Aug. 19, 1941. R. MÜLLER 2,252,780

FASTENING-INSERTING MACHINE

Filed March 4, 1940 2 Sheets-Sheet 1

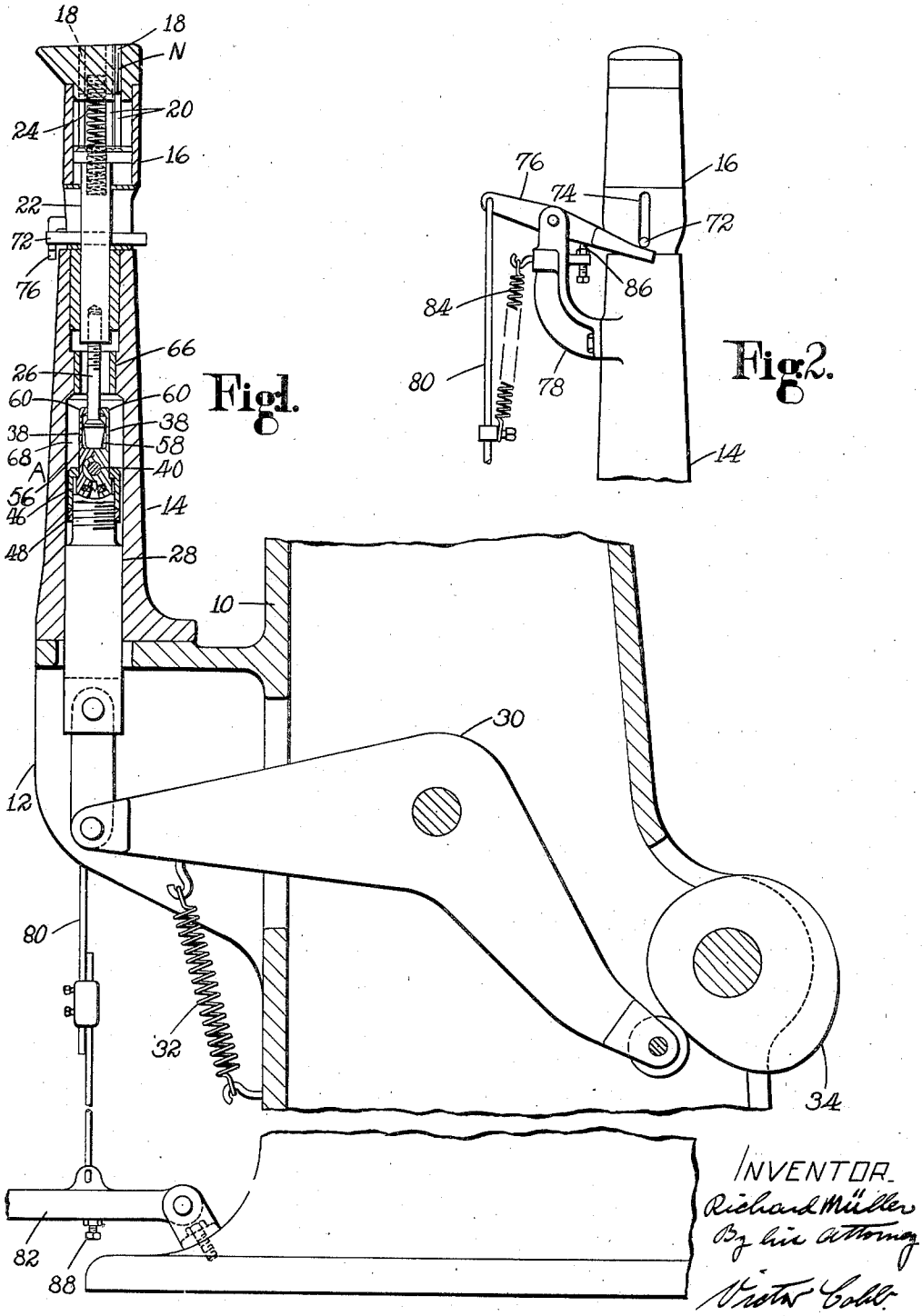


Fig1.

Fig2.

