

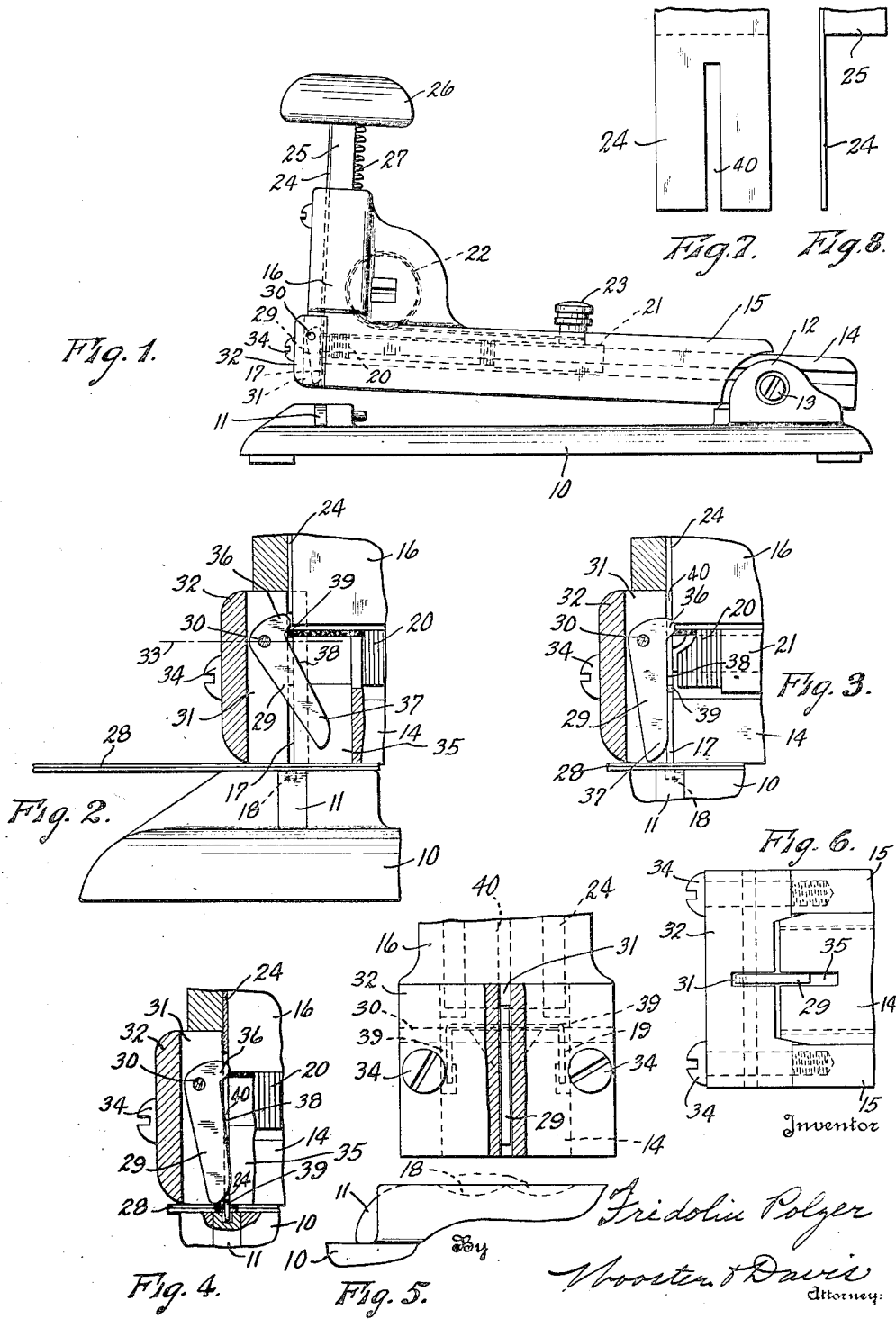
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STAPLING MACHINE

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STAPLING MACHINE

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This invention relates to new and useful improvements in stapling machines such for example as those used for stapling or fastening papers together.

