W. SHAW.

FASTENER SETTING MACHINE.

APPLICATION FILED FEB. 20, 1913.

1,205,277.

Patented Nov. 21, 1916.

3 SHEETS—SHEET 1.

Fig. 7.

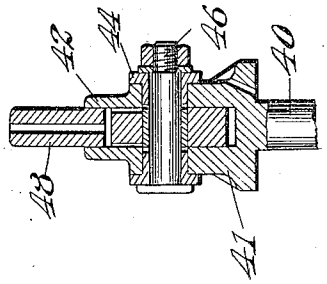


Fig. 1.

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3 SHEETS—SHEET 2.

Fig.2.

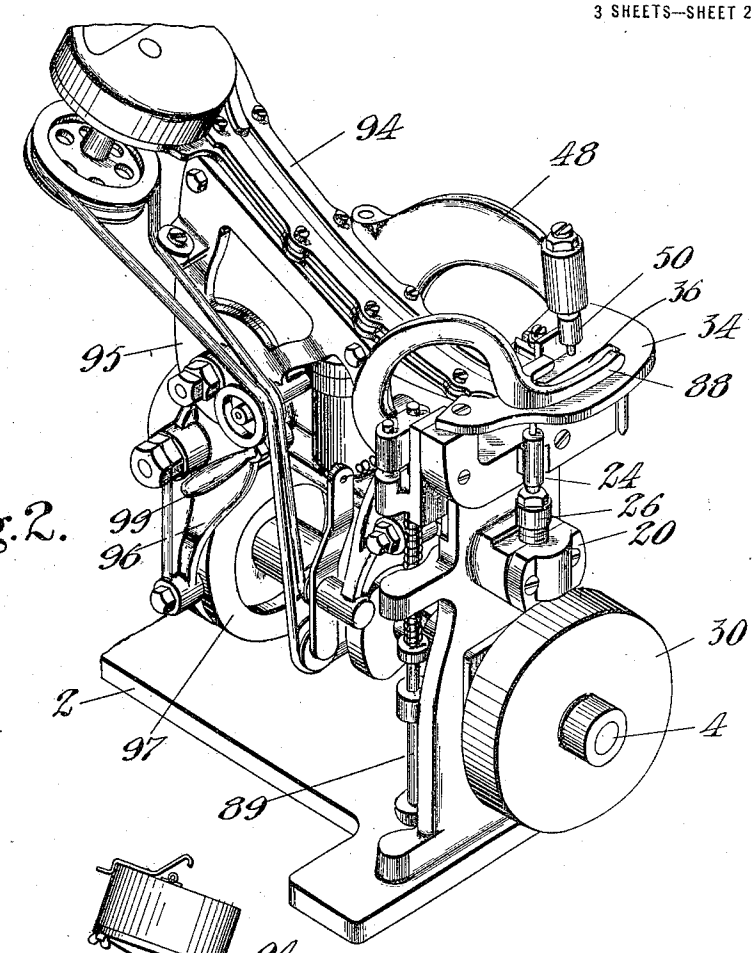
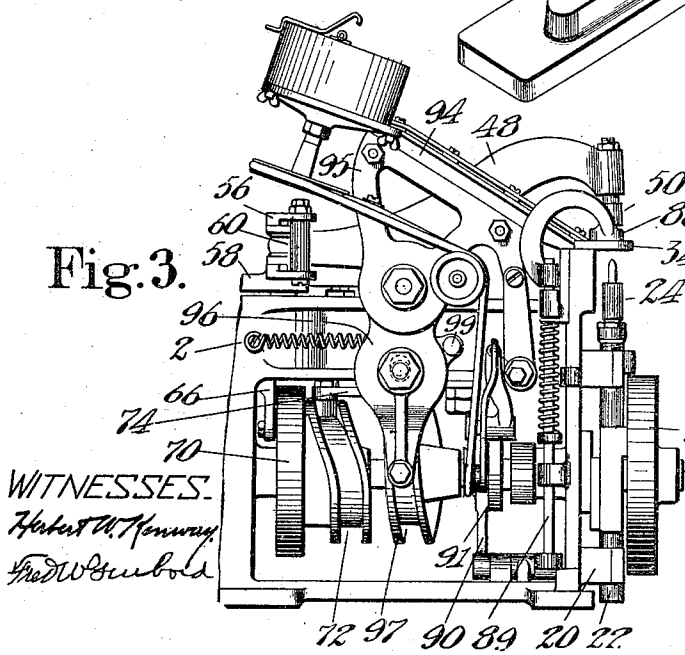


