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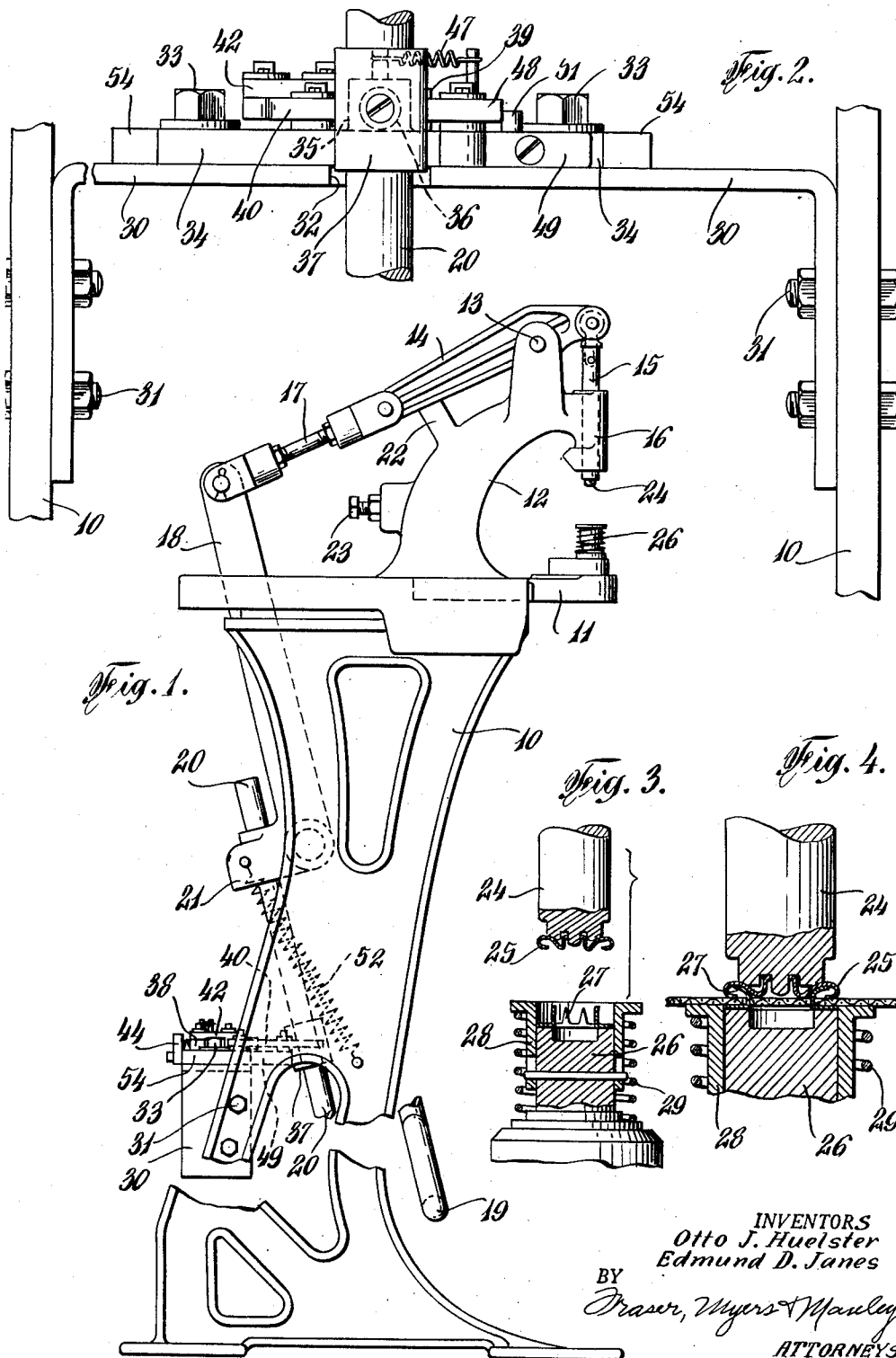
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MANUALLY OPERATED FASTENER ATTACHING MACHINE

