 9

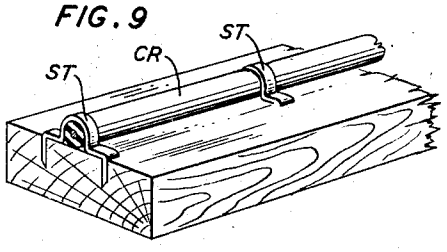
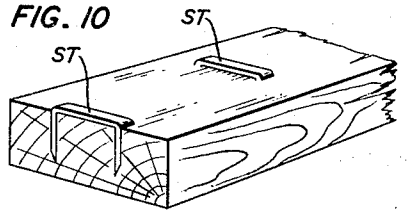


FIG. 10



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2,775,763

STAPLING MACHINE

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Application August 25, 1954, Serial No. 452,148

1 Claim. (Cl. 1—49)

This invention relates to stapling machines, and more particularly to small, portable hand machines for securing electrical conductors and the like to supporting surfaces.

An object of the present invention is the provision of a staple driving device wherein the staple driven bears against and conforms to the contour of the article being worked upon.

Another object of the invention is the provision in a staple driving device of a driving blade wherein the bottom of the blade is so shaped that the staple is deformed around the article being worked upon, the contour of the article acts as a mandrel and the working edge of the blade acts as a forming die.

A further object of the invention is the provision in a staple driving machine of a driving blade wherein the points of contact on the blade are in alignment with the prongs of the staple.

In staple driving machines, with which this invention is primarily concerned, the bottom or working edge of the blade usually is shaped to conform to the contour of the top of the staple, be it round or flat. Staples used for securing conductors to supporting surfaces are arcuately shaped at their top and are not deformed as they are driven home into the supporting surface and into contact with the wire or conductor. The force of the blow imparted to the staple determines how far the staple is driven into the supportnig surface and the amount of indentation on the surface of the wire or conductor. Thus it will be readily observed that if a conductor has a fairly large diameter, the amount of indentation will be greater than when the diameter of the conductor is smaller.

Applicant, aware of the shortcomings of present day staple driving devices, has provided a stapling machine wherein the blade is so shaped that the staple, which has a substantially flat top, and is of the well known type, is deformed around the conductor so that it conforms to the contour of the conductor, firmly embraces the conductor on each side thereof, and controls the amount of indentation of the conductor to prevent injury thereto. The shape of the conductor cooperates with the profile of the working edge of the blade to deform the staple around the conductor and force the prongs of the staple into the supporting surface.

In accordance with the preferred embodiment of the invention, the bottom or working edge of the staple driving blade is bifurcated to provide a slot or recess having a rectangular configuration, the side walls of which are substantially parallel and at right angles to the top of the slot, the depth of the slot being less than the diameter of the article being worked upon and the width of the slot being greater.

In the drawings:

Fig. 1 is a side elevational view, with part of the casing broken away, to show the staples and the staple feeding mechanism;

Fig. 2 is a fragmentary side elevational view, partly in section, with the operative parts in their normal position;

Fig. 3 is a view similar to Fig. 2, with the plunger and driving blade retracted by the operating lever and ready to be released to drive a staple;

Fig. 4 is a view similar to Fig. 3, with the plunger and driving blade released and the staple in the process of being driven;

Fig. 5 is an end view, partly in section, taken in the direction of the arrows 5, 5 on Fig. 3;

Fig. 6 is a fragmentary end view, partly in section, with the driving blade poised above the staple and the tool positioned over the conductor;

Fig. 7 is a view similar to Fig. 6 and shows the prongs of the staple entering the supporting surface with the top of the staple engaging the top of the conductor;

Fig. 8 is a view similar to Fig. 7 and shows the staple driven home and deformed to conform to the contour of the wire;

Fig. 9 is a fragmentary perspective view showing the staple embracing the conductor; and

Fig. 10 is a fragmentary perspective view showing the form the staple assumes when it is driven home without a conductor or the like positioned thereunder, and serves to illustrate why the staple assumes the shape of the article worked upon as shown in Fig. 9.

As shown in the drawings, the tool of my invention comprises a casing or housing **10** provided at its front or driving end with a tubular chamber **11**, having rearwardly extending flat parallel wing portions **12**. Positioned between the rearwardly extending members **12** and extending toward the rear of the casing **10**, where it is firmly secured, is the handle **13**. The handle **13** is fixedly supported and is located directly beneath and in alignment with the operating lever **14** so that the fingers of the operator's hand may conveniently grip the handle while the palm of the hand engages the operating lever **14**, to apply a downward force thereto.

Slidably mounted in the tubular chamber **11** of the housing **10**, as shown in Figs. 2, 3, and 4, is a spring driven plunger **15** having a staple driving blade **16** secured thereto and extending beyond the bottom edge thereof.

As shown in Figs. 5, 6, 7 and 8, the blade **16**, at its lower or working edge, is bifurcated to provide a rectangular recess or slot **17**, the side walls of which are substantially parallel and at right angles with respect to the top of the slot. The depth of the slot **17** is substantially less than its width. The blade **16** is maintained in juxtaposition with respect to the staples ST by means of the side walls **18** of the tubular chamber **11**, which act as guides to confine the blade **16** as it travels downwardly to contact the staples ST.