Fig.3.



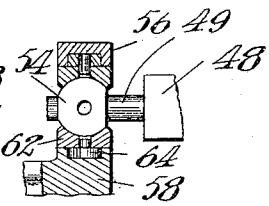


Fig.6.

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FASTENER SETTING MACHINE.

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3 SHEETS—SHEET 3.

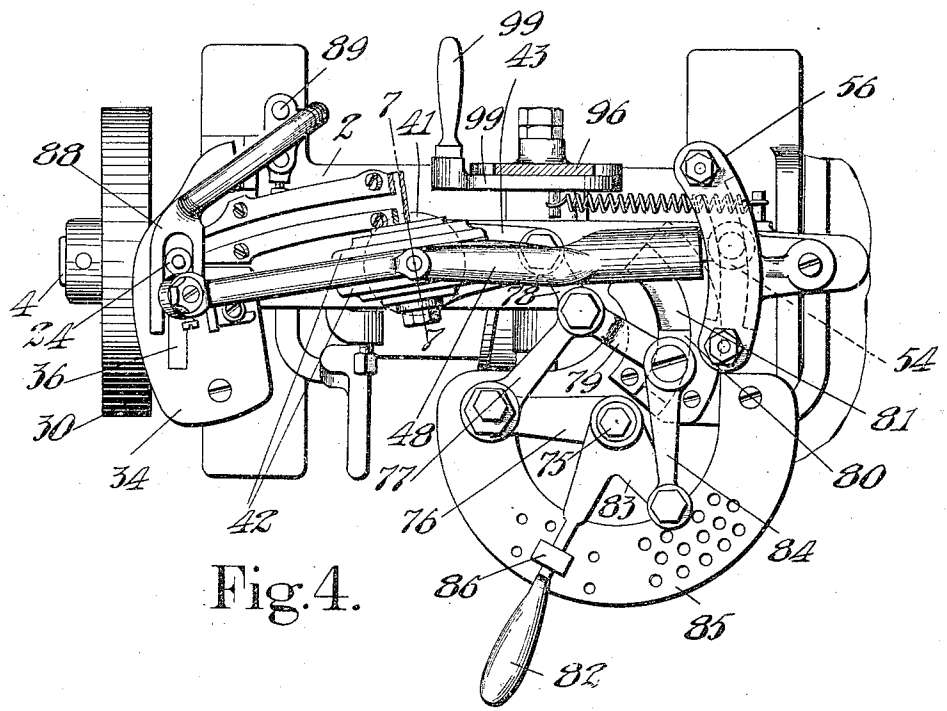


Fig. 4.

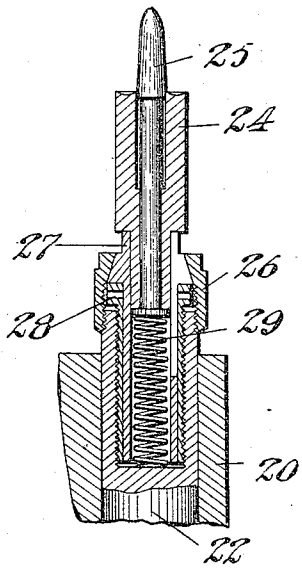


Fig. 5.

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UNITED STATES PATENT OFFICE.

