

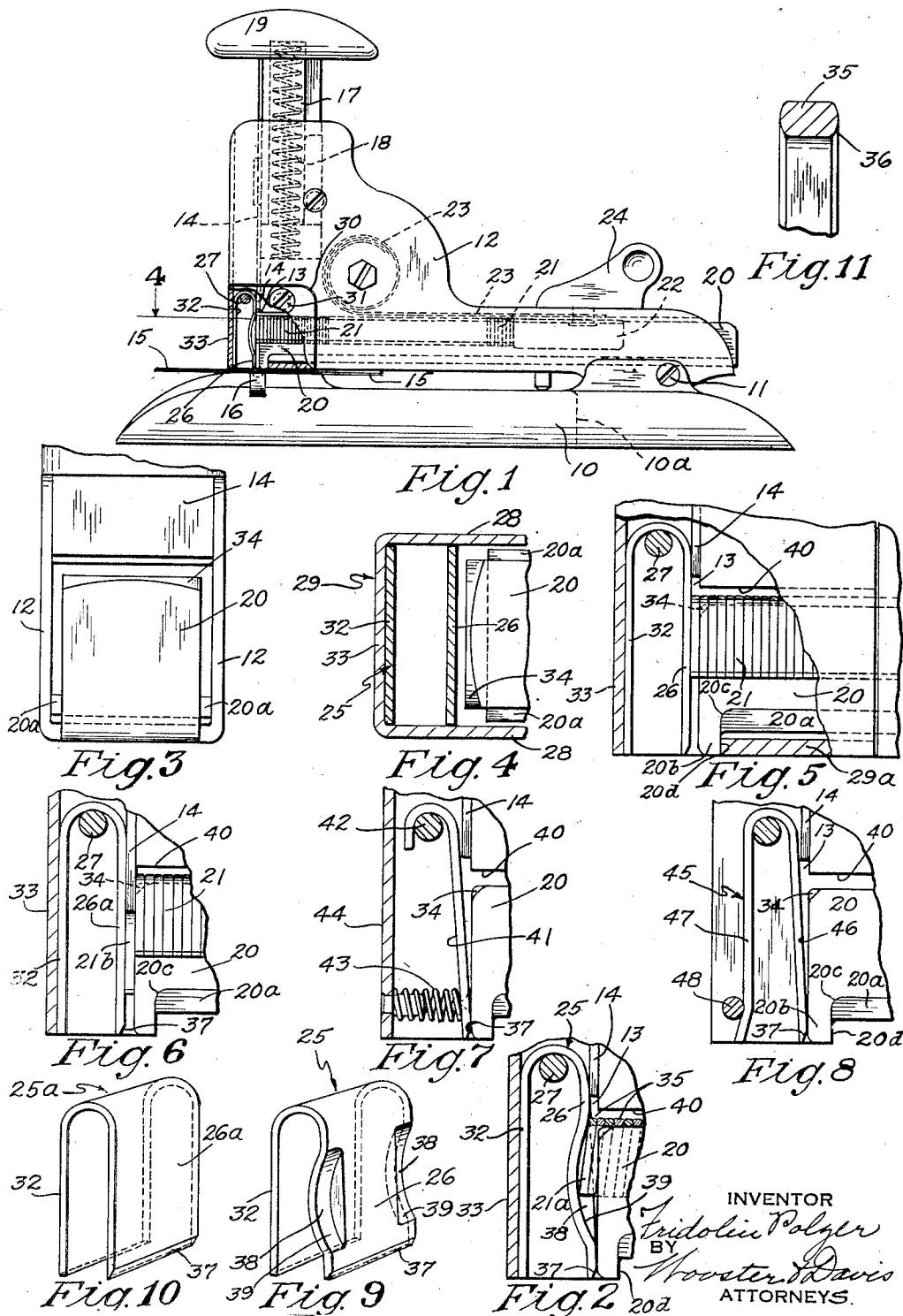
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STAPLE DRIVING MACHINE

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STAPLE DRIVING MACHINE

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This invention relates to a staple driving machine, and has for an object to provide a machine which will accurately and effectively drive staples of different widths, particularly wire staples, without clogging the machine and without destroying the staples.