Located in the top of the plunger **15** is a centrally disposed recess **19** in which the lower end of the coiled spring **20** is positioned. The upper end of the spring **20** bears against the cap **21** which is held in place against the tension of the spring **20** by means of the arms **22** and **23**, the lower ends of which are secured to the casing **10** by means of rivets **24** and **25** and the upper ends of the cap **21** by means of the extending cap studs **26** and **27**, which are in engagement with the slots **28** in the upper portions of the arms **22** and **23**.

Positioned between the members **12** and pivotedly mounted by means of the screw **29** is the rocker arm **30**, one end of which is connected to a link member **31** which in turn is connected to the operating lever **14** by means of the screw **32**. Located on the opposite end of the rocker arm **30** is a spring-biased pawl or dog **33**, one end of which is pivotedly secured to the rocker arm while the other end is provided with an extending toe portion **34** which engages the recess **35** in the plunger **15** to raise

the plunger when the spring controlled operating lever **14** is depressed, as shown in Figs. 2 and 3. The pawl **33** is provided, adjacent the toe **34**, with a raised portion or boss **36** which acts as a cam to release the plunger **15** by causing the pawl **33** to be kicked out of the notch or recess **35** when the cam engages the shoulder or boss **37** of the member **11**.

As shown in Figs. 1 and 2, the operating mechanism of the tool of this invention is in its normal position and ready to drive one of the staples ST positioned in the staple driveway in the mechanism of the tool and which are fed by a following member **38** which is held in engagement with the last staple by means of the coiled spring tape **41** attached thereto, which causes the first staple to bear against the inside face of the driving blade **16**.

In the operation of this tool, the depression of the operating handle **14** causes the link **31** to rotate the rocker arm **30** in a clockwise direction, thereby causing the pawl **33**, which is in engagement with the recess **35** of the plunger, to force upwardly, against the tension of the spring **20**, the plunger **15** and its associated blade **16** as shown in Fig. 3, thereby permitting a staple to be positioned under the driving blade **16** with the driving edges or tangs of the driving blade positioned directly over the prongs of the staple as shown in Fig. 5, and more in detail in Fig. 6. Continued movement of the operating lever **14** causes the pawl **33** to become disengaged from the recess **35**, due to the cam **36** engaging the boss **37**, thereby releasing the plunger **15** and its associated blade **16** and permitting it to travel downwardly causing the working edge of the blade **16** to strike the staple ST a smart blow to drive it home, as shown in Figs. 7, 8, and 9, and deform it around the conductor CR, as shown in Figs. 8 and 9.

In order to absorb the shock of the plunger **15** at the end of its downward stroke, a pad of resilient material is provided at the base thereof.

As shown in the various figures, a longitudinally extending wire receiving groove **39** is provided in the base of the housing of the machine.

With further reference to Figs. 6, 7, and 8, these figures show the three positions of the driving blade from the start of its stroke until it drives the staple home and deforms it around the conductor. In Fig. 6, the bifurcated driving blade **16** is poised above the staple ST ready to drive it, with the conductor CR positioned in the groove **39** of the machine.

In Fig. 7, the driving blade **16** has been released, by the mechanism as heretofore described, has engaged the staple ST, forced the prongs thereof into the supporting surface SS, and is about to deform the top portion of the staple around the conductor CR.

In the final stage, as shown in Fig. 8, the blade **16** has completed its downward travel and has deformed the staple ST around the conductor CR to provide shoulder

portions on each side of the conductor which firmly embrace it as shown in Fig. 9, and at the same time, slightly indent the conductor to firmly secure it in place.

Due to the novel shape of the recess **17** in the blade **16** which, as shown and as heretofore described, has a depth less than the diameter of the conductor and a width greater than its depth, with the side walls and top wall of the recess at right angles with respect to each other, the staple is deformed around the conductor as shown in Fig. 8, and is not merely driven in with the top of the staple acting on the top surface of the conductor, with the conductor limiting the amount of travel of the staple into the supporting surface.

In the novel machine of my invention, the shape and proportions of the driving blade are of major import and serve to deform the staple around the conductor and at the same time limit the amount of pressure applied to the conductor by the staple.

By way of illustration, I have shown in Fig. 10 how the staple is driven home with its top inside surface bearing against a supporting surface when no conductor or article has been interposed therebetween. It will be readily observed that in the device of this invention the blade does not merely drive the staple but actually conforms it to the contour of the article worked upon and also limits the pressure applied by the staple to the article.

While I have shown and described the preferred embodiment of my invention, it is understood that variations and modifications may be made therein without departing from the spirit of the invention.

What is claimed is:

A machine for driving a staple into a supporting surface for securing an electrical conductor thereto, comprising a casing, a driveway in said casing, a staple driving blade mounted in said driveway, a staple magazine defined by the walls of said casing and opening into said driveway, means in said magazine for feeding staples to said driveway, said driving blade at its lower end being bifurcated, the ends of said bifurcation being flat and in true alignment, the sidewalls of said bifurcation being spaced equidistant throughout their length and at right angles with respect to the flats on the bottom edge of said driving blade, the depth of said bifurcation being less than the outside diameter of the electrical conductor being attached and the width of said bifurcation being greater than its depth.

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