WALTER SHAW, OF DEDHAM, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

FASTENER-SETTING MACHINE.

1,205,277. Specification of Letters Patent. Patented Nov. 21, 1916.

Application filed February 20, 1913. Serial No. 749,640.

To all whom it may concern:

Be it known that I, WALTER SHAW, a citizen of the United States, residing at Dedham, in the county of Norfolk and State of Massachusetts, have invented certain Improvements in Fastener-Setting Machines, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to machines for setting fasteners in sheet material such as the uppers of boots and shoes and is herein shown as embodied in an eyeleting machine, although many of its features may be embodied to good advantage in machines for setting other fasteners, such as lacing hooks or studs.

In many machines of this class the work is fed by an oscillating lever or carrier on which is mounted a work feeding tool and an important feature of the invention consists in mechanism for imparting such a feeding movement to an oscillating lever or carrier that the work engaging tool shall move in a straight line path during the feeding operation.

As herein shown the feeding tool is mounted in a lever and the result required is effected by providing means for sliding the lever relatively to its axis during the feeding movement. The desired action of the feed lever may be procured by providing guiding means adjacent to the axis of the lever and by connecting a portion of the lever to a cam which serves positively to move the lever longitudinally when turned about its axis to cause the work engaging tool to travel in a straight line. Such mechanism possesses the advantage of simplicity and is particularly effective since the position of the lever is positively controlled at every point in its movement. Moreover, this construction necessitates the employment of few moving parts so that the operation of the machine at high speed is facilitated.

Another feature of the invention relates to a novel form of spacing mechanism for fastener setting machines. These machines are usually run at a high rate of speed and it is, accordingly, important to reduce the number of moving parts of the spacing mechanism to a minimum. To this end, in the invention as herein disclosed, a pair of transmission links are interposed between the feed lever carrier and its actuator and the effect of these links upon the carrier is regulated by connecting their common pivot point to a variable point in the machine frame.

Still another feature of the invention consists in an improved mounting for a setting tool whereby such tools may be readily removed or inserted in the machine, as is necessary in changing from one style of fastener or eyelet to another, and which will hold a tool of this kind without danger of displacement.

These and other features of the invention will be best understood and appreciated from the following description of a preferred embodiment thereof selected for purposes of illustration and shown in the accompanying drawings in which—

Figure 1 is a view of the machine in side elevation; Fig. 2 is a view in perspective of the front portion of the machine; Fig. 3 is a partial view in elevation from the side opposite to that shown in Fig. 1; Fig. 4 is a plan view of the machine with certain parts broken away; Fig. 5 is a sectional view of the lower setting die and its mounting; Fig. 6 is a sectional view of the connection between the carrying lever and its actuating yoke, and Fig. 7 is a sectional view on line 7—7 of Fig. 4 showing the connection between the tool lever and its carrier member.

The invention is herein disclosed as embodied in a machine of the general type of that shown in Letters Patent of the United States No. 603,023 granted April 26, 1898 upon an application of S. Field. In that, as in the present machine, there is provided a reciprocatory lower setting die with which coöperates an upsetting die carried by a lever arranged to oscillate in a horizontal plane to feed the work and in a vertical plane to effect the clenching operation. In the patented machine, however, there is provided an independent punch and mechanism for actuating the punch, whereas, in the machine of this invention, a combined punch and setting die is carried by the oscillating lever and all separate punching mechanism is eliminated.

The machine frame 2 is provided with horizontal bearings for the driving shaft 4 which is arranged to be connected or dis-

connected at will to a grooved driving pulley 6 at the rear of the machine. Connection of the pulley and shaft is effected by a friction member 8 normally moved into clutching engagement by a spring pressed plunger 10 acting through a shipper lever 18. The clutch member 8 is moved to disengage the pulley 6 by a cam operated lever 12, one arm of which acts through a pair of toggle links 14 and 16 which become effective when moved into alinement but which permit the spring pressed plunger 10 to act and engage the clutch when broken by the depression of a treadle rod 15. The clutch mechanism forms no part of the present invention but is fully disclosed in United States Letters Patent No. 1,048,840, granted December 31, 1912 on an application of A. F. Littlefield.