Aug. 19, 1941. R. MÜLLER 2,252,780

FASTENING-INSERTING MACHINE

Filed March 4, 1940 2 Sheets-Sheet 2

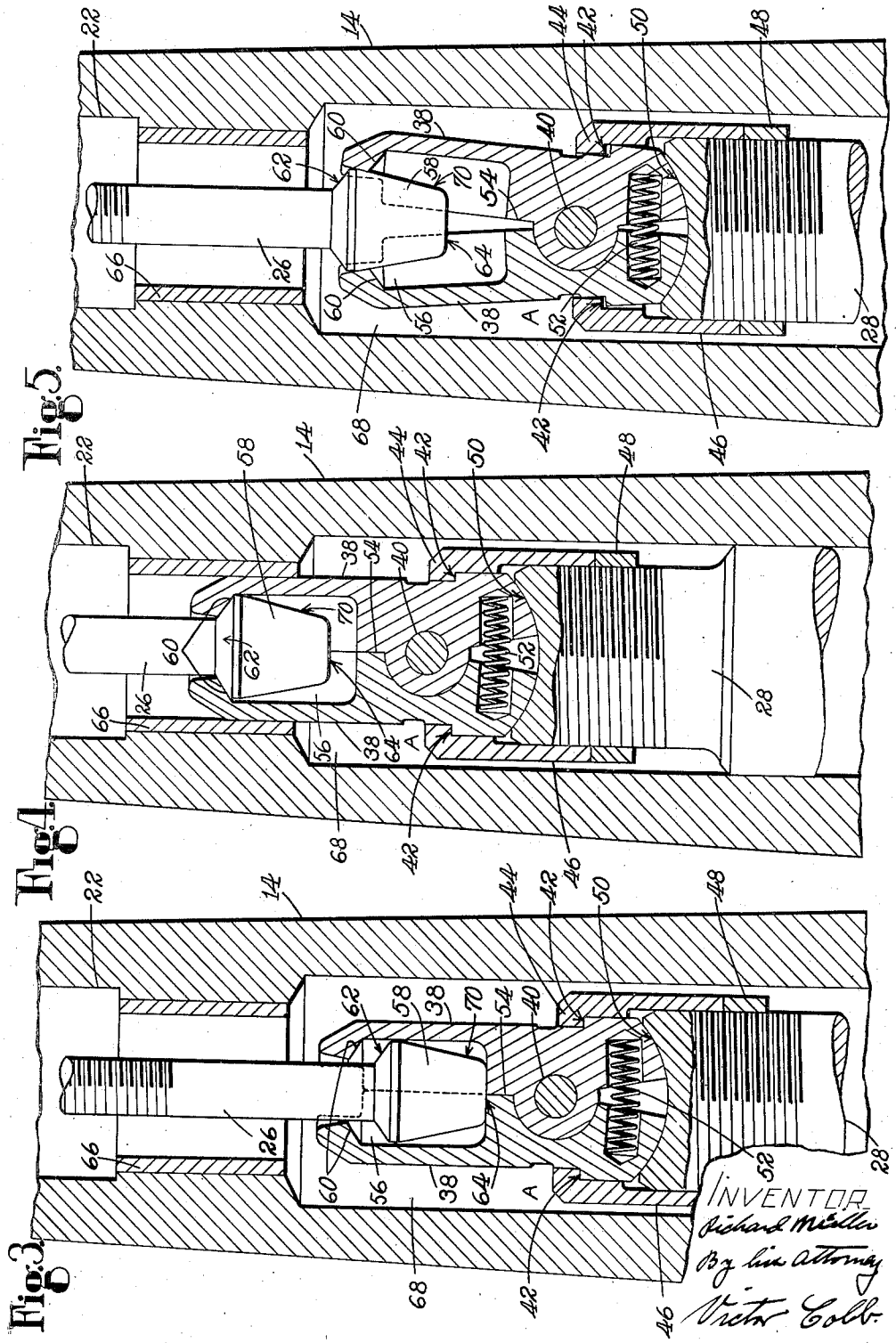


Fig. 5.

Fig. 4.

Fig. 3.

INVENTOR
Richard Müller
By his Attorney
Victor Cobb.

