Jan. 16, 1962 J. J. OUSSANI 3,016,538

MULTIPLE STAPLER

Filed Sept. 16, 1960

FIG. 1

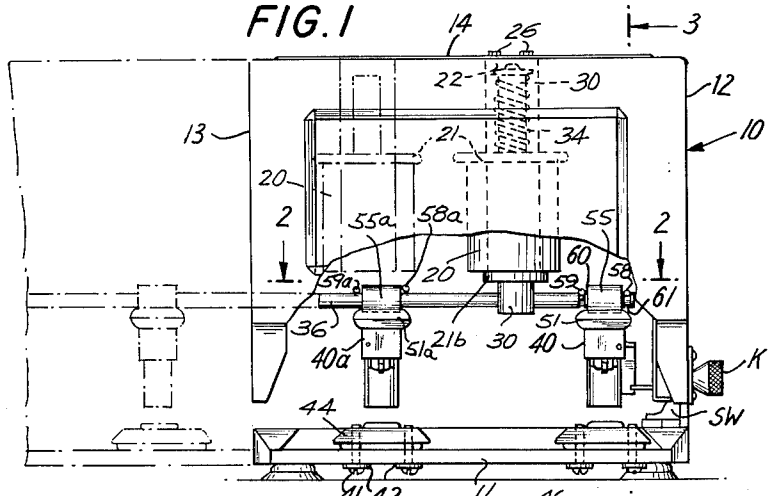


FIG. 2

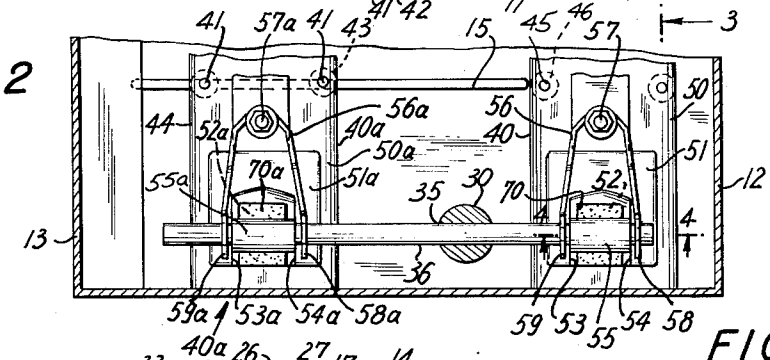


FIG. 3

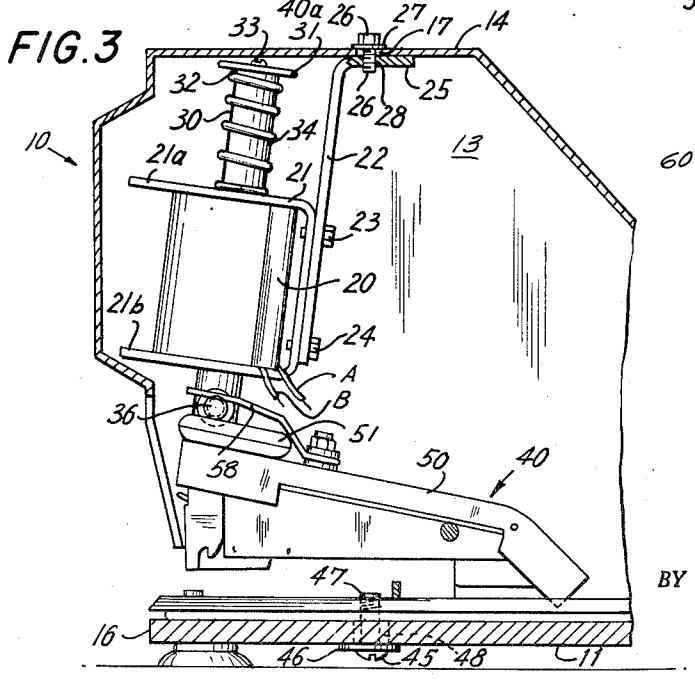
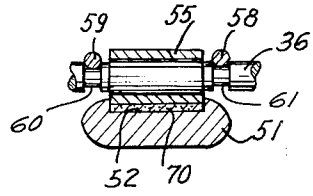


FIG. 4



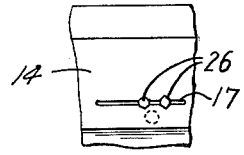


FIG. 5

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3,016,538
MULTIPLE STAPLER

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This invention relates to a powerized stapling device, and more particularly to a multiple stapling device for driving a plurality of staples in a single operating cycle.