At its front end the frame is provided with a pair of lugs 20 in which are formed vertical bearings for a plunger 22 which carries at its upper end the lower setting die 24. Reciprocation of the plunger 22 is effected by a cam 30 secured to the forward end of the shaft 4 and provided in its inner face with a cam groove for a cam roller 32 on the plunger 26.

In the upper part of the frame there is provided a vertical bearing in which is journaled the shank 40 of the carrier member 41 for the oscillating lever 48. The carrier member, above its shank 40, has two spaced vertical guides 42 in which are formed oppositely disposed elongated slots. In these slots are slidingly received a pair of flanged blocks 44 somewhat shorter than the length of the slots. The blocks 44 are connected by a bushed stud 46 which constitutes the horizontal axis of the lever 48 as shown in Fig. 7. The blocks 44, together with the pivot stud 46, are slidable in the slots of the guiding members 42 so that the lever 48 may be shifted back and forth across the axis of the shank 40 for a purpose which will be described hereinafter.

The lever 48 carries at its forward end a combined punching, setting and feeding tool 50 which coöperates with a cutting block 36 to perforate the work and then with the lower setting die 24 to set an eyelet therein. The acting face of the cutting block 36 is disposed in the same horizontal plane as the axis of the lever 48 so that the cutting edge of the punch shall meet the cutting block squarely and form a clean perforation in the work. Vertical oscillation of the lever 48 is effected by a bar 66 mounted at the rear end of the frame for vertical reciprocation and provided at its lower end with a cam roller 68 which runs in a cam 70. At its upper end the bar 66 carries a yoke between the sides of which is engaged the rear end of the lever 48.

An important feature of the invention consists in utilizing the yoke, by which the lever 48 is oscillated vertically, to control the horizontal swinging of the lever by which the feeding operation is effected. To this end the upper and lower horizontal sides 56 and 58 of the yoke are curved and provided upon their inner surfaces with cam grooves in each of which is received a roller 64 journaled in a socket piece 62, one upon each side of a ball 54 connected to the rear end of the lever 48 through a stem 49. The ball 54 and socket piece 62 constitute a universal connection between the lever 48 and the vertically movable yoke and, together with the sliding connection between the lever 48 and its carrier 41, permit the necessary relative angular movement between the yoke and lever to take place when the bar 66 is reciprocated. A vertical pin 59 set in an arm projecting rearwardly from the lower side 58 of the yoke and arranged to slide in the machine frame serves to prevent the bar 66 and yoke from twisting.

It will be noted from an inspection of Fig. 4 that the lever 48 is bent so that the portion adjacent to its front end makes a slight angle with the portion adjacent its rear end. This construction is advantageous because it brings the rear end of the lever directly above the actuating bar 66 when its forward end is in punching position. No twisting strain is therefore imposed upon the yoke during the punching operation.

As shown in Fig. 4 the cam grooves in the sides of the yoke are curved upon a radius less than the distance of the yoke from the vertical axis of the lever 48 and are so disposed that as the lever 48 is oscillated to feed the work it will also be shifted rearwardly and the resultant movement of its forward end will be in a straight line. It will be apparent that by properly designing the curvature of the cams of the yoke, any desired movement may be secured in the feeding tool and, accordingly, mechanism of this general character but designed to give other than straight line movements to the work engaging tool would not be without the scope of the invention.

The horizontal oscillation of the lever 48 is produced by mechanism which acts directly upon its carrier member 41. This member is provided with a rearwardly extending arm 43 connected through the medium of two pivoted links 77 and 78 to the upper horizontal arm 76 of the vertical rock shaft 75. This rock shaft is oscillated by a cam 72 on the shaft 4 which acts upon a cam roller carried by a horizontal arm 74 fast to the lower end of the rock shaft.