Other objects and advantages will become apparent from the following description taken in connection with the accompanying drawing. However, it will be understood that the invention is not limited to the details disclosed but includes all such variations and modifications as fall within the spirit of the invention and the scope of the appended claims.

In this drawing:

Fig. 1 is a side elevation of a stapling machine showing one form of my invention applied thereto with a portion of a side plate broken away to more clearly show the construction;

Fig. 2 is a view of a portion of the guide bar and staple guideway on an enlarged scale;

Fig. 3 is a front elevation of the lower end of the housing and the front of the staple guide on an enlarged scale, the closing block being removed;

Fig. 4 is a detail section substantially on line 4—4 of Fig. 1, but with the staples omitted;

Fig. 5 is a detailed side view of the lower front of the housing with a part of the side plate broken away and showing a slightly modified construction;

Fig. 6 is a similar view showing the staple partly driven;

Fig. 7 is a view similar to Fig. 5 showing a somewhat different construction;

Fig. 8 is a view similar to Fig. 7 showing another modification;

Fig. 9 is a perspective view of the yieldable front wall member of Fig. 2 and on a somewhat smaller scale;

Fig. 10 is a similar view of the front wall of Figs. 5 and 6 on a somewhat reduced scale; and

Fig. 11 is a detailed view of a portion of the usual type of staple and on an enlarged scale.

In the drawing I have shown by way of example the invention in Fig. 1 as applied to a stapling machine in which the staples are driven through the work, such as sheets of paper, cloth, and the like, and the prongs folded over or clinched on one side thereof, but the invention is not limited to use on a stapling machine, but may equally as well be used on a stapler or tacker where the prongs of the staple are not clinched, as for example where they are driven through a shipping tag into a wooden box for attaching the tag thereto.

In short, it can be used in any staple driving machine of either the desk type, plier type, tacker type, etc.

Referring now to Fig. 1 in which is shown in side elevation a desk type stapling and tacking machine, when used as a tacker, the base 10 being swung to the right out of the way about the pivot 11, the base being provided with a notch or slot 10a leading from one end to permit this. This pivot attaches to the base a housing 12 having a guideway 13 for a plunger 14 reciprocable vertically in the guideway to drive individual staples downwardly in the guideway and drive it through the work such as sheets of paper 15 on the anvil 16 which cooperates with the plunger in the stapler type of machine to clinch the staples. The plunger 14 is carried by a plunger bar 17 reciprocable vertically in the housing and normally held in the upper position shown by a spring 18. Bar 17 also carries a hand knob 19 by which the plunger may be depressed to drive the staple. Within the housing is a guide for the staples to be fed in succession to the guideway under the plunger. In this present case this guide is in the form of a slide or bar 20 upon which the staples indicated at 21, usually in the form of a connected strip, are fed from the rear end of the bar 20. They are fed forwardly by an inverted U-shaped follower 22 through the action of a coil spring 23 connected with the follower. The handle 24 permits withdrawal of the follower for insertion of the staple strip. All of these parts as described are old and may be varied as desired. My improvement comprises primarily means forming a yieldable wall for the staple and plunger guideway at the forward end of the guide bar 20 through which the staples are fed or forced by the plunger to the driving position.