Patented Aug. 19, 1941

2,252,780

UNITED STATES PATENT OFFICE

2,252,780

FASTENING-INSERTING MACHINE

Richard Müller, Rodelheim, Frankfort-on-the-Main, Germany, assignor to United Shoe Machinery Corporation, Flemington, N. J., a corporation of New Jersey

Application March 4, 1940, Serial No. 322,153
In Germany October 4, 1939

14 Claims. (Cl. 1—32)

This invention relates to machines by which fastenings, such as nails, may be inserted to join work-pieces, it being of particular utility in connection with the attachment of heels to shoes by nails driven from within said shoes.

In inside heel-attaching machines, in which a work-supporting jack has passages in which nail-drivers reciprocate, it is a common practice to make jacks with their drivers interchangeable upon the frame of the machine, so the nails may be inserted in accordance with different designs suitable for use with heels of diverse forms and sizes. This interchange in ordinary practice is facilitated by the fact that the reciprocatory plunger which carries the drivers is actuated by a power-driven plunger, which engages it only to produce its inserting stroke, the driver-plunger being retracted solely by a spring contained within the jack. Said jack with its driver-assembly is thus left free for withdrawal from the frame. Under some conditions, it may be desired, however, to join the actuating plunger to the driver-plunger more positively, so the drivers will be moved under the power of the machine in both directions, or at least by a force ample to overcome any resistance which may be encountered. Such a connection will ensure the retraction of the drivers if an accumulation of dirt in their passages causes them to stick to a degree too great for the spring in the jack to overcome, and it will also permit the drivers to be employed for such work as pricking heels for the attachment of protective plates.

It is an object of my invention to provide for this positive retraction of the driver or drivers of a fastening-inserting machine, by a connection which will still leave the jack and driver-assembly free for removal from the machine. I obtain this result by combining with a work-support or jack, a driver or drivers reciprocating in it and an actuating member reciprocating with the driver, means connecting the actuating member and driver and arranged to release said driver at a predetermined point in its travel, as in its inactive or retracted position. This connection is preferably of such a character that it permits the support to be lifted from the frame in the direction of reciprocation of the driver. More specifically, a jack has a driver-plunger movable within it, this being actuated by a reciprocatory plunger, the two plungers being connected by an automatically releasable clutch. This clutch is shown as consisting of an enlargement or head upon one plunger and jaws upon the other plunger engaging the head, which head may have a surface for separating the jaws at the desired point in the travel of the plungers.

Another object of the invention is to enable the operator to determine conveniently whether, when a fastening or fastenings are delivered to the driver-passages of the work-support or jack, any fastening in missed, so it may be supplied to give a complete load before the driver-plunger is actuated under the power of the machine. To this end, there is a member movable by the operator to raise the driver from normal position, said driver upon release of the member by the operator being free to return to normal. When this is combined with the releasable connection or clutch between the driver-plunger and its actuating plunger, there is permitted a positive movement of the driver in both directions without interfering with the ability of the operator to freely inspect the load of nails in the work-support.

A particular embodiment of the invention is illustrated in the accompanying drawings, in which

Fig. 1 shows in vertical section the lower portion of a heel-attaching machine to which my invention is applied;

Fig. 2, a front elevation of the jack and driver-elevating means;

Fig. 3, an enlarged vertical section through the connection between the driver-plunger and its actuating plunger, with the elements in their normal relation;

Fig. 4, a similar view illustrating the manner in which the connection between the plungers is maintained during the retraction of the drivers; and

Fig. 5, a like view showing the parts of the connection as they appear during the removal of the jack and driver-assembly, or during the elevation of the drivers by the operator.

The machine appearing in the drawings may be, generally, that disclosed in Letters Patent of the United States No. 1,847,274, Standish, March 1, 1932. In this, we have a frame-column 10, from the front of which projects a bracket 12 carrying a vertical post 14. Mounted separably upon the top of this post, so it may be lifted therefrom, is a work-supporting jack 16, in which are vertical passages 18 arranged in accordance with a particular nailing design. In these passages operate drivers 20, carried upon the upper extremity of a plunger 22 guided in the jack. A spring 24, necessarily relatively weak on account of its location and interposed between the jack-top and the plunger, tends to hold the drivers in

their normal lowered positions, at which they may receive upon their upper ends a load of nails N to be inserted. Threaded into the bottom of the driver-plunger for vertical adjustment is a rod 26 connected, in a manner to be later described, to an actuating plunger 28 guided in the post 14 in alinement with the plunger 22. The plunger 28 is reciprocated once during each operating cycle of the machine by a lever 30, fulcrumed upon the column and maintained by a strong spring 32 in contact with a power-driven cam 34.

