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H. E. HENRICKSEN

2,589,692

LOCKING DEVICE FOR FOOT PRESSES

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Fig. 1

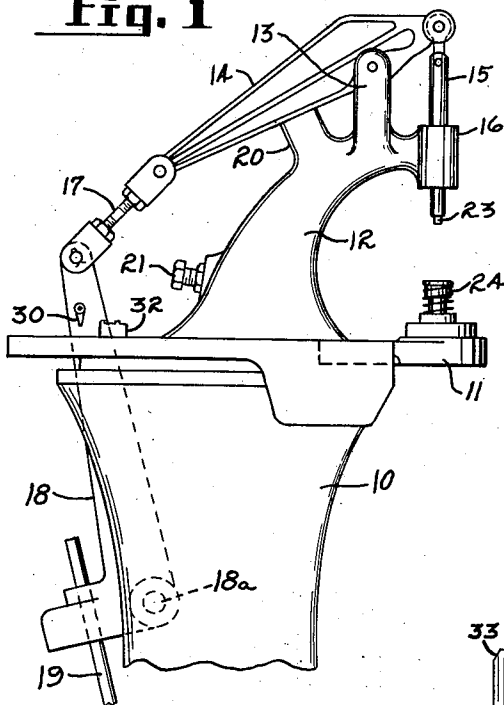


Fig. 2

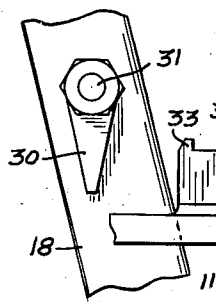


Fig. 2A

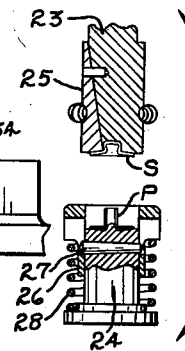


Fig. 5

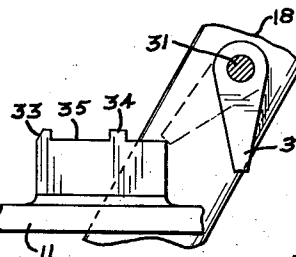


Fig. 5A

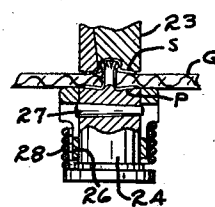


Fig. 3

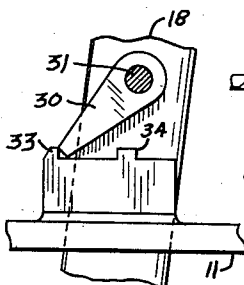


Fig. 3A

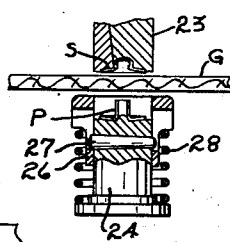


Fig. 6

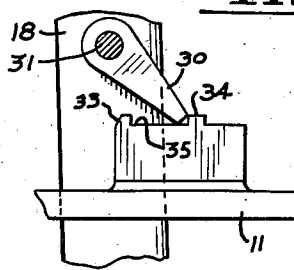


Fig. 4

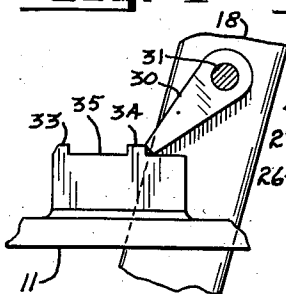
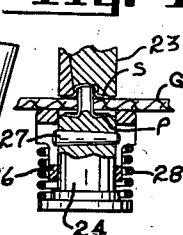


Fig. 4A



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LOCKING DEVICE FOR FOOT PRESSES

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3 Claims. (Cl. 218—5)

1

2

This invention relates to fastener setting machines of the type that are operated by a foot treadle. More particularly it relates to a safety unit attached to such machines to insure that the setting of the fastener element, once started by movement of a treadle operating means, must be carried to completion, and is an improvement upon the invention disclosed in the Huelster et al. Patent No. 2,345,476, dated March 28, 1944.

In foot operable fastener attaching and setting machines, a treadle is usually provided as the operating means, and a strong or impulsive kick to the treadle by the operator is required to insure a secure and complete attachment of the fastener elements to the material of a garment or the like. Occasionally, and especially toward the end of a working period, an operator may, perchance, give but a weak or 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 improved means for insuring that the fastener elements will be completely closed in a secure manner to the material.