In the form shown in Figs. 2 and 9 this comprises a flat spring member 25 bent to substantially inverted U-shape with one wall 26 thereof forming the front wall of the guideway. It may be mounted by any suitable means, but a convenient way is to place it over a transverse pin 27 extending between the side plates 28 of a removable block 29. This block embraces the front lower corner of the housing which is recessed at opposite sides at 30 to receive the side plates which are secured in position by the screws 31. The underside of the bar 20 is also cut away as indicated to provide a depending shoulder 20a behind which a cross bar 29a of the block 29 joining the side plates 28 may extend to position the block and assist in holding it in its proper position. In this arrangement the other leg 32

of the spring member rests against the front wall 33 of the block. This member is of a size so that the front leg 26 is normally spaced from the top edge of the guide bar 20 a distance equal to about the width of the narrowest staple to be driven, which is also about substantially the thickness of the plunger 14. The lower end of the wall or leg 26 may or may not be normally in engagement with the front wall of the guide bar 20. The pin 27 and the upper end of this spring member should be above the top wall of the guide 20 to permit the wall 26 to yield laterally.

In operation, as the staples are fed individually to the guideway under the plunger they are driven in the usual manner. If staples somewhat wider than the normal staples are inserted, the wall 26 of the guideway will yield forwardly to permit the wider staple to pass down the guideway under the action of the plunger, and at the same time it will form a perfect guide in combination with the front wall of the guide bar 20 for the staple in its downward movement under the action of the plunger, so that it is carried downwardly in the proper upright position for driving. It will therefore be evident that due to this yieldable wall for the staple and plunger guideway, staples of various thicknesses or widths can be driven with equal facility by this machine without clogging. This is not true in the ordinary machine in which rigid walls are provided for the guideway, and in which the width of the guideway must be substantially that of the staple.

It is preferred that the top front edge of the guide bar 20 be somewhat beveled as indicated at 34 to facilitate the entrance of staples of different widths into the guideway, as this wall will act as a cam on the side of the staple cross bar and force it into the guideway as it is depressed by the plunger. However, this is not absolutely necessary as the staples are usually made of round wire which has been flattened so that the edges of the crown or cross bar 35 of the staple, as shown in Fig. 11, is thus somewhat rounded on the edges as indicated at 36, which will have a camming action on a sharp edge at the forward end of the guide bar 20 and will cause the wall 26 to yield to permit the wider staple to enter the guideway.

This front wall 26 is also preferably beveled somewhat at its lower edge as indicated at 37 so that it will not dig into the work, such as paper, because of its lateral movement. It is also preferably provided with recesses 38 in alignment with the depending legs or prongs of the staples 21 so that should a staple be fed with its prongs inclined forwardly as indicated at 21a in Fig. 2, these prongs will enter these recesses and permit the crown or cross bar 35 of the staple to enter the guideway 13. The lower walls of these recesses are curved or inclined as shown at 39 so that when the staple is forced downwardly under the action of the plunger 14 these inclined walls will move the prongs of the staple to the vertical or upright position so that they will be driven straight. If the prongs should happen to be inclined in the opposite direction or backwardly the rolling action of the cross bar 35 on the wall 26 due to friction thereon will turn the staple to bring the prongs to the upright position. The sides of the staple slide or guide 20 and spacing ribs 20a are also cut away somewhat as indicated at 20b to provide clearance for the staple prongs and the front edge of these ribs may

be beveled or rounded as indicated at 20c to assist in straightening up the staple.

In Figs. 5, 6 and 10 the recesses 38 are omitted in the spring member 25a. This construction forms a yieldable front wall 26a which will yield forwardly the same as the wall 26 to permit the driving of staples of different widths. If with this spring member the staple prongs should be inclined somewhat forwardly there is sufficient clearance between the top wall of the guide bar 20 and the lower wall 40 in the housing above this guide to permit the staple strip to buckle or bend upwardly sufficiently back of the forward staple to permit the cross bar or crown 35 of the staple to enter the raceway. The entrance of the top or cross bar of the staple into the raceway is also assisted by the rounded or beveled front edge 34 of the staple guide bar, and further by the fact the staples are ordinarily made from round wire which has been somewhat flattened so that the sides of the bar are somewhat rounded as shown at 36, Fig. 11.

Fig. 6 shows a staple 21b partly driven through the guideway by the plunger 14, and it will be evident that the front wall 26a will yield sufficiently to the left if necessary to accommodate the thickness of the staple.