Filed June 24, 1942

2 Sheets-Sheet 1



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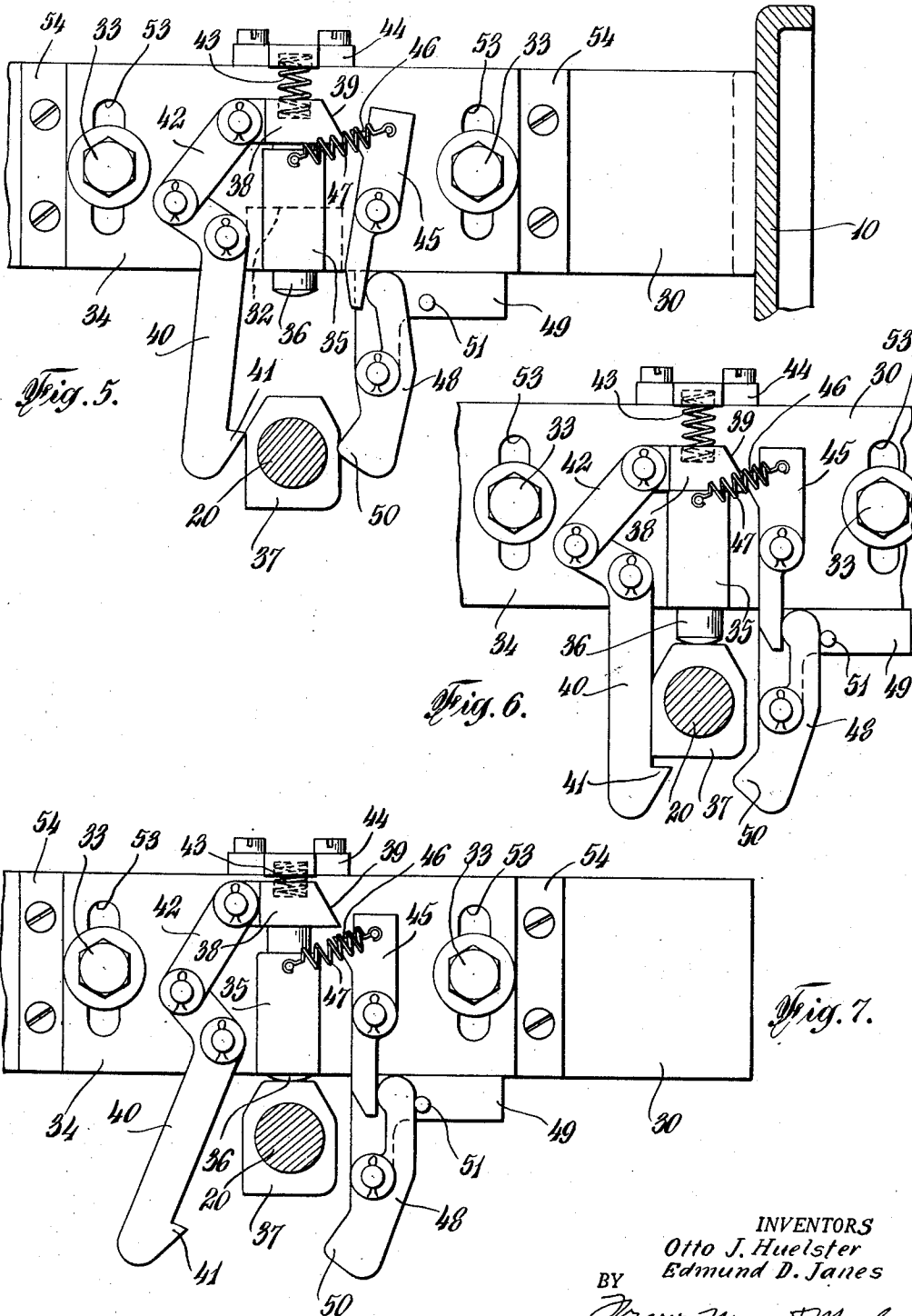
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MANUALLY OPERATED FASTENER
ATTACHING MACHINE

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Our present invention relates to manually operable fastener attaching machines and the like and aims to provide certain improvements therein. More particularly it relates to an attachment to such machines whereby to insure that a setting of the fastener elements, once started by the movement of the manually operable means, must be carried to completion.

In the operation of manually operable fastener attaching and setting machines a treadle is usually provided as the operating means and a sound or impulsive kick to the treadle is required to insure a complete and secure assembly of the fastener elements to the material to which said elements are to be applied. Occasionally, and especially toward the end of a working session an operator will give but a weak or a relatively mild kick to the treadle thereby resulting in the fastener elements being only partially or insecurely closed upon the material.

The present invention has for its primary object the provision of means for insuring that the fastener elements will be completely closed in a secure manner to the material. A further object is to provide means which will oblige the operator to give to the treadle a full stroke once a fastener attaching operation is started and which will prevent the treadle from returning to its normal position until it has completed a full stroke. A further object is to prevent the return of the treadle to normal position after the fastener elements have become partially interlocked and to only permit the return of the treadle when the complementary fastener elements have been securely locked to the material. A still further object is to prevent the removal of the material with only partially locked fastener elements from between the dies of the machine.