5 Heretofore, machines of this type have been subject to the limitation that they become clogged since it has been possible for a second staple to enter the raceway of the machine before the first staple to enter it has been driven out. One means suggested to overcome the objection noted acts to lock the machine plunger to prevent its coming back unless the driving stroke has been completed to prevent the second staple from entering the raceway. However, this is unsatisfactory as the catch becomes broken or is not reliable.

10 An object of the present invention is to provide a stapling machine with means for preventing clogging by jamming or wedging of a staple in the plunger guideway or raceway, including means independent of the plunger for preventing a second staple moving into the raceway of the machine until after the first staple to enter the raceway has been driven from it.

15 Another object is to provide a stapling machine including means to lock or hold the staple strip whereby to prevent other staples entering the raceway during the time the first staple to enter the raceway remains in the same.

20 A further object is to provide a stapling machine wherein the staple is held under pressure for the greater part of its passage through the staple raceway of the machine whereby the staple is prevented from dropping out of the raceway.

25 An additional object is to provide a stapling machine including a feeding spring for feeding the staples to a position to be engaged and driven by the machine plunger, the pressure of the feeding spring on the staple strip co-operating with a holding or locking means acting to prevent a second staple from entering the staple raceway of the machine until after the first staple to enter the raceway has been removed therefrom.

30 Yet another object is to provide a stapling

machine including a holding means operating to prevent a second staple from entering the staple raceway of the machine until after the first staple to enter said raceway has been removed therefrom, the holding means being held in operative or holding position by the staple in the raceway and the pressure of the feed spring.

35 A further object is to provide a stapling machine including a feeding spring for feeding the staple strip toward the staple raceway, a locking or holding means for preventing a second staple entering the raceway until the first staple to enter it has been removed from it, said locking means holding the staple strip against the action of the feeding spring while a staple is in the raceway, and said spring co-acting with the locking means to maintain a pressure on a staple in the raceway.

40 An additional object is to provide a stapling machine including a feeding spring for feeding a staple strip toward the staple raceway of the machine and a holding means operable to prevent a second staple entering the raceway until the first staple to enter it has been removed, said holding means being moved to and held in operative position by the first staple to enter the raceway.

45 Other and additional objects and advantages will become apparent from a consideration of the following detailed description taken in connection with the accompanying drawings wherein a satisfactory embodiment of the invention is shown. However, it is to be understood that the invention is not limited to the particular arrangement of parts or the details of construction shown since many changes in construction, combination and arrangement of parts may be made without departing from the spirit of the invention or the scope of the appended claims to which reference must be had for a definition of the limitations of the invention.

50 In the drawings:

Fig. 1 is a side elevational view of a complete stapling machine constructed in accordance with the present invention;

Fig. 2 is a sectional view through the for-

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ward portion or operating head of the machine showing the improved staple holding means in inoperative position;

Fig. 3 is a similar sectional view but showing the holding means in operative position, a staple being shown in the raceway;

Fig. 4 is a similar sectional view the staple having been driven and the plunger in its lowest position;

Fig. 5 is a front view of the lower portion of the head of the machine, part being broken away to clearly show the location of the holding or locking means;

Fig. 6 is a bottom plan view of the head of the machine;

Fig. 7 is a front elevation of the lower part of the plunger; and

Fig. 8 is a side view thereof.

Referring in detail to the drawings the improved staple machine includes a base or support 10 at its forward end carrying an anvil portion 11. At its rear end the base carries upstanding ears 12 between which is disposed and to which is pivotally secured as at 13 the rear end portion of a guide bar 14. A housing 15 encloses the guide bar and at its forward end provides an operating head 16. The operating head 16 includes a guide way 17 aligned with the depressions 18 in the anvil, such depressions serving to turn over or clinch the ends of the staples.

The guide bar 14 may have the longitudinal edges of its upper portion cut away as at 19 to accommodate the legs or prongs of the staples forming the strip 20 which strip as shown is carried on the guide bar. A follower 21 operated by a spring 22 is slidable on the guide bar 14 and acts to feed the staple strip forward toward the raceway 17 and plunger 24. This follower includes a finger piece 23 whereby the follower may be manipulated as for example when the follower is removed from the guide bar to permit the insertion of a new strip of staples into the machine.