Still more particularly this invention relates to an improved powerized device wherein a plurality of stapling units in side by side relation are operated from a single impeller member, said stapler units being adjustably positioned with respect to each other.

It is known to me to provide a multiple stapler device having two or more staple driving units operated by a single source of motive power. Such devices usually take the form of a housing having individual stapling units secured to the base thereof, and having a fixed impeller including a fixed cross bar disposed in spaced relation to and in a plane vertically above the units. When the impeller of such known units is activated, as by closing a switch, the cross bar descends, striking the driver arms of the stapler units and forcing the latter through a staple clinching cycle.

Such multiple staple driving units are faulty in one or more aspects, which faults are remedied in the improved device herein described and claimed. A problem often encountered in known multiple fastening units is a very high noise level occasioned by the fixed cross bar slamming against the plural stapler units. A further problem encountered in the use of such known devices is that the individual stapler units may operate effectively when spaced apart in one manner, yet may be ineffective and furnish inequality of clinching of staples when differently positioned.

For example, a known device employing three stapling units may operate satisfactorily where the three units are equally spaced from each other, but unsatisfactorily where two units are arranged close together and the third unit spaced apart from the other two.

Further problems in known devices relate to the relative difficulty of adjusting the spacing of the individual units.

It is accordingly an object of this invention to provide a multiple stapler device having a reduced noise level as compared with powerized multiple stapling units heretofore known.

Still a further object of this invention is to provide an improved multiple stapler having novel adjustment mechanism whereby the point of application of the effective force of the impeller may, in a measure, be varied so as to provide efficient uniform driving force for each stapling unit, not withstanding uneven or unbalanced orientation of the units with respect to each other, and assuring an equalized clinching of the work at spaced points to which multiple staples are simultaneously applied.

Still a further object of this invention is to provide a multiple stapler unit having the aforesaid advantages and which, in addition, permits facile adjustment of the spacing of the staple driving units with respect to each other.

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 front elevational view of a multiple stapling device in accordance with the invention, with parts of the housing broken away to show detail;

FIGURE 2 is a magnified section taken on the line 2—2 of FIGURE 1;

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

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

FIGURE 5 is a reduced plan view of the stapler device.

In accordance with the invention, there is provided a housing 10 including a base 11, side walls 12, 13 and top wall 14. The base 11 is provided with a laterally directed slot 15, substantially parallel with the front edge 16 of the base 11. The top wall 14 is similarly formed with a lateral slot 17 (see FIGURE 5) paralleling the edge 16.

A solenoid 20 carried by U-shaped bracket 21 is adjustably secured to the housing 10 through the medium of depending bracket 22. Brackets 22 and 21 are secured together by bolts 23, 24, the upper end of bracket 22 being formed into a flange 25 which is slidably clamped against the top wall 14 by bolts 26, 26 which pass through washers 27, 27 and slot 17 and are then threaded into complementally formed apertures 28 in flange 25 of bracket 22.

Solenoid 20 carries an armature or plunger 30 which extends through the core of the solenoid and is slidably journalled in legs 21*a*, 21*b* of bracket 21. A cap member 31 is secured to the upper end 32 of plunger 30, as by bolt 33, and expansion coil spring 34 is biased between said cap and upper leg 21*a* of the bracket 21, thereby serving to maintain plunger 30 normally in the elevated position in FIGURES 1 and 3. The lower end of plunger 30 is apertured at 35 and a rounded cross bar or yoke 36 is slidably and rotatably fitted in said aperture.

A plurality of stapler units 40, 40*a*, which may basically comprise standard manual staplers, are secured to the base 11 in a manner to provide widthwise relative adjustment. For this purpose, bolts 41 are sleeved through washers 42, passed upwardly through slot 15 and secured in apertures 43 provided in the base 44 of stapler 40*a*. End stapler 40 is similarly mounted with bolts 45 and washers 46 threaded into a cooperative aperture 47 in the anvil carrying base, except that said bolts pass through separate spaced apertures 48 formed in base 11 to secure end stapler 40 non-slidably to the base.

