Oct. 25, 1960 J. J. OUSSANI 2,957,174

STAPLING DEVICE

Filed Dec. 31, 1957

Fig. 1.

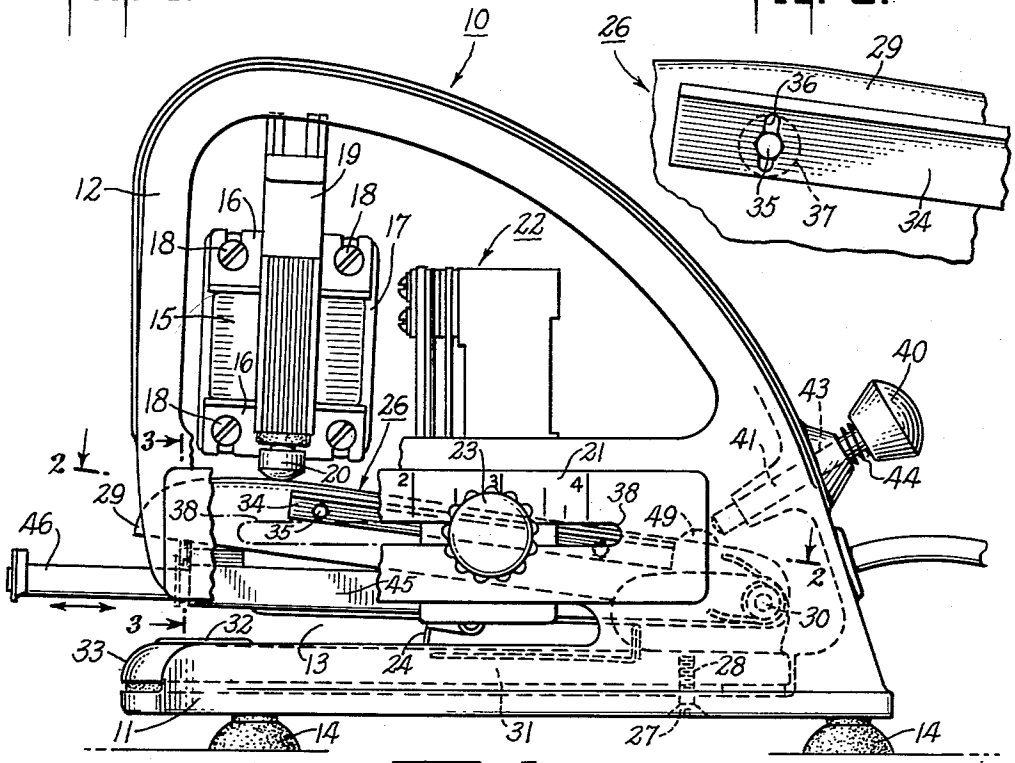


Fig. 5.

Fig. 2.

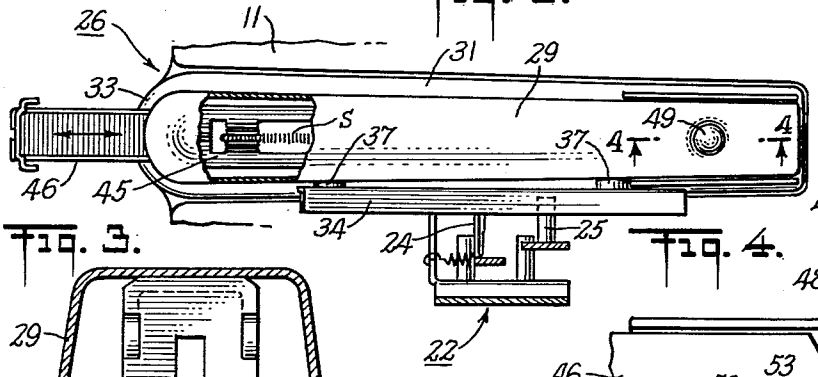


Fig. 3.