The foregoing and other objects of the invention not specifically enumerated we accomplish by applying to a manually operable fastener attaching and setting machine and the like a latch device, which becomes operative after the treadle during its work-stroke has been moved a predetermined distance less than its full stroke for locking the treadle against return movement to its normal position, but permitting return movement of the treadle to its initial locking position from any intermediate point between said locking position and the full stroke position so that an impulsive force may be applied to the treadle to complete the full work-stroke thereof, and means operable when the treadle reaches the limit of its full work-stroke for rendering the

locking means inoperative whereby to permit the treadle to return to its normal position.

The invention will be better understood from the detailed description which follows when considered in connection with the accompanying drawings wherein:

Figure 1 is a side elevation of a conventional form of manually operable fastener attaching and setting machine, with the latching device of our invention applied thereto.

Fig. 2 is a front elevation on an enlarged scale of the latching device shown in Fig. 1.

Fig. 3 is a longitudinal section through a pair of fastener element holding and setting dies and showing the relationship between a socket element and a pronged ring fastener element adapted to be held by said dies.

Fig. 4 is a longitudinal section showing the relative position of the dies and the fastener elements of Fig. 3 just as the latching takes place in the latching device.

Figs. 5, 6 and 7 show top plan views of the latching mechanism in normal position, in latching position, and upon completion of the full work-stroke position of the treadle, respectively.

The latching device constituting the present invention is applicable to any type of treadle operated machine and we have herein shown said device as applied to a conventional form of such machine, which comprises a stand 10 carrying a table 11 from which rises a head 12 having a bearing 13 in which is pivoted a lever or rocker arm 14 for operating a plunger 15, said plunger being vertically slidable in a bearing 16 carried by the head 12. The lever 14 is actuated through an adjustable link 17 and lever arm 18 by means of a stirrup or treadle 19 forming part of a treadle rod 20 which is longitudinally adjustable in a clamp 21 carried by the lever arm 18. A stop 22 on the head 12 is provided for limiting the upward movement of the plunger 15 by contact with the rocker arm 14, and said head 12 also has an adjustable stop 23 for limiting the downward movement of the plunger 15 by contact with the lever arm 18.

The machine may be provided with any type of dies depending upon the character of the fastener elements which are to be set by the machine, and in Fig. 3 there is shown an upper die 24 adapted to receive and hold a socket element 25 and a lower die 25 adapted to receive and hold a pronged ring element 27 which, in cooperation with the socket element 25 when set upon suitable material or fabric, will provide the socket member for cooperative detachable en-

gement with a complemental stud member. As herein shown, the lower die is formed with a slidable sleeve 28 which is normally held in its uppermost position by an expansion coil-spring 29, the sleeve being adapted to be depressed as the upper die in moving downwardly engages against the material to which the fastener elements are to be attached and which is normally held across the top of said sleeve. While no specific means are herein shown for feeding the fastener elements to the respective dies it will be understood that any conventional means may be employed.

Referring now to Figs. 2, 5, 6 and 7, which illustrate the specific latch means which constitute the present invention, numeral 30 designates an inverted U-shaped bracket member which may be suitably secured to the side walls of the stand 10 by bolts or the like 31, said bracket having a medial cut-out portion 32 to provide a clearance for the treadle rod 20 when it is moved to the full length of its kick or work-stroke. Mounted on the top of the bracket 30 by bolts 33 is a flat plate 34 having a plunger block 35 extending upwardly from its surface and transversely thereacross for approximately one-half its width. Movable through the plunger block 35 is a plunger 36, the forward end of which is adapted to be engaged by a latch-block 37 attached to an intermediate portion of the treadle rod 20, the opposite end of the plunger being formed with an integral cross-head 38, one end of which is formed with an oblique cam face 39. Pivotally mounted on the plate 34 is a bell-crank lever 40 having arms of unequal length, the free end of the long arm being formed with a nose or detent 41 which normally engages against the adjacent side face of the latch-block 37 in a sliding manner. The free end of the short arm of the bell-crank lever 40 is pivotally connected to one end of a link 42, the opposite end of which is pivotally connected to one end of the head 38 on the plunger. The plunger head 38 is urged forwardly with respect to the front of the machine (downwardly in Figs. 5, 6 and 7 of the drawings) by a coil-spring 43, one end of which seats within a recess in said plunger head and the other end of which seats within a recess in a block 44 secured to the rear face of the plate 34. It will thus be seen that the detent or nose 41 of the bell-crank lever 40 is normally biased by the spring 43 to move in a counterclockwise direction about its pivotal mounting on the plate 34. Also pivotally mounted on the top face of the plate 34, on the side of the plunger block opposite to that upon which the lever 40 is mounted, is a locking lever 45 having a detent or nose 46 extending from one side thereof toward the plunger and having an inclined face which is complemental to the oblique cam face 39 on the plunger head. The locking lever 45 is normally biased by a coil-spring 47 to rotate in a counterclockwise direction and normally has its nose spaced from the cam face 39, as shown in Fig. 5. The locking lever 45 through the biasing spring 47 is also held in engagement with one end of a rocker arm 48 mounted on a bracket 49 attached to the front side of plate 34, the opposite end of the rocker arm 48 having a nose 50 which is normally urged in a clockwise direction and held in engagement with the side face of the latch-block 37 opposite to that which is engaged by the detent 41. To limit the clockwise movement of the rocker arm 48, a stop pin 51 is mounted on bracket 49. Connected at one end to a pin on the clamp 21 is a