It will be understood, however, that slot 15 may be extended and bolts 45 pass therethrough, if adjustability of the end stapler 40 is desired.

The driver arms 50, 50*a* of staplers 40, 40*a* are optionally but preferably provided with operating pads 51, 51*a*. The pads 51, 51*a* are recessed to form longitudinal troughs 52, 52*a*, preferably having vertical side walls 53, 54; 53*a*, 54*a*, respectively. Rollers 55, 55*a* are slidably and rotatably carried on cross bar 36 and are seated in the troughs 52, 52*a*, respectively. The rollers 55, 55*a* are removably retained in the troughs 52 and 52*a* by U-shaped wire springs 56, 56*a*, secured at the center branch by bolts 57, 57*a* to the driver arms 50, 50*a*, respectively.

The end branches 58, 59, 58*a*, 59*a* of springs 56, 56*a*, respectively, are passed over cross bar 36 in straddling relation to rollers 55, 55*a*, respectively, and serve to bias the rollers tightly into troughs 52, 52*a*, and to provide a block against the rollers becoming unseated from said troughs.

Where adjustment of the stapler 40 is desired, the bar 36 may be formed with spaced annular grooves 60, 61 (see FIGURE 1) within which end branches 58, 59 of spring 56 may be seated.

The solenoid impeller 20 is actuated by temporarily connecting leads A, B thereof to a suitable source of current, to effect stapling. Any of a variety of switching devices may be employed for this purpose, the operation of such devices being well known to those skilled in the art. The solenoid in the instant device employs a switching mechanism SW, which is closed by the insertion of

articles to be stapled and which may be adjusted forwardly or rearwardly with respect to the front edge 16 of the staplers, by manipulation of knob K, so as to permit the staples to be driven selectively at various distances from the edge of the work.

While the device has been described in connection with two staplers 40, 40*a*, it will be recognized that three (as shown in phantom, FIGURE 1) or more units may be employed, depending only upon the space within the housing and the size of the solenoid utilized.

When a voltage is applied across leads A, B, plunger 30 carrying cross bar 36 is thrust downwardly. Unlike multiple staplers heretofore known, the cross bar 36, being linked directly to the driver arms 50, 50*a* of the staplers, provides quiet operation by eliminating any impact of the parts which is encountered in known units having a cross spaced from the driver arms.

The noise level of the device may optionally but preferably be further reduced by interposing thin pads or cushions 70, 70*a* in the base of troughs 52, 52*a*, respectively.

Notwithstanding the intimate association of driver arm 50*a* with cross bar 36, stapler 40*a* may be easily laterally adjusted with respect to stationary unit 40. This adjustment is accomplished by loosening bolts 41, 41, sliding stapler 40*a* to the desired position, and again tightening the bolts. In the course of such movement, rollers 55*a* and spring fingers or branches 58*a*, 59*a* slide freely along bar 36. The constant biasing influence of the said fingers maintains driver arm 50 biased upwardly toward bar 36 and assures that roller 55*a* will remain captive within the trough 52*a*.

In a device employing plural stapler units, I have found that notwithstanding the positive connection of the cross bar with the individual units, it is desirable to vary the point of application of impelling force of the plunger 30 to the cross bar 36 to assure uniform staple clinching by all units and to minimize wear. Such adjustment is provided in the illustrated embodiment by bolts 26, slot 17 and the slidable connection of plunger 30 to cross bar 36.

Thus, as seen in FIGURE 1, the solenoid and plunger assembly may be adjusted from the unbalanced location (solid lines) to the balanced or centered location by merely loosening bolts 26, shifting the solenoid unit in slot 17 to the desired centered position, and subsequently retightening the bolts. If an unbalanced location of staples is desired, as for example if two stapler units are to be located near one end of bar 36 and one unit near the other end, the plunger 30 should be adjusted so as to be nearer the two units, preferably at a position on the bar where the sum of the movements of upward force of the two units is exactly counterbalanced by the upward movement of the single unit, so that there is no substantial tendency for cross bar 36 to tilt with respect to plunger 30 in the course of a driving stroke.