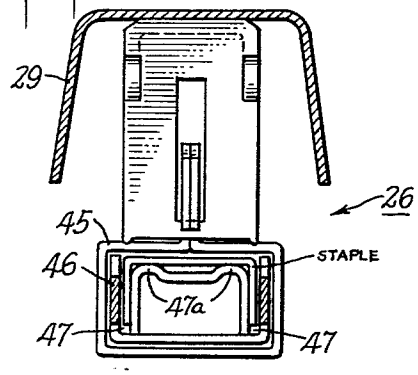
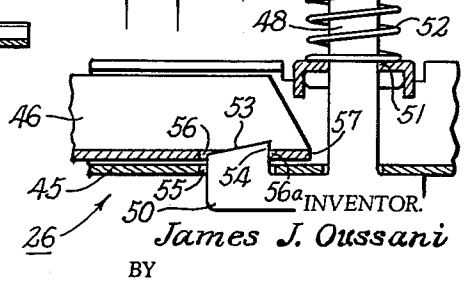


Fig. 4.



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STAPLING DEVICE

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1 Claim. (Cl. 1—3)

This invention relates to a fastening device, and more particularly to a power impelled device for driving fastening elements, such as staples, adjustably at predetermined spacings from an edge portion of the articles to be fastened. Still more particularly, this invention relates to an improved, powerized, preferably electrically impelled stapler which utilizes a leading edge portion of the articles to be fastened as the means for triggering the electrical impeller, the said stapler including novel means permitting efficient use of staples with legs of a wide variety of lengths.

This invention further relates to a stapling device of the type described which includes novel means for adapting to powerized operation and efficiently utilizing in such adaptation, the features of certain manually operated stapling devices as exemplified in the patent to Mueller 2,801,414 of August 6, 1957.

While it is well known in the art to utilize the electrical and pneumatic motors as sources of power for driving staples and like fasteners, as exemplified by my Patent No. 2,403,947 of July 16, 1946, and my application Serial No. 496,465, filed March 24, 1955, the modes heretofore employed have been subject to one or more disadvantages, which disadvantages have, in a measure, prevented a more widespread consumer acceptance of powerized fastening devices.

Such disadvantages included the necessity for providing a relatively large housing for correlating the motor and fastener assemblies, particularly where adjustable fastener positioning is desired. A further disadvantage frequently encountered is lack of rigidity in the motor control structure, which latter flaw decreases the efficiency of the device and, after long periods of use, may necessitate replacement of parts, or at least extensive readjustments of a magnitude requiring return of the machine to the factory.

Another commonly found fault of such fasteners is the lack of a means permitting use of staples of a variety of lengths.

Still a further shortcoming inherent in most powerized staplers heretofore known, and particularly those assemblies wherein an ordinary manual stapler is adapted to powerized use, is the lack of a safe, convenient means of reloading the staple magazine without requiring the time consuming operation of readjustment of the relation of the parts to each other, including shutting off the source of impelling power.

Accordingly, it is an object of this invention to provide in a relatively compact housing a powerized fastener of the adjustable type, having novel motor control means to assure long life, and prolonged efficient operation.

A further object of this invention is to provide a stapler device capable of adjustment efficiently to accommodate staples having legs of a wide range of sizes.

A still further object of this invention is to provide a stapler device of the type described which may be quickly and safely reloaded, without the hazard incident to requiring the operator to place his fingers near the staple turning anvil in effecting this operation.

To attain these objects and such further objects as may appear herein or be hereinafter pointed out, I make reference to the accompanying drawings forming a part hereof, in which—

Figure 1 is a side elevation of my device, with parts broken away to show detail;

Figure 2 is a fragmentary section taken on the line 2—2 of Figure 1;

Figure 3 is a magnified section taken on the line 3—3 of Figure 1;

Figure 4 is a fragmentary magnified section taken on the line 4—4 of Figure 2;

Figure 5 is an enlarged view of a portion of Figure 1.

Reference is now made to the drawings wherein a housing **10**, of cast or sheeted metal or the like is provided with a base **11**, separated from the head portion **12** by an open throat **13**. The base **11** is preferably provided with suction cups **14** or the like, to dampen the noise incident to operation, as well as to avoid marring of the surface supporting the device, or slippage with respect thereto.

A solenoid **15**, having slotted feet **16**, is adjustably mounted on the bracket **17**, extending inwardly from the head portion **12** of the housing **10** by bolts **18**, or other affixing means. An armature or magnetically responsive core **19**, having an extending plunger **20**, is slidably guided within the solenoid **15**.

