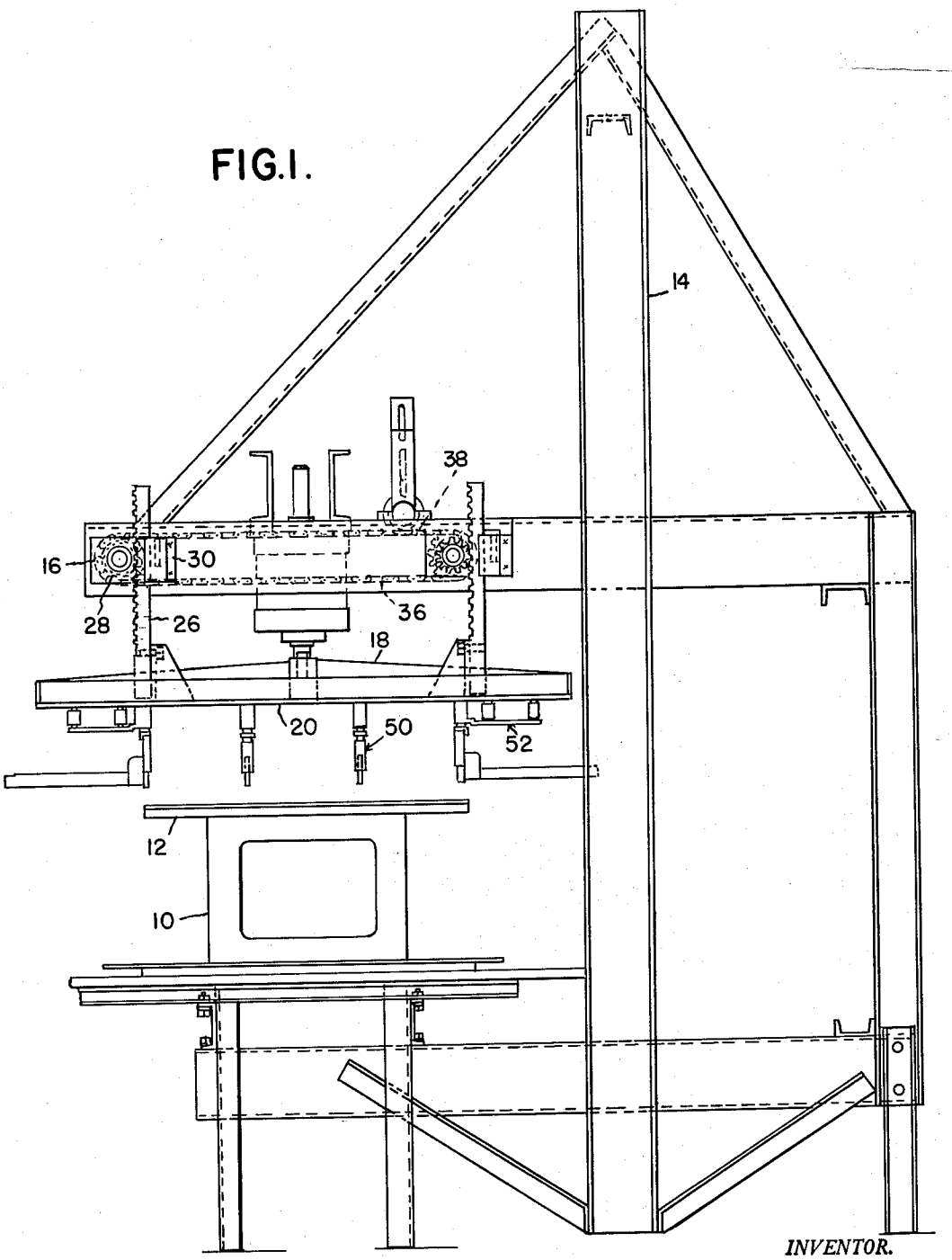
May 1, 1956 C. J. DAVIES 2,743,442

MULTIPLE STAPLING MACHINE

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FIG. 1.