coil-spring 52, the opposite end of which is connected to a side of the stand 10, said spring operating to urge the treadle 19 back to normal starting position when displaced therefrom.

In utilizing this invention it is preferred that the point at which the latching takes place between the latch-block 37 and the detent 41 be just after the prongs of the prong ring 27 have been upset in the breast part of socket 25 to a degree which will prevent separation of said parts, as shown in Fig. 4. This or any other point can be controlled by making the plate which carries the latching lever 40 adjustable along the line of movement of the latch-block. As herein shown this adjustability is provided by forming in the plate 34 longitudinal slots 53 and providing guide rails 54 along the ends of the plate attached to the bracket 30.

When the treadle bar 20 is urged rearwardly (to the left in Fig. 1 and upwardly in Figs. 5 to 7) under the impulse of a kick, the latch-block 37 will pass the detent 41 of the bell-crank lever 40, whereupon said detent will snap in behind the latch-block under the influence of spring 43. At approximately the same time the nose end 50 of the rocker arm 48 will likewise move into the path of the latch-block rearwardly thereof. The relation of the parts of the latching device at this time is shown in Fig. 6 and, as will be obvious, the treadle rod 20 can not now return to its normal starting position. However, as the movement of the treadle is continued rearwardly the latch-block 37 will strike the plunger 36 and move it rearwardly against the tension of spring 43. As this latter movement is taking place the detent 41 on the bellcrank lever will be moved out of the path of the latch-block and the nose 46 on the locking lever 45 will pass over the cam face 39 on the plunger head and be moved by spring 47 in front of said plunger head to hold detent 41 out of the path of the latch-block until nose 46 is later moved away from its position in front of plunger head 38. The relation of the parts when the treadle reaches the limit of its work-stroke is shown in Fig. 7. Now under the influence of spring 52 the treadle bar is returned to its normal starting position since the detent 41 no longer prevents such return movement. However, as the treadle bar is returning to normal position it carries with it the latch-block 37 the forward face of which first passes detent 41 and a moment later, on encountering the nose 50 of rocker arm 48, moves it out of the latch-block path into sliding engagement with the side of the latch-block, the force of spring 52 being greater than that of spring 47, and as the rocker arm 48 is thus moved in a counterclockwise direction it rocks locking lever 45 in a clockwise direction to withdraw the detent 46 from in front of the plunger head 38 to permit the plunger head under the influence of spring 43 to move forwardly to return the nose end 41 of lever 40 into engagement with the side of the latch-block. All the elements of the mechanism are thus brought back into normal position so that the cycle may be repeated.

Now let it be supposed that a weak or relatively mild kick is given to the treadle sufficient to move the latch-block beyond the latching position but short of a full stroke. The fastener elements 25 and 27 will thereupon become partially locked to the material but in an insecure and unsatisfactory manner, and as the treadle can not now return to its starting position the setting dies can not be moved apart, hence the material

with the partially secured fastener elements can not be removed from the machine. The operator is accordingly immediately apprised of this fact and is thereupon obliged to complete the setting stroke by giving to the treadle a movement sufficient to carry it to the end of its work-stroke, that is, to a point where nose 46 moves in front of plunger head 38. If the mild kick has only carried the latch-block just past the detent 41 there is still sufficient movement left for the treadle to give to it an impulsive kick which will insure a firm setting of the fastener elements on the material. On the other hand, if the kick has carried the latch-block past the detent 41 but short of its full length stroke, limited return movement of the treadle bar back to latching position of the latch-block is possible so that an impulsive kick can still be given to the treadle to complete the setting operation. It will thus be apparent that if the initial kick upon the treadle is insufficient to carry it through its full work-stroke but sufficient to bring the parts into latching relation, there is still sufficient movement available to the treadle so that an impulsive kick may be given thereto to complete the setting operation in a firm and satisfactory manner.