The housing **10** is provided on one side with an extended slotted depth edge gauge **21**. An electrical control **22** is mounted to be slidably guided within the gauge slot **21**, a knurled knob **23** being provided for forward and rearward adjustment of the said control. As the said control has been described in detail in my aforementioned Patent No. 2,403,947, discussion herein will be limited to the phases of the said control pertinent to the instant invention.

The control **22** is provided with a trigger **24** adapted to straddle the throat portion **13** and, upon insertion of items to be fastened into trigger abutting position within the said throat, to close an electrical circuit, thereby energizing the solenoid **15**.

The control **22** is provided further with an inwardly extending abutment finger **25** (see Figure 2) carrying the latch, which finger, when depressed, is adapted to unlatch the contacts to break the solenoid circuit.

A manually operable stapler assembly **26** is affixed to the base **11** of the housing **10** by a bolt **27** which extends inwardly through the said base into a threaded aperture **28** formed in the stapler **26**. The stapler **26** is provided with a driver arm **29**, pivotally connected at **30** to a base **31**, which base carries a staple turning anvil **32** adjacent the front end **33** thereof. The driver arm **29**, in addition, is provided with an L-shaped rail **34** which is mounted in spaced, offset relation to the said arm by means of bolts **35**, **35** passing through the slots **36**, **36**, and forcing the rail **34** against the spacers **37**, **37** extending between the arm **29** and the rail **34**.

With the stapler assembly **26** operatively positioned within the housing **10**, the plunger **20** will lie against the driver arm **29** at a point adjacent the unpivoted end thereof.

My device may be adjusted to permit staples to be driven a predetermined distance inwardly from the leading edge thereof. To accomplish this adjustment, the knurled knob **23** is loosened, permitting the control **22** to be advanced or retracted within the slotted gauge **21** to the desired position, where it may be reset by tightening the knob. When the desired setting is effected, the articles to be fastened are inserted within the throat **13** to the point where they abut the trigger, thereby closing the circuit through the solenoid **15** and causing the driver arm **29** to be pivoted downwardly about the point **30** to

the staple driving position. As the driver arm **29** reaches the fully descended staple clinching position, the abutment finger **25** is engaged by the rail member **24** and is depressed thereby to the circuit breaking position, thus deactivating the solenoid **15** and permitting the driver arm **29** to return to the position shown in Figure 1.

It will be readily recognized that the rail member **34** is of a length to perform the deactivating function in every adjusted position of the control **22**.

The adjustable connection between the rail member **34** and thed river arm **29** permits my device to effect efficient clinching of staples having legs of a wide variety of lengths insofar as the adjustment permits automatic deactivation of the impeller circuit to shut off the power to the impeller after the completion of the clinch stroke in accordance with the length of the legs of the staple.

It has been determined that most efficient operation of a powerized stapler can be secured only where the timed deactivation of the impelling means is accurately coordinated with the leg length of staples used. Accordingly, I have provided my device with a simple adjustment which will permit the user accurately to retime deactivation of the solenoid **15** to accommodate differently sized staples, without necessitating removal of the stapling device **26** from the housing **10**.

To accomplish such retiming for different leg lengths of staples placed in the channel **47** of the magazine in the usual way within the limits of the depth of the channel **47**, it is necessary merely to depress the driver arm **29** manually until the bolts **35, 35** register with the opening **38** of the slotted gauge **21**, and by means of a screw driver or the like, reach through the opening **38** and loosen the said bolts. With the bolts **35, 35** thus loosened, the entire rail member **34** is rendered upwardly and downwardly movable within the range of adjustment provided by the slots **36, 36**. It will be readily recognized that when changing from a longer to a shorter staple, upward adjustment of the rail member **34** relative to the driver arm **29** will be required, and vice versa.

The driver arm **29** may likewise be provided with gauging lines delineating proper adjustment for staples of standard sizes.

When the desired adjustment of the rail member **34** is effected, the bolts **35, 35** are tightened, again fixedly positioning the rail member **34** relative to the driver arm **29**.