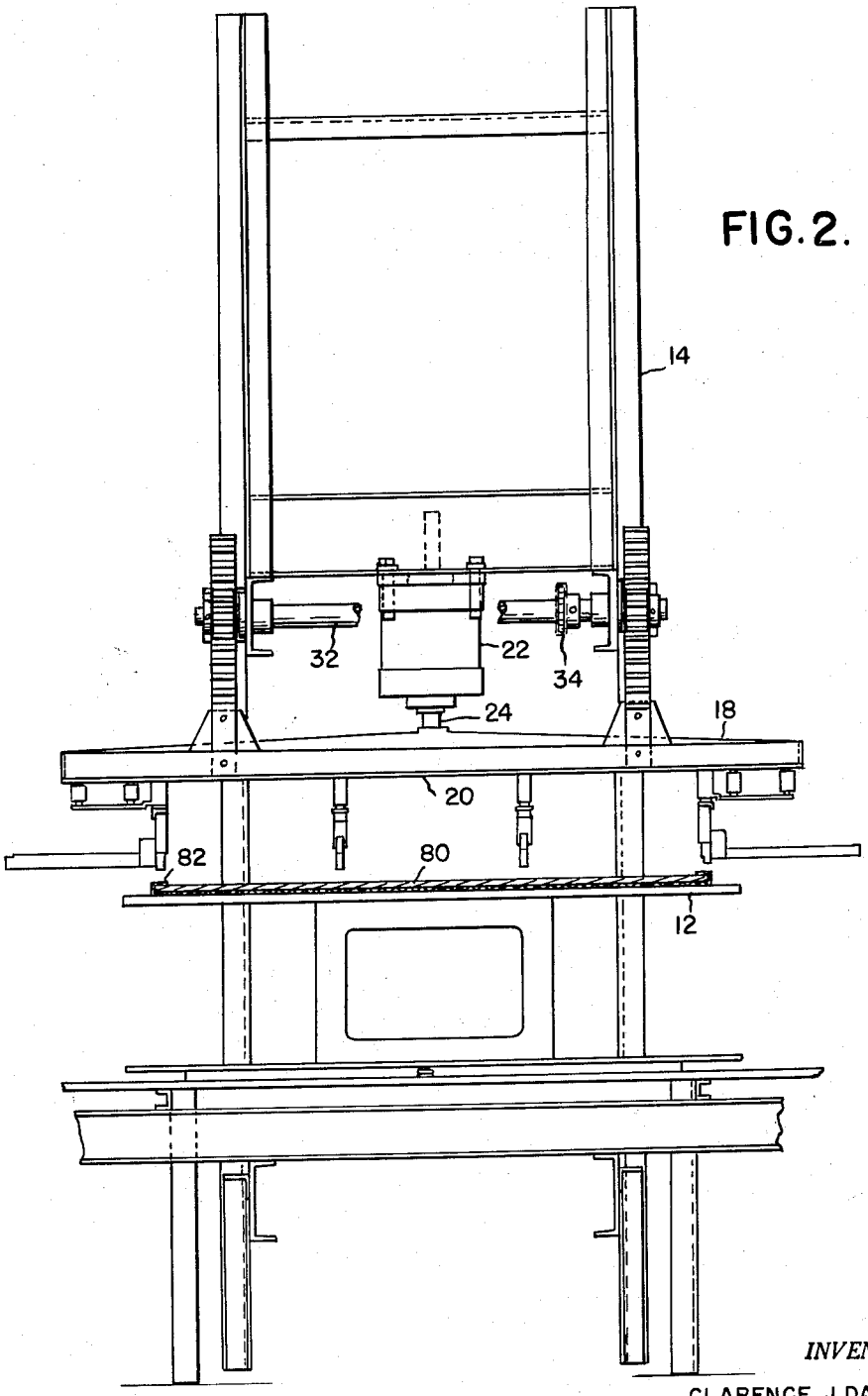
INVENTOR.
CLARENCE J. DAVIES
BY Whittemore, Hulbert & Belknap
ATTORNEYS

May 1, 1956 C. J. DAVIES 2,743,442

MULTIPLE STAPLING MACHINE

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FIG. 2.



INVENTOR.