A plunger 24 operates in the raceway 17 and this plunger is carried by a bar 25 having a head 26, the plunger bar and head being normally held in the elevated position shown in Fig. 1, by means of a coil spring 27. As the staples are fed forward by the spring 22 and follower 21, they may be driven as for example to secure sheets of paper 28 together. This stapling or riveting operation is performed by pressing or striking the head 26 whereby to operate the plunger 24 through the raceway.

The staple strip is fed forward the distance necessary to project the first staple of the strip (indicated at 39) into the raceway in a position beneath the plunger 24. As a matter of fact the raceway 17 is of a width to receive but one staple. Therefore, when the head 26 is pressed or struck the plunger in its downward movement to the raceway

will carry the first staple 39 of the strip with it driving the same through the sheets 28, the arms or legs of the staple being clenched or bent over when they strike the anvil 11 if such an anvil is used.

As before pointed out it has happened that machines of the type described become clogged. This occurs when as for example the plunger has been depressed sufficient to move the foremost staple downwardly in the raceway without moving it sufficiently far to expel it from the raceway. Then when the plunger is again depressed a second staple will have moved into the raceway, this second staple being then the foremost staple of the strip and being disposed above the first staple which was left in the guide way, and this second staple will be driven down on top of the first staple resulting in the machine becoming clogged.

According to the present invention means are provided to prevent a second staple from entering the raceway until after the first staple to enter therein has been removed therefrom. This means as shown takes the form of a lever or dog 29 pivoted at 30 and disposed within a slot 31 in a removable portion 32 of the head 16. This lever 29 has its pivot located at a point a short distance below the connecting portions of the staples or top of guide bar 14, the center of the pivot being indicated by the dot and dash line 33.

The part 32 may be secured to the head 16 as for example by means of the screws 34 and the part is so arranged that the lever 39 may enter into and cross the raceway 17. To further accommodate the lever 29 the end of the guide bar 14 adjacent the raceway is grooved or notched as at 35.

The parts are shown in their normal positions in Fig. 2 and here it will be noted that the lever 29 has its head or operating portion 36 in engagement with the foremost staple 39 of the strip 20, the spring 22 acting through the follower and staple strip to rock the lever 29 about its pivot and to dispose its end 37 having a cam surface 38 across the raceway 17 and into the notch 35 in the guide bar. However, it will be noted that the lever 29 has been rocked about its pivot 30 a distance sufficient to permit the first staple of the strip 20 to enter the raceway under the lower end of the plunger 24.

Now, should the plunger 24 be depressed it will engage this first staple which is designated 39 and move it downwardly in the raceway. As it moves downward the connecting or cross bar of the inverted U-shaped staple 39 will engage the cam surface 38 of the lever 29 rocking such lever clockwise about its pivot and into its operating position as shown in Fig. 3. The lower portion of the plunger has a longitudinal slot 40 so that the plunger straddles the lever 29 when forcing the staple downwardly.

Here it will be seen that the head 36 of the lever has entered a short distance into the notch 35 in the guide bar moving the strip 20 a short distance rearwardly along the guide bar in opposition to the action of the spring 22 and away from plunger 24.

It will be appreciated that in this position the spring 22 acting through the strip 20 and the lever 29 will cause the lever to grip the staple 39 whereby the staple is prevented from dropping out of the raceway. As long as the staple 39 remains in the raceway the lever 29 will be held in the position shown in Fig. 3 and the second staple of the strip will be prevented from entering the raceway. Therefore, the plunger may be partly depressed as much as desired without in any way affecting the situation since it will not be possible for incomplete actions of the plunger to force additional staples into the raceway one on top of the other.

When the plunger is completely depressed to drive the staple through the paper sheets as shown in Fig. 4, or through other matter which it may be desired to staple together, the staple is of course, moved away from the lever 29 and the action of the spring 22 on the strip 20 will return the lever to its normal position as shown in Fig. 2 and the next staple on the strip is now in position under the plunger ready to be driven. In Fig. 4 the parts are shown with the plunger in its lowest position just after completing the setting of the staple, it being understood the plunger has a vertical slot 40 opening through its lower end so that it can straddle the staple holding member 29.

Since the lever 29 always has either its head portion 36 or its arm portion 37 extending across the raceway it is necessary to provide this slot 40 in the plunger 24 in order that the plunger may be depressed without interfering with the lever. As the device is constructed the plunger straddles the lever during the time the plunger is depressed in the raceway.