To facilitate safe and rapid reloading of the magazine of my fastening device, I have provided novel means for accomplishing the above mentioned operation without necessitating removal of the stapler from the housing or deactivation of the power source. Likewise, in carrying out the reloading operation with my device, the dangerous operation of interposing the fingers between the driver arm **29** and the anvil **32** is obviated.

To accomplish the loading advantages as aforesaid, I have provided at a rearward position on the housing **10**, a knob **40** operatively connected to a stud **41**, having a rounded end **42**, which stud is slidably guided in a bearing aperture **43** formed through the housing **10**. The knob **40** is normally biased to be spaced outwardly from the housing **10** by a spring **44**.

The stapler **26**, as exemplified by the said Mueller patent, is provided with a carrier arm **45** and a magazine **46**, telescoping within said carrier arm, and slidable outwardly therefrom.

The magazine **46** is provided with spaced parallel recesses **47, 47** adapted to receive staple legs, and upper shoulders **47*a***, **47*a*** adapted to support the under-saddle portions of the staples. The magazine **46** is biased to lie outwardly telescoped from the carrier arm **45** by coil spring S, which spring also serves to feed the staples.

The carrier arm is provided with a detent **48**, having at one end a rounded head portion **49** and at the other

end an ear or dog **50**, the said detent being slidably mounted in an opening **51** formed through the carrier arm **45**, and biased upwardly relative to said arm by a spring **52** interposed between the arm **45** and the head **49**. The dog **50** is provided with a forwardly inclined cam face **53** and a rearward shoulder portion **54** for purposes which will appear hereafter.

The carrier **45** and the magazine **46** are provided with slots **55, 56**, respectively, which slots, in the fully inwardly telescoped position of the magazine, register with each other (see Figure 4).

To reload the stapler, it is necessary merely to depress the knob **40**, thereby forcing the detent **48** downwardly against the biasing pressure of the spring **52** through the contact of the end **42** and the head **49**. As the detent is depressed, the rear shoulder **54** of the dog **50** will release the rear shoulder **56*a*** of the magazine **46**, thereby permitting the said magazine to be ejected from telescoped position within the carrier **45** (see Figure 2) under the influence of coil spring S.

It is a simple matter, with the magazine thus extended, to load a strip of staples, the legs of the said staples lying within the recesses or channels **47, 47** formed in the said magazine. The loading process is completed and the device readied for continued operation by forcing the magazine inwardly against the biasing pressure of the spring S. As the magazine **46** reaches the fully nested position within the carrier **45**, the leading edge **57** of the magazine engages the cam face **53** of the dog **50**, forcing the detent assembly **48** downwardly until the slots **55, 56** register, at which point the dog **50** will spring upwardly under the biasing influence of the spring **52**, locking the carrier **45** to the magazine **46**.

It should be noted that at no time during the loading process is it necessary for the operator to place his fingers in the path between the anvil and the driving head. Likewise, no part of the loading operation takes place near the trigger **24**, thereby providing a further assurance against accidental actuation of the device during loading.

By the above structure I have provided a fastener of compact outline and rugged design, assuring long life and trouble-free operation. The device is particularly adaptable in that, unlike other powerized fasteners, staples of a wide variety of lengths may be employed. Further, the novel loading assembly of my device assures speedy staple reloading and maximum safety.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is—

A powerized fastening device comprising a housing, impeller means mounted within said housing, a stapler device secured within said housing, said last named device including a driver arm positioned to be actuated by said impeller means, a carrier arm pivotally mounted relative to said driver arm, an elongated staple magazine arranged to telescope within said carrier arm to a position within said housing and spring biased normally to extend from said carrier arm to loading position outside said housing, a depressible latching dog arranged to retain said magazine within said carrier arm against said biasing pressure and upon depression to release said magazine, and a plunger member extending through and reciprocably carried by said housing said plunger being operatively associated with said dog whereby said magazine may be extended to loading position outside said housing by manually reciprocating said plunger member inwardly with respect to said housing.

References Cited in the file of this patent

UNITED STATES PATENTS

2,205,861	Oussani	June 25, 1940
2,403,947	Oussani	July 16, 1946
2,801,414	Mueller	Aug. 6, 1957