CLARENCE J. DAVIES

BY Whittemore, Hulbert & Belknap

ATTORNEYS

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MULTIPLE STAPLING MACHINE

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FIG.4.

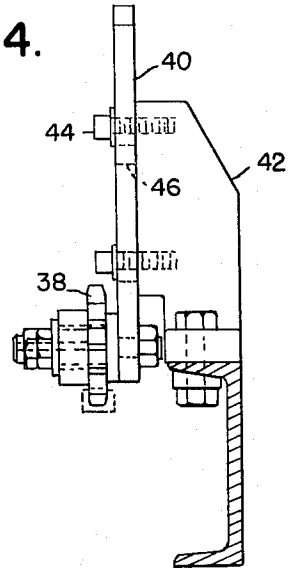


FIG.3.

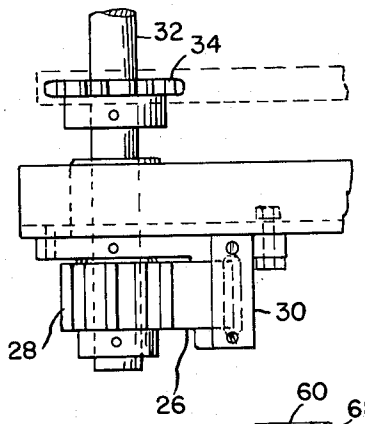


FIG.7.

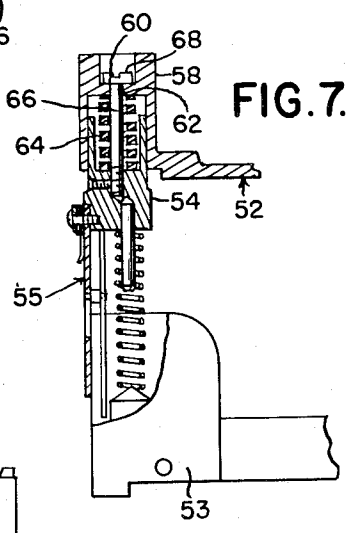


FIG.5.

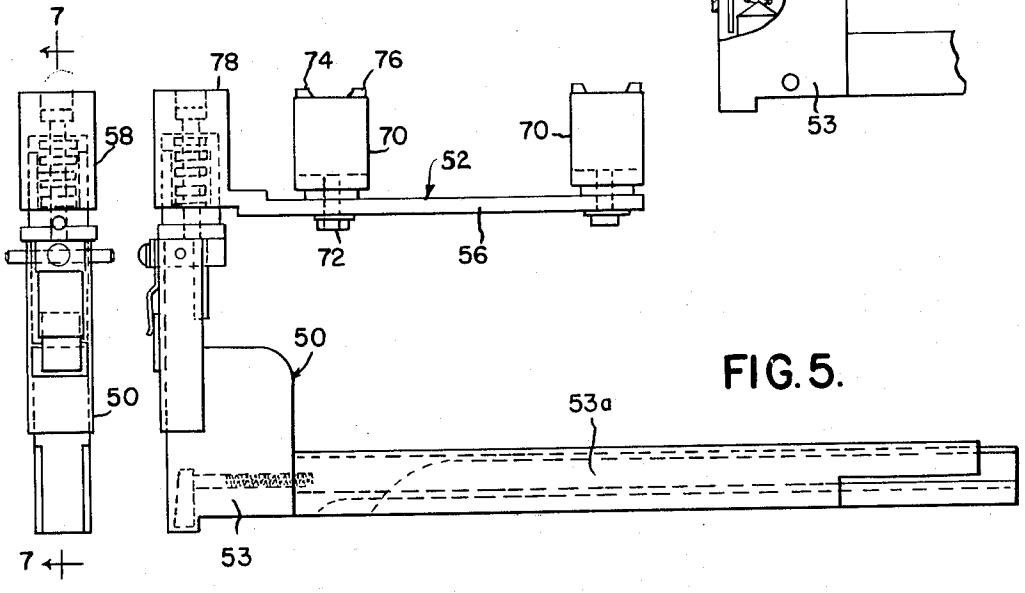


FIG.6.