From the foregoing description it is believed that the operation of the improved device will be evident. Further, it is believed that it will be obvious that a second staple is prevented from entering the raceway during the time the first staple to enter the raceway remains therein. This is due to the fact that the first staple entering the raceway operates the lever 29 to so dispose its head 36 as to hold or lock the staple strip against movement toward the guideway as long as that first staple to enter the guideway is in contact with the lever. As a matter of fact the operation is such that the staple strip is moved backwardly along the guide bar for a short distance in opposition to the action of the spring 22 so that the first staple is held in the raceway by action of this spring.

Additionally, it is to be noted that the spring 22 acting through the staple strip 20 constantly exerts a pressure on the lever 29. When a staple is in the raceway and in engagement with the lever as shown in Fig. 3 this pressure is transmitted to the staple and accordingly the staple is held against any tendency to turn out of its proper position in the machine. Although in the drawings my improved device is shown as applied to a machine in which an anvil is used to clinch the staples it will of course be understood it may also be used in so-called tacking machines in which no anvil is employed but the staples are driven into the work without clinching.

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

1. In a staple driving machine including a raceway, means for feeding a staple strip toward said raceway, a plunger operable in said raceway to drive the staples of the strip one at a time, and staple locking means operated by a staple in a raceway to engage a second staple and prevent its entering the raceway until the first staple to enter the raceway has been removed therefrom.

2. In a staple driving machine including a raceway, means for feeding a staple strip toward said raceway, a plunger operable in the raceway to drive the staples, and means in the raceway operated by a staple in the raceway to engage the first staple on the strip to prevent a second staple entering the raceway while a staple is in the raceway.

3. In a staple driving machine including a raceway, means for feeding a staple strip toward said raceway, a plunger operable in said raceway to drive the staples of the strip one at a time, and means independent of said plunger to prevent a second staple entering the raceway until the first staple to enter the same has been removed therefrom.

4. In a staple driving machine including a raceway, means for feeding a staple strip toward said raceway, a plunger operable in the raceway to drive the staples, and a pivoted means to engage the staple strip to prevent a second staple entering the raceway while the first staple to enter it remains therein and operated to holding position by said first staple.

5. In a staple driving machine including a raceway, means for feeding a staple strip toward said raceway, a plunger operable in the raceway to drive the staples, and a pivoted means projecting into the raceway and acting in cooperation with the first staple to engage the strip to prevent a second staple entering the raceway until after the first staple to enter it has been removed.

6. In a staple driving machine including a raceway, means for feeding a staple to said raceway, a plunger operable in the raceway to drive the staple, and means operated by

a staple in the raceway to a position to engage a second staple to prevent said second staple from being fed to the raceway.

7. In a staple driving machine including a raceway, means for feeding a staple strip toward said raceway, a plunger operable in the raceway to drive the staple, and a pivoted means operated by a staple in the raceway to engage the foremost staple on the strip to prevent a second staple entering the raceway until the first staple has been removed therefrom.

8. In a staple driving machine including a raceway, spring means for feeding a staple strip toward said raceway, a plunger operable in the raceway to drive the staples as they are fed into the raceway, a pivoted means projecting into the raceway adapted to engage the foremost staple on the strip, and means whereby said pivoted means is operated by a staple in the raceway to engage said foremost staple to hold the strip against action of the spring to prevent a second staple entering the raceway.

9. In a staple driving machine, an operating head having a raceway therein, a guide bar, means for feeding a staple strip along said guide bar toward said raceway, and means operable by a staple in the raceway to engage said strip and move the same back along the guide bar in opposition to the first named means whereby to prevent a second staple from entering the guide way while the first staple to enter it remains therein.

10. In a staple driving machine, an operating head having a raceway therein a guide bar, a feeding spring for feeding a staple strip along said guide bar toward said raceway, and means operated by said spring to engage a staple in the raceway to hold the same and prevent it dropping out of position therein.

11. In a staple driving machine, an operating head having a raceway therein, a guide bar, a feeding spring for feeding a staple strip along said guide bar toward said raceway, means operable by a staple in the raceway to engage the strip and hold the same against the action of the feeding spring to prevent a second staple being fed to the raceway while the first staple remains therein.