The above described multiple stapler unit will be found to operate at a noise level far below multiple units heretofore known, due primarily to the novel connection between the cross bar and the individual units. Moreover, the noise reduction effected by such connection is accomplished without any loss in adjustability of the stapler units to each other, to provide a variety of spacings of staples driven by the unit.

By providing an impeller assembly which is adjustable with respect to the cross bar, each stapler unit is permitted to operate at maximum efficiency and with a minimum of wear, notwithstanding unequal spacing or unbalanced orientation of the stapler units.

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

1. An adjustable powerized multiple stapler device comprising a housing having a base portion, a plurality of stapler members mounted side by side to said base to be laterally adjustable relative to each other, each said stapler including a driver arm, an electrical impeller secured to said housing having a depending, vertically shiftable plunger, means for activating and deactivating said impeller, a cross bar carried by said plunger horizontally disposed above said driver arms, and spring retainer fingers carried by said driver arms including portions extending over and slidably engaging said cross bar, said fingers biasing said driver arms against said cross-bar.

2. An adjustable powerized multiple stapler device comprising a housing having a base portion, a plurality of stapler members mounted side by side to said base to be laterally adjustable relative to each other, each said stapler including a driver arm, an electrical impeller secured to said housing having a depending, vertically shiftable plunger, means for activating and deactivating said impeller, a cross bar carried by said plunger horizontally disposed above said driver arms, roller means slidably and rotatably carried by said cross bar, and retainer means including spring fingers carried by said arms and biased against said cross bar whereby said driver arms are biased against said roller means.

3. An adjustable powerized multiple stapler device comprising a housing having a base portion, a first stapler member secured to said base portion adjacent a side of said housing, at least one other stapler member positioned in side by side relation to said first stapler and adjustably mounted to said base to be movable laterally toward and away from said first stapler, driver arms on said staplers, an electrical impeller member laterally adjustably secured to a top wall portion of said housing, a plunger carried by said impeller and vertically shiftable thereby, means carried by said housing for activating and deactivating said impeller, a cross bar slidably coupled to said plunger, said cross bar being horizontally disposed above said driver arms, spring fingers coupling said driver arms of said staplers and said cross bar extending over and slidably coupling said cross bar and said driver arms.

4. An adjustable powerized multiple stapler device comprising a housing having a base portion, a plurality of stapler members secured to said base in side to side relation, said stapler members and base including cooperative fastener means permitting relative sidewise adjustment of said staplers, driver arms on said staplers, an impeller member secured to said housing to be laterally adjustable thereon, means carried by said housing for actuating said impeller through a stapling cycle, a plunger carried by said impeller and vertically shiftable thereby, a cross bar laterally slidably connected to said plunger and disposed horizontally above said driver arms of said stapler members, and coupling means slidably joining said cross bar and driver arms for relative lateral sliding movement.

5. A device in accordance with claim 4 wherein said coupling means comprise spring fingers secured to said arms and said cross bar is sandwiched between said arms and said fingers.

6. An adjustable powerized multiple stapler device comprising a housing having a base portion, a plurality of stapler members mounted to said base to be laterally adjustable relative to each other, each said stapler including a driver arm having a recessed seat thereon, an electrical impeller member secured to said housing, a plunger carried by said impeller and vertically shiftable thereby, means for energizing and deenergizing said impeller responsive to the insertion of articles to be stapled, a cross bar carried by said plunger and horizontally disposed above said recessed seats of said driver arms, a plurality of roller members slidably and rotatably carried by said cross bar, each said roller member being disposed within one of said seats, and retainer means carried by said driver arms, said last named means including paired finger portions extending over and biased against said cross bar in spanning relation of said roller members

whereby said roller members are maintained between said fingers and pressed within said seats.

7. A device in accordance with claim 6 wherein said impeller member is laterally shiftably secured to the top portion of said housing and said plunger is laterally slidably connected to said cross bar, whereby said impeller

may be centered to a position substantially intermediate said driver arms.

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