INVENTOR.
CLARENCE J. DAVIES
BY Whittemore, Hulbert & Belknap
ATTORNEYS

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MULTIPLE STAPLING MACHINE

Clarence J. Davies, Detroit, Mich., assignor to National Automotive Fibres, Inc., Detroit, Mich., a corporation of Delaware

Application January 18, 1954, Serial No. 404,479

9 Claims. (Cl. 1—3)

The present invention relates to a multiple stapling machine.

It is an object of the present invention to provide a stapling machine particularly useful in the application of trim material to panel boards.

It is a further object of the present invention to provide a machine capable of driving as many staples at one time as may be required.

It is a further object of the present invention to provide stapling mechanism including means mounting a plurality of stapling heads providing for location and adjustment of the stapling heads with a minimum of time and difficulty.

More specifically, it is an object of the present invention to provide stapling mechanism including a platen formed of magnetic material and having a flat stapler supporting surface in combination with a plurality of staplers including mounting brackets carrying permanent magnets for attachment of the brackets to the flat surface of the platen.

It is a further object of the present invention to provide means for insuring the application of a multiplicity of staples in a uniform manner.

More specifically, it is an object of the present invention to provide a movable platen and guide means for insuring uniform movement of the platen and preventing canting or tilting thereof.

More specifically, it is an object of the present invention to provide a movable platen and means connecting the platen to a platen support including a plurality of sets of racks and pinions together with means for insuring simultaneous rotational movement of all of the pinions.

It is a further object of the present invention to provide stapling means of the character described comprising a platen, a plurality of staplers on said platen, and means mounting said staplers including relatively strong spring means insuring the application of substantially uniform pressure to each of the staplers.

Other objects and features of the invention will become apparent as the description proceeds, especially when taken in conjunction with the accompanying drawings, wherein:

Figure 1 is a side elevation of the stapling machine.

Figure 2 is a front elevation of the stapling machine shown in Figure 1.

Figure 3 is an enlarged fragmentary plan view looking in the direction of the arrow 3, Figure 1.

Figure 4 is an enlarged sectional view on the line 4—4, Figure 1.

Figure 5 is a side elevational view of a stapler used in the stapling machine and its supporting bracket.

Figure 6 is an end view of the structure shown in Figure 5.

Figure 7 is a fragmentary section on the line 7—7, Figure 6.

The stapling press or machine comprises a main frame preferably formed of structural elements, as best illustrated in Figures 1 and 2, and including a bed portion 10 on which is mounted a panel supporting table 12. The

frame includes a vertically extending column indicated generally at 14 carrying an overhanging platen supporting portion indicated generally at 16. Depending from the underside of the platen supporting portion 16 is a platen 18 which preferably is formed of ribbed magnetic material such for example as a ferrous material and having a smooth flat under-surface 20. Intermediate the platen supporting portion 16 and the platen 18 is power mechanism for raising and lowering the platen, and as illustrated in the figures thus comprises a cylinder 22 having therein a piston to which is connected a piston rod 24 secured to the platen 20. Conveniently, the cylinder 22 may be operated by compressed air.

In stapling mechanism of the character described it is essential to insure uniform movement of the platen 20 relative to the table 12 so that staples carried by the platen may operate uniformly. In order to prevent canting or tilting of the platen 18, equalizing mechanism is provided intermediate the platen support 16 and the platen 18. The equalizing mechanism takes the form of a plurality, preferably four, sets of racks and pinions.

As illustrated in the figures, the racks 26 are rigidly secured to the platen and extend upwardly therefrom. The platen support 16 is provided with a corresponding number of pinions 28 and rack guide members indicated generally at 30 adapted to engage the smooth back and side surfaces of the racks and to cooperate with the pinions to support each of the racks for accurately guided vertical movement. The pinions 28 are provided in pairs, each pair being rigidly secured to a cross shaft 32. As a result of this construction each of the pair of pinions supported on a single cross shaft 32 is required to partake of exactly the same rotational movement. The cross shafts 32 are provided with sprockets 34 which in turn are interconnected by a chain 36 to insure simultaneous rotation of the two cross shafts 32. A chain tightener including a sprocket 38 is provided, details of which are best illustrated in Figure 4. The sprocket 38 is mounted for rotation on a plate 40 rigidly secured to a bracket 42 by screws 44. The screws 44 pass through elongated slots 46 in the plate 40 and hence the plate is vertically adjustable to insure the required tightening of the chain 36.