In Fig. 7 is shown a form of yieldable wall of the guideway comprising a wall 41 hung from any suitable pivot as a pin 42. Then a spring 43 between this wall 41 and the wall 44 tends to force this wall 41 toward the end of the staple guide bar 20, but permits the wall to yield to accommodate staples of different widths.

In Fig. 8 is shown a substantially inverted U-shaped member 45 having a yieldable front wall 46 functioning in the same manner as wall 26. In this case, however, the front wall 44 may be omitted and the opposite leg 47 of the U-shaped spring may engage the cross pin 48 to provide the necessary spring action to the front wall 46.

The entrance of the cross bar into the raceway in the forms of Figs. 7 and 8 is permitted by the staple strip buckling or bending upwardly back of the forward staple as described in connection with Figs. 5, 6 and 10. It is also assisted by the rounded or beveled forward edge 34 of the staple strip guide bar 20 and by the fact the sides of the staple cross bar are somewhat rounded as shown at 36, Fig. 11.

It will be evident that in all of these forms and modifications of the invention shown one wall of the staple guideway under the plunger is yieldable laterally to permit the passage of staples of different widths through the guideway, and this yieldable wall may be either the front or the back of the guideway, although it is preferred that it be the front wall as this is more practical and easier to make.

Another advantage of this device is that, if the plunger should be driven several times so as to jam several staples in the guideway, the machine will not become clogged because the yieldable wall will merely yield laterally to accommodate these staples, and then the next depression of the plunger with the lower end of the guideway free, will merely force these staples out the lower end of the guideway to free the machine and the spring wall will return to its normal position so that the machine will operate in the normal manner.

The staple strip feed spring 23 is not of sufficient strength to displace the yieldable wall of the raceway, this being displaced by the plunger forcing the staple through the raceway. The

yieldable wall need not engage the front wall of the guide bar 20 but may be normally spaced therefrom the width of the narrowest staple to be driven as shown in Fig. 5. This will properly guide the narrowest staple and will yield to permit passage of wider staples in the manner described.

Having thus set forth the nature of my invention, what I claim is:

1. In a staple driving machine, a movable plunger for driving the individual staples, a guideway for the plunger, a support and guide for the staples, means for feeding the staples along said guide to the guideway, the forward wall of said guideway being yieldable forwardly to permit driving of staples of different widths through the guideway, and said wall having recesses opposite the prongs of the staples to receive prongs inclined forwardly and inclined at their lower ends to guide the prongs to a vertical position in the guideway as the staple is driven downwardly therein.

2. In a staple driving machine, a movable plunger for driving the individual staples, a guideway for the plunger, a guide for substantially U-shaped staples, means for feeding the staples along said guide to the guideway, and one of the walls of the guideway being yieldable laterally to permit driving of staples of different widths, said wall comprising a plate of sufficient width to guide the prongs of the U-shaped staple, said plate being arranged with one end at the discharge end of the guideway and its opposite end curved upon itself about an axis extending transversely of the guideway, and a support for the plate within said curved end.

3. In a staple driving machine, a movable plunger for driving the individual staples, a guideway for said plunger, a guide bar for substantially U-shaped staples, means for feeding the staples along said bar to the guideway, and one wall of the guideway at the front end of the bar being yieldable laterally to permit driving of staples of different widths, said wall comprising a plate of sufficient width to guide the prongs of the U-shaped staple, said plate being arranged with one end at the discharge end of the guideway and its opposite end curved backwardly about an axis extending transversely of the guideway, and a bar extending transversely of the guideway on which said curved end rests to support the plate.

4. In a staple driving machine, a movable plunger for driving the individual staples, a guideway for the plunger, a guide for the staples, means for feeding staples along said guide to the guideway, an inverted substantially U-shaped spring plate mounted with one leg forming the front wall of the guideway under the plunger, and a transverse bar in the loop of the spring plate forming a support for the plate.