The transverse component of the movement of the arm 76 transmitted to the carrier 41 through the arm 43 determines the extent of the feeding movement of the lever 48. This component is varied by controlling the path of movement of the pivot

point of the two links 77 and 78. To this end there is provided in the machine frame a grooved guideway 81 in which is arranged a slider block 80. This block is adjustable in the guideway 81 and carries the normally stationary end of a radius link 79 connected to the pivotal point of the two links 77 and 78. The position of the slider block 80 is determined by a spacing lever 82 loosely mounted upon the upper end of the rock shaft 75 and having an arm 83 connected to the slider block through a link 84. The spacing lever is movable over a spacing plate 85 and may be maintained in any adjusted position by a split stud 86 adapted to be inserted in holes in the plate 85.

As shown in Fig. 4 the spacing lever 82 is set in position corresponding to a short spacing and in which the movement of the pivotal point of the connected links 77 and 78 takes place in an arc extending substantially transverse to the path of movement of the end of the arm 43 on the carrier member. When it is desired to increase the extent of the feeding movements of the lever 48 the spacing lever 82 is swung toward the right, as seen in Fig. 4, and the block 80 moved toward the inner end of the slot 81. As the block is moved in this direction the path of movement of the pivotal point of the links 77 and 78 will be shifted until it extends more and more nearly in the same general direction as the movement of the arm 76 so that a greater movement will be imparted to the arm 43.

The mounting of the lower setting die 24 is shown in detail in Fig. 5 from which it will be seen that the upper end of the plunger 22 is recessed and internally threaded to receive an adjustable supporting piece 28. At its upper end the supporting piece 28 is provided with a flange upon which rests the flange of a clamping sleeve 27. The clamping sleeve 27 is arranged to contain a compression spring 29 for the center spindle 25 of the setting die and is split at its upper end to receive the reduced shank of the setting die. The outer surface of the flange of the clamping sleeve 27 is conical in shape and is engaged by the inner conical surface of a lock nut 26 threaded upon the outer surface of the end of the plunger 22. When the nut 26 is screwed down upon the plunger the split end of the clamping sleeve is contracted upon the shank of the setting die 24 so that the latter is held firmly in place. The vertical position of the die in the plunger may be adjusted by screwing the supporting piece 27 into or out of the plunger and so raising or lowering the position of the clamping sleeve.

The machine is provided with a presser foot 88 which serves to hold the work in position upon the table 34 during the reverse movement of the combined punching, setting and feeding tool 50. This presser foot is secured to the upper end of a vertical rod 89 and normally pressed downwardly by a spring encircling the rod 89. It is lifted intermittently by a cam 91 on the shaft 4 which acts through a cam lever 90 journaled to turn on a horizontal axis and underlying the end of the rod 89.

The lower setting die is supplied with eyelets from a raceway 94 which is arranged to be moved into delivering position with its end in line with the setting die and then retracted during the upward movement of the latter in the usual manner. To this end a cam lever 96 is pivotally mounted upon one side of the machine frame and arranged to carry at its upper end a bracket 95 upon which the raceway is supported. The lever 96, and with it the raceway, is oscillated by a cam 97 on the shaft 4. In order to provide means for moving the raceway into an inoperative position independently of the cam 97 the pivot of the cam lever 96 is made eccentric and may be turned by an arm 99 to shift the upper end of the lever rearwardly about its lower end as an axis.

The machine herein disclosed, while capable of general work, is particularly adapted for setting fasteners, such as large eyelets, which require a considerable degree of clenching pressure. The machine is also well adapted to perforate the heavy leather in which large eyelets are commonly set and to operate with a wide spacing, which is another requirement of this class of work. The capacity of the machine for operating upon heavy work is due to the fact that its design involves the employment of relatively few moving parts and permits these parts to be made heavy and strong without sacrificing the speed of the machine or its accuracy in operation.