At the underside of the platen 18 there are provided a plurality of staplers 50 each of which is mounted in a stapler support bracket 52, details of which are best shown in Figures 5–7. The particular stapler may be of conventional design and the details thereof form no part of the present invention. However, each of the staplers comprises a base or work-engaging portion 53 having a staple magazine 53*a* and is provided with an upwardly extending movable driver 55 including an upwardly open cup element 54. The brackets 52 comprise an elongated upwardly extending cup portion 58 substantially closed adjacent its upper end by a transverse wall 60 having an aperture 62 extending therethrough. The lower open side of the cup portion 58 is located substantially in the plane of the arm portion 56.

It will be understood that in normal use the base 53 of the stapler rests against the article to be stapled and the stapling operation is performed by depressing the driver 55, which forces a staple into the material to be stapled. In the present case however, an entirely different and novel arrangement is provided in which the stapler as a whole is mounted by its driver to the movable platen and the base 53 of the stapler is thereby suspended from the driver. By virtue of this arrangement downward movement of the platen first moves the base of the stapler into contact with the work and continued downward movement of the stapler thereafter moves the driver thereof downwardly relative to the base, effecting the stapling operation. The usual spring means which urges the driver upwardly relative to the base of the stapler

combines with gravity to insure that upon upward movement of the platen, the driver first moves upwardly to limiting position and thereafter draws the base of the stapler upwardly.

The cup element **54** of the driver is slidably received in the cup portion **58** of the bracket **52** and receives a relatively strong compression spring **64** the upper end of which bears against the underside of the transverse wall **60**. Extending upwardly from the cup element **54** is an assembly screw **66** having a head **68** located above the transverse wall **60**. The purpose of the relatively strong compression spring is to permit the application of substantially equal pressure to all of the staplers during operation. The strength of the spring is selected so that the required pressure will be applied to each stapler and thereafter the stapler will yield relative to its mounting bracket **52**.

In order to provide for ready adjustment of the heads into desired position, the brackets **52** are provided with a pair of permanent magnets **70** which as illustrated in Figure 5, are connected thereto by assembly screws **72**. The permanent magnets **70** include poles **74** and **76** which occupy the horizontal plane passing through the upper end **78** of the cup portion **58** of the bracket **52**. Accordingly, when the bracket is engaged at the flat side **20** of the platen **18** the upper surface **78** of the cup portion **58** of the bracket will be in firm engagement with the platen and the poles **74** and **76** of the permanent magnets **70** will also be in engagement therewith. With this construction it is extremely easy to shift the stapler supporting brackets to the required position to effect the stapling operation. For simplicity, only eight staplers have been illustrated as secured to the platen **18** but in practice as many as desired may be employed. In some cases as many as fifty may be used satisfactorily.

Referring again to Figure 2 there is illustrated on the table **12** a panel **80** which may be formed of a suitable fiber board or the like. Covering the underside of the panel **80** is a trim fabric the lateral edges of which are turned over as indicated at **82**. The operation of the staplers is to press staples through the turned edge portions **82** of the trim fabric and into the panel board to effect secure attachment of the trim fabric to the panel board.

The use of the permanent magnets for attaching the stapler supports to the smooth underside of the platen permits the location of a stapler in any position and permits slight adjustments of the individual staplers to be effected with the minimum of time and difficulty. The provision of the relatively strong compression springs **62** is important in that it permits each stapler to operate satisfactorily to fully seat the staple in the panel board, a condition which could not be obtained otherwise due to small variations in dimensions of the staplers or the panel boards, trim fabric, or the like. By employing a relatively strong compression spring each stapler is permitted to drive its staple fully into the panel board irrespective of any possible slight variation in height of the staplers or variation in thickness of the trim panel, trim fabric, or the like.

The provision of the rack and pinion guide means for insuring uniform vertical movement of the platen further contributes to this desirable result.