12. In a staple driving machine, an operating head having a raceway therein, a guide bar, said guide bar having a notch in its end adjacent the raceway, means for feeding a staple strip along said guide bar toward said raceway, and means operable by a staple in the raceway to enter said notch in the guide bar to hold the strip against the action of the feeding means and prevent a second staple being fed to the raceway while the first staple remains therein.

13. In a staple driving machine, an operating head having a raceway therein, means for feeding staples toward said raceway, a

plunger operable in said raceway to drive the staples, means projecting into the raceway and operable by a staple therein to engage the following staple to prevent a second staple entering the raceway while the first staple to enter it remains therein, and said plunger including a bifurcated portion to accommodate said means.

14. In a staple driving machine including a raceway, means for feeding a staple strip toward said raceway, a plunger operable in the raceway to drive the staples, a lever pivoted intermediate its ends and projecting into the raceway, said lever having an operating portion and a cam like portion, and said cam like portion adapted to be engaged by a staple in the raceway to operate the lever and bring its operating portion into engagement with the staple strip whereby to prevent a second staple entering the raceway while the first staple to enter it remains therein.

15. In a staple driving machine including a raceway, means for feeding a staple toward said raceway, a plunger operable in the raceway to drive the staple, means to prevent a second staple entering the raceway while the first staple to enter it remains therein, and said feeding means operating to move said means to permit a second staple to enter the raceway when the first has been moved therefrom.

16. In a staple driving machine having a raceway, a plunger operable in the raceway to drive the staples, a guiding means for a staple strip, a follower, a spring for advancing the follower to feed the staple strip toward the raceway, a pivoted lever adapted to engage the forward end of the strip, and means for operating the lever on operation of the plunger to engage the strip and move it backward from the raceway against the action of the spring.

17. In a staple driving machine having a raceway, a plunger operable in the raceway to drive the staples, a guiding means for a staple strip, a follower, a spring for advancing the follower to feed the staple strip toward the raceway, a lever mounted on a pivot below the top of the staple strip and having an edge portion to engage the end of the strip, said lever also having a cam portion below the pivot to be engaged by a staple as it is forced through the raceway and cooperate therewith to force the edge portion against the strip.

18. In a staple driving machine including a raceway, means for feeding a staple strip toward said raceway, a plunger operable in the raceway to drive the staples, and means straddled by the plunger movable to engagement with the staple strip to prevent a second staple entering the raceway while the first staple to enter it remains therein and

operated to holding position by said first staple.

19. In a staple driving machine having a raceway, a plunger operable in the raceway to drive the staples and having a longitudinal slot leading from its lower end, a guiding means for a staple strip, a spring for advancing the strip toward the raceway, and a pivoted lever having a portion to extend across the raceway and engage the foremost staple on the strip, said lever also having a cam portion to be engaged by a staple as it is forced through the raceway and cooperate therewith to force the first portion against the foremost staple, said plunger straddling the lever as it forces a staple through the raceway.

20. In a staple driving machine including a housing having a raceway, means for feeding a staple strip toward said raceway, a plunger operable in the raceway to drive the staples, a detachable member forming a portion of one wall of the raceway, and movable means mounted in said detachable member operated by a staple in the raceway to a position to engage a second staple to prevent said second staple being fed to the raceway while the first staple remains therein.

21. In a staple driving machine including a housing having a raceway, means for feeding a staple strip toward said raceway, a plunger operable in the raceway to drive the staples, a detachable member forming a portion of the front wall of the raceway, and a lever pivotally mounted in said detachable member having a portion adapted to engage the foremost staple on the strip and a second portion adapted to extend into the raceway to be engaged by a staple therein and operated by said staple to move the first portion to staple engaging position to prevent a second-staple entering the raceway while the first staple remains therein.

22. In a staple driving machine having a raceway, a plunger operable in the raceway to drive the staples, a guiding means for a staple strip, a feeding spring for feeding a staple strip toward said raceway, and means operable by a staple in the raceway to engage the strip and hold it against the action of the feeding spring to prevent a second staple entering the raceway while the first staple remains therein.

In testimony whereof I affix my signature.
FRIDOLIN POLZER.