At A is means so joining the actuating plunger 28 to the plunger 22, that the movement of the former will be positively transmitted to the latter in both directions. Carried at the upper extremity of the actuating plunger are two clutch-jaws 38, 38 pivoted together at 40. Overhanging shoulders 42 upon the lower portions of the jaws is a flange 44 upon a sleeve 46, threaded upon the upper end of the plunger 28 and locked against accidental rotation by a threaded collar 48. The lower spaced arcuate ends of the jaws move over a complemental surface 50 at the top of the plunger 28. An expansion spring 52, lying in opposite recesses in the jaws below their pivot, forces the upper clutching portions toward each other to the extent allowed by their contact at 54. Between the jaws, in a space formed at 56, is a head or enlargement 58 upon the lower end of the rod 26, the jaws normally overhanging this head at 60. At the top of the head is a frusto-conical surface 62, above which are corresponding surfaces upon the jaws, while the horizontal bottom surface 64 of the head rests upon opposed surfaces of the jaws.

After the operator has delivered a load of nails N upon the drivers 20 in the jack-passages 18, he jacks a shoe, places a heel upon the heel-seat, clamps the work as in the previously mentioned patent, and starts the power-operation of the machine. With the connection A as illustrated in Fig. 3, the actuating plunger 28 rises, carrying with it the driver-plunger 22 by engagement of the jaws with the surface 64 of the driver-rod-head 58. The nails are thereby inserted through the heel-seat of the shoe into the heel to effect its attachment. At this time, the clutch-jaws 38 are within a cylindrical passage through a bushing 66 fixed in the post 14 (see Fig. 4). Consequently, when the descent of the actuating plunger begins, the jaws are held against separation, and the drivers are positively withdrawn from the work and through the jack-passages by the engagement of the flange of the sleeve 46 with the shoulders 42 upon the jaws. This continues until the drivers are lowered to points at which any resistance to their retraction will have been overcome. Then the jaws leave the bushing, the weight of the driver-assembly and the force of the spring 24 being sufficient to complete their retraction, so the head 58 returns to the normal position of Fig. 3. The jaws 38 are now in a space 68 in the post 14, which gives them considerable lateral clearance. In the movement of retraction, the spring 32, because of its location, may be made amply strong to overcome any driver-resistance which may be offered. However, if desired, the cam 34 may have a closed path, so it operates the lever 30 in both directions. The attachment of the heel having been effected, the work is unclamped and may be removed from the jack. If, now, the operator wishes to change the nailing design, he frees the jack 16 and lifts it from the post 14, the removal being in the direction of reciprocation of the drivers. As the head 58 is thus raised with the jack, its surface 62 engages the overhanging portions 60 of the jaws and cams them apart in the space 68 (Fig. 5), so the driver-assembly and jack are released automatically from the actuating plunger 28. When another jack with its driver-assembly is lowered into place, a lower frusto-conical surface 70 upon the head contacts with complemental surfaces upon the opposed ends of the jaws to separate them for the reception of the head within the space 56. This is also as illustrated in Fig. 5, and restores the elements to the normal position of Fig. 3.

To enable the operator to make certain that the jack-passages are fully loaded with nails, the driver-plunger 22 is provided with a lateral projection 72 emerging through a vertical slot 74 in the jack (Fig. 2). Extending beneath the projection is the inner arm of a lever 76, fulcrumed upon a bracket 78 rising from the post 14. A rod 80, which may be adjustable as to length, unites the outer arm of the lever to a treadle 82 pivoted at the bottom of the column 10. A spring 84 joining the rod to the bracket holds the inner arm of the lever normally down upon a projection 86, while a stop 88 for the treadle limits the upward movement of the lever-arm. By depressing the treadle, the operator may force the lever against the projection 72. This lifts the driver-assembly until the points of the nails upon the drivers are visible above the jack-top, so the completeness of the load may readily be checked. This is done when the driver-assembly is retracted and the head 58 within the space 68 of the post. The head, therefore, releases itself for elevation just as when the jack and driver-assembly are to be changed. It is similarly restored to normal when the treadle is freed by the operator.

Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a fastening-inserting machine, a work-support, a fastening-driver reciprocating therein, an actuating member reciprocating with the driver, and means connecting the actuating member and driver, said connecting means being so arranged as to release said driver from the actuating member at a predetermined point only in its travel.

2. In a fastening-inserting machine, a work-support, a fastening-driver reciprocating therein, an actuating member reciprocating with the driver in opposite directions between an inactive position and a fastening-inserting position, and means for releasing the driver from the actuating member only upon retraction to its inactive position.

3. In a fastening-inserting machine, a frame, a work-support mounted thereon, a fastening-driver reciprocating in the support, said support and driver being separable together from the frame in the direction of reciprocation of the driver, an actuating member, means connecting the actuating member to the driver and arranged to reciprocate said driver in both directions, and means for freeing the driver from the actuating member and permitting it to be lifted with the support from the frame.

4. In a fastening-inserting machine, a frame, a work-support mounted thereon, a fastening-driver reciprocating in the support, said support and driver being separable together from the

frame in the direction of reciprocation of the driver, an actuating member, means connecting the actuating member to the driver and arranged to reciprocate said driver positively in both directions, and means made effective during the movement of the actuating member for freeing the driver from said actuating member and permitting it to be lifted with the support from the frame.

5. In a heel-attaching machine, a jack, a driver-plunger movable in the jack, a reciprocatory actuating plunger for the driver-plunger, and an automatically releasable clutch connecting the plungers.

6. In a heel-attaching machine, a jack, a driver-plunger movable in the jack, and a reciprocatory actuating plunger for the driver-plunger, one of said plungers being provided with jaws engaging the other plunger.

7. In a heel-attaching machine, a jack, a driver-plunger movable in the jack, and a reciprocatory actuating plunger for the driver-plunger, one of said plungers being provided with an enlargement and the other plunger having jaws engaging the enlargement.

8. In a heel-attaching machine, a jack, a driver-plunger movable in the jack, a reciprocatory actuating plunger for the driver-plunger, one of said plungers being provided with a head and the other plunger having jaws engaging the head, means for forcing the jaws into retaining engagement with the head, and means for separating the jaws to release the head during the movement of one of the plungers.

9. In a heel-attaching machine, a jack, a driver-plunger movable in the jack, a reciprocatory actuating plunger for the driver-plunger, one of said plungers being provided with a head and the other plunger having jaws engaging the head, and means for forcing the jaws into retaining engagement with the head, said head having a surface engaging the jaws to separate them in the travel of the driver-plunger.

10. In a heel-actuating machine, a jack, a driver-plunger movable in the jack, a reciprocatory actuating plunger for the driver-plunger, one of said plungers being provided with jaws engaging the other plunger, and a member within which the jaws travel, said member having a surface contacting with the jaws to hold them in retaining engagement with the plunger and being provided with a space in which the jaws may separate to release the driver-plunger from the actuating plunger.

11. In a fastening-inserting machine, a work-support provided with a passage, a plunger having a fastening-driver movable in the passage, means for reciprocating the plunger under the power of the machine, and a member movable by the operator to raise the driver in its passage from normal position, said driver upon release of the member by the operator being free to return to normal.

12. In a fastening-inserting machine, a work-support provided with a passage, a plunger having a fastening-driver movable in the passage, a reciprocatory plunger for actuating the driver-plunger, means for releasably connecting the actuating plunger to the driver-plunger, and means arranged for actuation by the operator and effective to move the driver in its passage during the release of the driver-plunger.

13. In a heel-attaching machine, a jack provided with passages, a plunger having drivers movable in the jack-passages, a reciprocatory actuating plunger for the driver-plunger, a clutch connecting the plungers, means for automatically releasing the clutch when the drivers are retracted in their passages, and a member arranged for actuation by the operator to elevate the driver-plunger during its release from the actuating plunger.

14. In a heel-attaching machine, a jack provided with passages, a plunger having drivers movable in the jack-passages, the driver-plunger being provided with a projection, a reciprocatory actuating plunger for the driver-plunger, a clutch connecting the plungers, means for automatically releasing the clutch when the drivers are retracted in their passages, a lever fulcrumed adjacent to the jack for engagement with the projection, and a treadle connected to the lever.

RICHARD MÜLLER.