The drawings and the foregoing specification constitute a description of the improved multiple stapling machine in such full, clear, concise and exact terms as to enable any person skilled in the art to practice the invention, the scope of which is indicated by the appended claims.

What I claim as my invention is:

1. A stapling machine comprising a frame, a work supporting table on said frame, said frame including a column and a platen support overlying said table, a vertically movable platen carried by said platen support, two pairs of rack and pinion sets interconnecting said platen support and platen, all of the racks of said sets being rigidly connected together and extending vertically, the two pinions of each pair of sets being fixed to a single shaft, and chain and sprocket means connecting the two shafts, power means connecting said platen support and platen for moving said platen vertically, and a plurality of staplers carried by said platen.

2. A stapling machine as defined in claim 1 in which said power means comprises a piston and cylinder connected between said platen support and platen.

3. A stapling machine comprising a frame, a table on said frame, said frame including a column and a platen support overlying said table, a vertically movable platen carried by said platen support, a plurality of rack and pinion sets interconnecting said platen support and said platen, all of the racks of said sets being rigidly connected together and extending vertically, means connecting all of the pinions of said sets to insure equal rotation thereof, power means connecting said platen support and platen for moving said platen vertically, a plurality of staplers carried by said platen, said platen comprising a plate of magnetic material having a flat smooth under-surface, said staplers having brackets including permanent magnets secured thereto for attachment thereby to the under-surface of said platen in different positions of adjustment.

4. A stapling machine comprising a platen formed of magnetic material having a flat stapler supporting surface, a plurality of staplers adjustably mounted on said surface, said staplers comprising top extensions, a mounting bracket for each stapler having a sleeve in which the top extension of the stapler carried thereby is slidable, a relatively heavy compression spring interposed between said top extension and sleeve, and a plurality of permanent magnets secured to said bracket and engaged on the flat stapler supporting surface.

5. In a stapler machine, a bracket comprising an arm having at one end a laterally offset cup portion the open end of which is at the end adjacent said arm, a pair of permanent magnets carried by said arm having pole faces disposed in the plane of the end of said cup portion remote from said arm, a stapler having a mounting portion slidably received in said cup portion, and a relatively strong compression spring in said cup interposed between said cup and said mounting portion.

6. Structure as defined in claim 7 in which said cup has an apertured transverse wall at its upper end, said mounting portion has an upwardly open cup, said spring is seated in the cup of said mounting portion, and comprising a rigid connector secured to said mounting portion and extending through the aperture in the said transverse wall, and a head on said connector above said wall.

7. A stapling machine comprising a frame, a table on said frame, means on said frame for supporting a platen for vertical movement toward and away from said table, a stapler carried at the underside of said platen, said stapler comprising a work-engaging portion and a driver movably associated with said work-engaging portion, and means connecting said driver to said platen to suspend the work-engaging portion of said stapler therefrom the means connecting said driver to said platen comprising permanent magnets to provide for lateral adjustment of the stapler relative to said platen.

8. A stapling machine comprising a frame, a table on said frame, means on said frame for supporting a platen for vertical movement toward and away from said table, a stapler carried at the underside of said platen, said stapler comprising a work-engaging portion and a driver movably associated with said work-engaging portion, and means connecting said driver to said platen to suspend the work-engaging portion of said stapler therefrom, in which the means connecting said driver to said platen comprises a bracket, means for rigidly securing said bracket to the underside of said platen, said bracket including a vertical cylindrical guide portion, said driver including a portion vertically slidable in said guide portion, and a relatively strong spring interposed between

said guide portion and the portion of said driver received therein.

9. Stapling apparatus comprising a table, a platen above said table movable vertically toward and away from said table, a plurality of brackets carried at the underside of sair platen each of said brackets comprising vertically extending guide means, a stapler carried by each of said brackets and each comprising a staple driving portion, said staple driving portions comprising means slidably connected to said guide means, each of said staplers also comprising a work engaging portion connected to said staple driving portions for relative sliding movement, relatively light spring means acting between the staple driving portion and work-engaging portion of each of said staplers tending to separate said portions, and relatively heavy spring means acting between said guide means and said staple driving portions.

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