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

1. A fastener setting machine of the class described having, in combination, a tool lever mounted to turn about, a fixed axis to feed the work, a work feeding tool on the lever, and means for sliding the lever across its axis in a path substantially parallel to the plane in which the work is supported during its feeding movement.

2. A fastener setting machine of the class described having, in combination, a tool carrier mounted to turn about a fixed axis and being also arranged to slide transversely relative to said axis, a work feeding tool mounted in said carrier, and means for moving the tool carrier relatively to its axis to cause the feeding tool to move in a straight path during the turning of the carrier.

3. A fastener setting machine of the class described having, in combination, a carrier

member mounted to turn about a fixed axis, power operated means for turning the carrier member, a tool lever carried thereby and having a sliding connection therewith, a work feeding tool on said lever, and means for moving the tool carrying lever relatively to the axis of the carrier member during the turning of the member.

4. A fastener setting machine of the class described having, in combination, a tool lever mounted to turn about a fixed axis disposed perpendicularly to the plane of the work to feed the work, a work feeding tool on the lever, and a curved cam for sliding the lever across its axis during its feeding movement.

5. A fastener setting machine of the class described having, in combination, a tool lever mounted to turn about an axis disposed perpendicularly to the plane of the work to feed the work, a work feeding tool on one end of the lever, and a cam acting upon the other end of the lever to slide the lever relatively to its axis during its feeding movement.

6. A fastener setting machine of the class described having, in combination, a tool lever mounted to turn about one axis for feeding the work and another axis for engaging the work, and means for turning the lever about one axis for effecting the work engaging movement of the lever constructed and arranged to impart thereto also a sliding movement relatively to said axis during its feeding movement.

7. A fastener setting machine of the class described having, in combination, a tool lever mounted to turn about an axis to feed the work, guiding means permitting a sliding movement of the lever across its axis, means for shifting the lever relatively to the guiding means and a power operated device for turning the guiding means to change the position of the tool lever.

8. A fastener setting machine of the class described having, in combination, a carrier member, power operated means for turning said member about a fixed axis, guiding means on the carrier, a tool lever connected therewith, and means for sliding the lever relatively to the guiding means while the carrier member is being turned.

9. A fastener setting machine of the class described having, in combination, a carrier member mounted to turn about a fixed axis, means for turning the carrier member, a tool lever mounted in the carrier member, and means independent of the carrier member for shifting the tool lever relatively thereto.

10. A fastener setting machine of the class described, having, in combination, a setting die and an actuating device arranged to reciprocate in parallel paths, a carrier arranged to turn about an axis located between said paths, and a bent lever journaled therein and having an upsetting die arranged to be held at one side of the setting die when the end of the lever is in alinement with the actuating device.

11. A fastener setting machine of the class described having, in combination, a carrier member arranged to be turned varying distances about a fixed axis to effect the feeding operation, a tool lever mounted therein, and a cam connected to said lever and shaped to cause one end thereof to move in a straight path during the varying movements of the carrier member.

12. A fastener setting machine of the class described having, in combination, a carrier, a tool lever mounted therein, and means for turning the carrier and lever and simultaneously sliding the lever relatively to the carrier so that one end of the lever moves in a straight path.

13. A fastener setting machine of the class described having, in combination, a carrier member having a guideway therein, a tool lever slidably mounted in the guideway of the carrier, a combined punch and setting die mounted on the lever, cam operated feeding mechanism for swinging the carrier and the lever to feed the work, a curved cam connected to the lever and arranged to retract the lever in the guideway during the feeding movement, and a coöperating setting die.

14. A fastener setting machine of the class described having, in combination, a power actuated carrier member arranged to be turned about a fixed axis, a curved cam located at one side of said axis and having a radius of curvature less than its distance from said axis, a tool carrying lever mounted in said carrier and guided at one end by the curved cam, and a work feeding tool on the other end of the lever.