Although in the foregoing description, the invention has been described with specific relation to the setting of socket fastener elements, it will be obvious that it is equally applicable to other types of fastener elements, and in view of the adjustable character of the plate 34 which carries the latching lever 40 and also the adjustable stop means 23, the device may be used with fastener elements of different lengths and upon material or fabric of different thicknesses. It will furthermore be appreciated that while we have shown and described a preferred embodiment of our invention it is to be understood that we do not wish to be limited to the specific details of construction as herein disclosed, since these may be varied within the range of engineering skill without departing from the spirit of the invention as defined in the accompanying claims.

What we claim is:

1. In a manually operable fastener attaching machine or the like having dies for receiving and holding complemental fastener elements which are to be attached to material, at least one of said dies being movable toward the other, a treadle, means operatively connected with the treadle for moving the movable die, and means operative by the movement of the treadle after the treadle has been moved to bring the dies into the relation where the fastener elements carried by said dies will be in partially locking relation for preventing withdrawal of the material and of the incompletely assembled fastener from the machine until the treadle has completed its full stroke.

2. In a manually operable fastener attaching machine or the like having dies for receiving and holding complemental fastener elements which are to be attached to material, at least one of said dies being movable toward the other, a treadle, means including a treadle bar operatively connected with the treadle for moving the movable die, and means operable by the treadle bar after the treadle has been moved to bring the dies into the relation where the fastener elements carried by said dies will be in partially locking relation for locking the treadle against return movement

to its normal position in the event that the treadle has not been moved to the limit of its full stroke, but permitting completion of such full stroke.

3. In a manually operable fastener attaching machine or the like having a plunger die, means for operating the plunger die comprising a treadle and a treadle bar, and a latch device which becomes operative after the treadle has been moved a predetermined distance less than its full stroke for locking the treadle against return movement to its normal position but permitting return movement of the treadle to its initial locking position from any intermediate point between said locking position and the full stroke position so that an impulsive kick may be applied to the treadle to complete the full stroke thereof, said latch device comprising a cam latch-block carried by and movable with the treadle bar, a latching pawl, spring means urging the latching pawl against a side of the latch-block so as to engage behind a shoulder on said block after a predetermined movement thereof by the treadle bar, and means operable upon the treadle reaching the limit of its full stroke for moving the latching pawl out of the path of the latch block on its return movement.

4. In a manually operable fastener attaching machine according to claim 3 wherein the latching pawl is a bell-crank lever having a detent adapted to engage behind the latch-block, and wherein the means operable upon the treadle reaching the limit of its full stroke for moving the latching pawl out of the path of the latch-block comprises a plunger operatively connected to the bell-crank lever and a spring biasing said plunger forwardly and wherein the plunger has a cam adapted to cooperate with a cam on a locking lever for holding the detent on the latching pawl out of the path of the latch-block on its return movement until the detent-engaging shoulder of the latch-block has passed said detent.

5. In a manually operable fastener attaching machine according to claim 3 wherein the latching pawl is mounted to adjustably vary the predetermined point in the movement of the latch-block at which the latching pawl will engage behind the shoulder of the latch-block.

6. In a manually operable fastener attaching machine according to claim 3 wherein the latching pawl is a bell-crank lever having a detent adapted to engage behind the latch-block, and wherein the means operable upon the treadle reaching the limit of its full stroke for moving the latching pawl out of the path of the latch-block comprises a plunger operatively connected to the bell-crank lever and a spring biasing said plunger forwardly and wherein the plunger has a cam adapted to cooperate with a cam on a locking lever for holding the detent on the latching pawl out of the path of the latch-block on its return movement until the detent-engaging shoulder of the latch-block has passed said detent, and a rocking lever engageable by the latch-block in the course of its return movement for moving the cam on the rocking lever out of engagement with the cam on the plunger to permit the plunger to return to normal position under the influence of its biasing spring.

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