5. In a machine for driving substantially U-shaped staples, a movable plunger for driving the individual staples, a guideway for the plunger, a support and guide for inverted U-shaped staples, means for feeding the staples along said guide to the guideway, and an inverted substantially U-shaped spring plate mounted with one leg forming the front wall of the guideway under the plunger, said leg having recesses opposite the prongs of the staples in the guide to receive forwardly inclined prongs, and which recesses are inclined toward the guideway at their lower ends to guide the prongs to the guideway as the staple is driven through the guideway by the plunger.

6. In a staple driving machine, a movable plunger for driving the individual staples, a guideway for the plunger, a guide bar for inverted U-shaped staples, means for feeding staples along said bar to the guideway, an inverted substantially U-shaped spring plate mounted with one leg forming the front wall of the guideway opposite said bar and adapted to yield laterally to permit staples of different widths to be driven through the guideway, and the upper forward edge of the guide bar being beveled to guide the connecting bar of staples into the guideway.

7. In a staple driving machine, a movable plunger for driving the individual staples, a guideway for the plunger, a guide bar for inverted U-shaped staples, means for feeding staples along said bar to the guideway, the forward wall of said guideway opposite the end of the bar being yieldable forwardly under action of the plunger to permit driving of staples of different widths through the guideway, said wall having recesses opposite the prongs of the staples on the bar to receive prongs inclined forwardly, which recesses are inclined toward the guideway at their lower ends to guide the prongs into the guideway, and the forward upper edge of the guide bar being beveled to guide the cross bar of staples into the guideway.

8. In a staple driving machine, a movable plunger for driving individual staples, a guideway for the plunger, a guide for inverted U-shaped staples, means for feeding staples along said guide to the guideway, the forward wall of said guideway being yieldable forwardly against spring pressure under action of the plunger to permit driving of staples of different widths through the guideway, said wall having recesses opposite the prongs of the staples to receive forwardly inclined prongs, and said recesses being inclined at their lower ends toward the guideway to guide the prongs into the guideway as the staple is driven therethrough.

9. In a machine for driving substantially U-shaped staples, a movable plunger for driving the individual staples, a guideway for the plunger a portion of which forms a passage for guiding the staples to the work, a support and guide for the staples, spring operated means for feeding the staples along said guide to the guideway, the forward wall of the passage for the full length thereof being mounted to tend to move to its normal position and yieldable to move away from the rear wall of the passage for the full length thereof under action of a staple when forced through the passage by the plunger to permit staples of different widths to be driven through the passage, said wall extending above and below the staple guide to form a stop for forward movement of the staples under action of said spring means, and said spring means being of insufficient force to shift said wall so that it is yieldable only under action of the plunger.

10. In a machine for driving substantially U-shaped staples, a movable plunger for driving the individual staples, a guideway for the plunger a portion of which forms a passage for guiding the staples to the work, a support and guide for the staples, spring operated means for feeding the staples along said guide to the guideway, the forward wall of the passage being movable toward and from the rear wall of the passage for the full length of the passage and extending above and below the staple guide to form a stop for the forward movement of the staples under

action of said spring means, resilient means to resist shifting of said wall away from the rear wall of the passage and of greater force than said spring operated means for feeding the staples but permitting shifting of the wall under action of a staple when forced through the passage by the plunger to permit staples of different widths to be driven through the passage.

11. In a machine for driving substantially U-shaped staples, a housing having a guideway a portion of which forms a passage for guiding the staples to the work, a movable plunger in the guideway for driving the individual staples, a guide for substantially U-shaped staples, spring operated means for feeding staples along said guide to the guideway under the plunger, a yieldable resiliently mounted wall extending above and below the staple guide forming a wall of the passage for the full length thereof and also forming a stop for the staples to limit their feeding movement under action of said spring operated means and said latter means being of insufficient force to shift said wall, and said wall being of sufficient width to guide the prongs of a staple and shiftable laterally under action of a staple when forced through the passage by the plunger for the full length of the passage and independently of the opposite walls of the passage to permit driving of staples of different thicknesses.