A further object is to provide a unit having plural locking stations and wherein the first locking station will position the setting dies so that the cloth therebetween can still be adjusted for a proper setting position.

A further object is to provide a much simpler and foolproof safety mechanism of the above character and therefore more economical to construct than the device disclosed in the patent reference referred to.

The unit which accomplishes the purpose of the invention consists simply of a gravity influenced pawl loosely pivoted on the treadle lever and a block with lugs or ratchet teeth fixed to the machine table. The pawl coacts with the ratchet teeth on the catch block adjacent the lever and serves to preclude the return and advancing stroke of the treadle bar unless the stroke is completed in either direction.

The invention will be better understood from the following description when considered in connection with the accompanying drawing, wherein:

Fig. 1 is a side elevational view of a conventional form of foot operable fastener attaching and setting machine, with the safety device of my invention applied thereto.

Figs. 2, 3, 4 and 5 are diagrammatic views of the pawl and catch block showing the sequential steps in which the pawl goes from normal inac-

tive position through its catch positions during the setting stroke of the treadle bar.

Figs. 2A, 3A, 4A and 5A show sectional views of the setting tools such as used for setting a stud and post upon a garment and their relative positions as determined by the corresponding treadle bar positions as shown respectively in Figs. 2, 3, 4 and 5, and

Fig. 6 shows the reverse action of the pawl to the catch block during the return stroke of the treadle bar.

The safety unit according to the present invention is illustrated as applied to a treadle operated machine having a stand 10 upon which is supported a table or bed plate 11 from which rises a head 12 having upstanding bearing supports 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 a bell-crank lever 18 by means of a stirrup or treadle bar 19 adjustably connected to the bell-crank lever 18 which is pivotally mounted on the stand 10 as at 18a. A stop boss 20 is provided upon the head 12 for limiting the upward movement of the plunger 15 by reason of the rocker arm 14 contacting thereagainst in its downward stroke. Furthermore, the downward stroke of plunger 15 may be controlled by an adjustable stop 21 also located on the head 12 and against which bell-crank 18 is adapted to abut.

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 may consist of a setting die punch 23 carried on the end of the plunger 15 and an anvil die 24 supported on the bed plate 11 in direct alignment with plunger 15. Figs. 2A, 3A, 4A and 5A show in detail setting dies such as are used in setting a complementary stud S and post P upon a support G such as garment fabric. The die punch 23 is provided with a spring influenced catch finger 25 that serves to hold the stud S against the lower face of said die punch 23. The anvil die 24 is surrounded by a slidable sleeve 26 which is normally held in its uppermost position against a stop pin 27 by an expansion coil-spring 28. The sleeve serves to hold the post P in place upon the anvil die 24 and is adapted to be depressed about the die 24 coincident with the fastener setting operation, as will be more fully explained later.

Referring now to Figs. 2, 3, 4 and 5 which illustrate one specific form of latch means em-

3

played in the present invention, the numeral 30 designates a finger-like pawl that is freely pivoted on a pin 31 projecting out from one side of the lever 18 and normally hangs in a dependent state as seen in Fig. 2. A catch block 32 is permanently secured to the top surface of the table 11 and located in a position adjacent one side of the working stroke of the lever 18. The catch block 32 is formed with a pair of ratchet teeth 33 and 34 projecting from its upper surface 35 and for convenience sake referred to as the first ratchet tooth 33 and the second ratchet tooth 34.

Once the operator starts to move the operating treadle bar 19 it will be impossible to retract said bar 19 unless it completes its full stroke by reason of the manner in which the pawl 30 on bell-crank lever 18 engages with the ratchet teeth 33 and 34 on catch block 32 as will now be more fully explained.

Considering first Fig. 2, the pawl 30 is shown in its normal dependent position on the lever when the latter is in its retracted position. When the bell-crank lever 18 moves from left to right as viewed in Fig. 1 to operate the plunger 15, the pawl 30 while moving from left to right will cam or ride over the top of the block 32 and ratchet teeth 33 and 34. If, perchance, the treadle bar 19 should start back before it is anywhere near its finished stroke, the pawl 30 will engage with the first ratchet tooth 33 on block 32 and prevent further return movement of said treadle bar. In this first catch position of the safety unit the relative position of the punch die 23 and anvil die 24 is as shown in Fig. 3A and is such that any garment material G placed therebetween can still be adjusted for a proper location of the fastener setting.