15. A fastener setting machine of the class described having, in combination, a tool carrying lever movable transversely and longitudinally in a path substantially parallel to the plane in which the work is supported to feed the work, a work feeding tool on the lever, means acting upon the lever between its ends to control the transverse position of the lever, and means acting upon one end of the lever for controlling its longitudinal position.

16. A fastener setting machine of the class described having, in combination, a tool carrying lever having a roller mounted at one end and a work feeding tool at the other, means for turning said lever about an axis parallel to the axis of the roller, and a cam coöperating with the roller to shift the lever longitudinally while it is being moved about said axis.

17. A fastener setting machine of the class described having, in combination, a tool carrying lever movable about a vertical axis, a work feeding tool mounted on one end of

the lever, a pair of rollers mounted upon the other end of the lever on opposite sides of its horizontal axis, and a cam coöperating with each roller to control the position of the lever during its feeding movement.

18. A fastener setting machine of the class described having, in combination, a tool carrying lever movable about axes at substantially right angles, and a reciprocatory yoke for effecting movement about one of said axes and comprising a pair of closed cams constructed and arranged to control the position of the lever while it is moving about the other of said axes.

19. A fastener setting machine of the class described having, in combination, a reciprocatory setting die, a carrying lever having a combined punching, feeding and setting tool thereon, a cutting block at one side of the path of the reciprocatory setting die, and means for so moving the lever that the combined tool shall traverse a straight path in its feeding movement from the cutting block to setting position.

20. A fastener setting machine of the class described having, in combination, a setting die, a movable carrier member for the die perforated at one end and internally threaded to receive an adjustable supporting piece, a clamping sleeve having a flange adapted to rest upon the supporting piece and a tapered outer surface, and a clamping nut threaded upon the carrier member and provided with a tapered inner surface coöperating with that of the clamping sleeve whereby the latter may be contracted upon the setting die.

21. A fastener setting machine of the class described having, in combination, a setting die having a shoulder and a shank, a clamping sleeve arranged to receive the shank of the die and to underlie its shoulder, an adjustable supporting piece for the clamping sleeve, a carrier for the supporting piece, and means for securing the clamping sleeve in place upon the supporting piece and for contracting the clamping sleeve upon the shank of the die.

22. A fastener setting machine of the class described having, in combination, a frame, an oscillatory work feeding member, an oscillating actuating device therefor, interposed transmission links, and means for connecting the transmission links to different points on the frame to vary their effect upon the feeding member.

23. A fastener setting machine of the class described having, in combination, an oscillatory work feeding member, an oscillating actuating device therefor, interposed transmission links, a stationary guideway located at one side of the links, and means for connecting the links to different points in the guideway to vary the effect of the actuating device upon the feeding member.

24. A fastener setting machine of the class described having, in combination, a movable work feeding member, a rock shaft for actuating said member, interposed transmission links, a radius link for controlling the movement of the transmission links, and a spacing lever mounted to turn about the axis of the rock shaft and arranged adjustably to determine the position of the radius link.

25. A fastener setting machine of the class described having, in combination, a work feeding member movable from a variable initial position to a fixed final position, a rock shaft for actuating the feeding member, interposed transmission links, and a radius link movable to vary the initial position of the feed member and also to control the extent of the feeding movement.

26. A fastener setting machine of the class described having, in combination, a bent lever having a sliding actuating connection at one end and a combined punching and setting tool at the other, a setting die, and a punching block arranged in line with the tool when the sliding connection is substantially in midposition.

27. A fastener setting machine having, in combination, a tool lever mounted to swing about an axis to feed the work, a guide disposed adjacent to said axis for guiding the lever longitudinally, and means for shifting the longitudinal position of the lever during its swinging movements so that the work feeding end of the lever will move in a straight path in both directions.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WALTER SHAW.

Witnesses:
JOSEPH F. WOGAN,
HERBERT W. KENWAY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."