12. In a machine for driving substantially U-shaped staples, a movable plunger for driving the individual staples, a guideway for the plunger, a support and guide for inverted U-shaped staples, means for feeding the staples along said guide to the guideway, and an inverted substantially U-shaped spring plate mounted with one leg forming the front wall of the guideway under the plunger, said leg being of a width to form a guide for the prongs of the U-shaped staple when driven through the guideway by the plunger.

13. In a staple driving machine, a movable plunger for driving the individual staples, a guideway for the plunger, a guide bar for inverted U-shaped staples, spring operated means for feeding the staples along said bar to the guideway, the forward upper edge of the bar being somewhat beveled to guide the cross bar of staples into the guideway under action of the plunger, and a yieldable wall forming the front of the guideway opposite the end of the bar and of sufficient width to guide the prongs of the staples, said wall being yieldable under action of the plunger to permit driving of staples of different thicknesses of wire, and said spring operated feeding means being of insufficient force to shift said wall.

14. In a staple driving machine, a movable plunger for driving the individual staples, a guideway for the plunger, a guide for the staples, means for feeding staples along said guide to the guideway, and an inverted substantially U-shaped spring plate mounted with one leg forming the front wall of the guideway under the plunger.

15. In a staple driving machine, a movable plunger for driving the individual staples, a guideway for the plunger, a guide bar for inverted U-shaped staples, means for feeding staples along said bar to the guideway, a yieldable wall forming the front of the guideway opposite the

end of the bar and of sufficient width to guide the prongs of a staple, said wall being adapted to yield laterally to permit staples of different thicknesses to be driven through the guideway, the upper forward edge of the guide bar being beveled with the bevel being wider at the opposite sides of the guide bar than in the center to guide the connecting bar of staples into the guideway, and said feeding means being of insufficient force to shift said wall.

16. In a staple driving machine, a movable plunger for driving the individual staples, a guideway for the plunger, a guide bar for inverted U-shaped staples, a yieldable front wall for the guideway opposite the end of said bar of sufficient width to guide the prongs of a staple and spaced from the end of the bar a distance equal to substantially the thickness of the normal size staple to be used in the machine, and said wall adapted to yield laterally away from the end of the guide bar to permit driving of staples of greater thickness, the upper forward edge of the guide bar being beveled with the bevel wider at the opposite sides of the guide bar than in the center to guide the connecting bar of staples into the guideway.

17. In a staple driving machine, a movable plunger for driving the individual staples, a guideway for the plunger, a guide bar for inverted U-shaped staples, a yieldable front wall for the guideway opposite the end of said bar of sufficient width to guide the prongs of a staple and spaced from the end of the bar a distance equal to substantially the thickness of the normal size staple to be used in the machine, said wall being adapted to yield laterally away from the end of the bar to permit staples of greater thickness to be driven through the guideway, and the upper forward edge of the guide bar being beveled to guide the connecting bar of a staple into the raceway.

18. In a staple driving machine, a movable plunger for driving the individual staples, a guideway for the plunger, a guide bar for inverted U-shaped staples, means for feeding staples along said bar to the guideway, an inverted substantially U-shaped spring plate mounted with one leg forming the front wall of the guideway opposite said bar, said front wall being spaced from the end of the bar a distance substantially the thickness of the normal size staple to be used in the machine and adapted to yield laterally to permit staples of greater thickness to be driven through the guideway.

19. In a staple driving machine, a movable plunger for driving the individual staples, a guideway for the plunger, a guide bar for inverted U-shaped staples, means for feeding staples along said bar to the guideway, an inverted substantially U-shaped spring plate mounted with one leg forming the front wall of the guideway opposite said bar, said front wall being spaced from the end of the bar a distance substantially the thickness of the normal size staple to be used in the machine and adapted to yield laterally to permit staples of greater thickness to be driven through the guideway, and the upper forward edge of the guide bar being beveled to guide the connecting bar of staples into the guideway.

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