Upon further movement of the treadle bar 19 the next locking effect will result when the pawl 30 is in the position as shown in Fig. 4 wherein the dependent pawl engages with the second ratchet tooth 34. In this position of the pawl 30 to the catch block 32 the relative position of the punch 23 and anvil die 24 is such that the slidable sleeve 26 is depressed about the anvil die and the fastener elements penetrate the garment material G and are partially clinched together in the manner as shown in Fig. 4A. After the lever 18 has completed its full stroke, the pawl 30 will ride off from the right corner of the top surface 35 of the catch block 32 and drop its normal dependent position as shown in Fig. 5. When the pawl has thus cleared the catch block 32 it will then be understood that dies 23 and 24 will have been moved to their fastener setting positions and the fastener elements P and S will have been completely and securely affixed to the garment material G as shown in Fig. 5A.

In this released position of the pawl 30, the treadle bar 19 will be allowed to be returned to its initial starting position causing the pawl 30 to again move over the top of the catch block 32 and cam over the ratchet teeth 33 and 34 in a reverse movement. If, perchance, the treadle bar 19 is not returned to its initial starting position and a kick is given to said treadle bar, it cannot return to its completely advanced position by reason of the fact that the pawl 30 will engage with the second ratchet teeth 34 during the period of time that said pawl is moving along the top surface 35 of the catch block 32 between the ratchet teeth 33 and 34.

It will be apparent from the foregoing description that a very simple device has been provided

4

without the use of springs or numerous interacting levers, latches, etc., to provide the safety feature that is needed to operate various types of fastener setting machines operated by foot power. It will further be appreciated that while there is here shown and described a preferred embodiment of the invention, it is to be understood that the invention is not to be limited to the specific details of the 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 I claim is:

1. In a foot operated machine having a plunger, a rocker arm for operating said plunger, and a treadle lever for operating said rocker arm, a freely swinging pawl pivoted on the lever and normally hanging in a pendent position, a catch block of predetermined length attached to the machine in a position adjacent one side of the working stroke of said lever and having a substantially horizontal upper surface, said catch block having a series of ratchet teeth projecting from its upper surface, the length of said pawl being such that its free end normally is disposed below the upper surface of said block and slides over the upper surface of said catch block and drops off at the completion of the lever travel in either direction over one end or the other of said block so as to reverse the angular position of the pawl, said teeth cooperating with said pawl when the latter is moving across the upper surface of said block and serving to prevent a reverse movement of the lever until completion of either its forward or return stroke.

2. In a manually operated fastener attaching machine having setting dies for receiving and holding complemental fastener elements which are adapted to be attached to support material, at least one of said dies being moveable toward the other, a frame, a lever pivoted to said frame, means operatively connected with the lever for moving the moveable die, a catch block attached to said frame in a position adjacent one side of the working stroke of said lever, said catch block having a ratchet tooth projecting above its upper surface, a freely swinging pawl pivoted on the lever normally hanging in a pendent position with its free end disposed below the top surface of said block, said pawl during the fastener setting stroke of said lever having its free end riding upon the top surface of said block and disposed in an inclined direction, and by reason of said tooth must continue in the same direction until it drops off one end of said block before said lever can make its return stroke, the position of said tooth being such that when engaged by said pawl in a reverse stroke before finishing a complete setting stroke the material to which the fastener elements are to be attached will still be free of the fastener elements and capable of being adjusted between said setting dies.

3. In a manually operated fastener attaching machine having setting dies for receiving and holding complemental fastener elements which are adapted to be attached to support material, at least one of said dies being moveable toward the other, a frame, a lever pivoted to said frame, means operatively connected with the lever for moving the moveable die, a catch block attached to said frame in a position adjacent one side of the working stroke of said lever, said catch block having a pair of ratchet teeth projecting above its upper surface, a first one and a second one,

5

a freely swinging pawl pivoted on the lever and normally hanging in a pendent position with its free end disposed below the top surface of said block, said pawl during the fastener setting stroke of said lever having its free end riding upon the top surface of said block and disposed in an inclined direction and adapted to engage with either of said teeth to prevent a reverse stroke of the lever until said lever has completed a setting stroke and the pawl has dropped off of one end of said block, the position of said first tooth being such that when engaged by said pawl in a reverse stroke before finishing a complete setting stroke the material to which the fastener elements are to be attached will be free of the fastener elements and capable of being adjusted between said setting dies, and the position of said second tooth being such that if engaged by said reverse

6

stroke of the pawl the fastener elements will be partially clinched to said material and it being necessary for said pawl to drop off one end of said block to complete the fastener setting operation and allow the full return stroke of said lever.

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REFERENCES CITED

The following references are of record in the file of this patent:

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