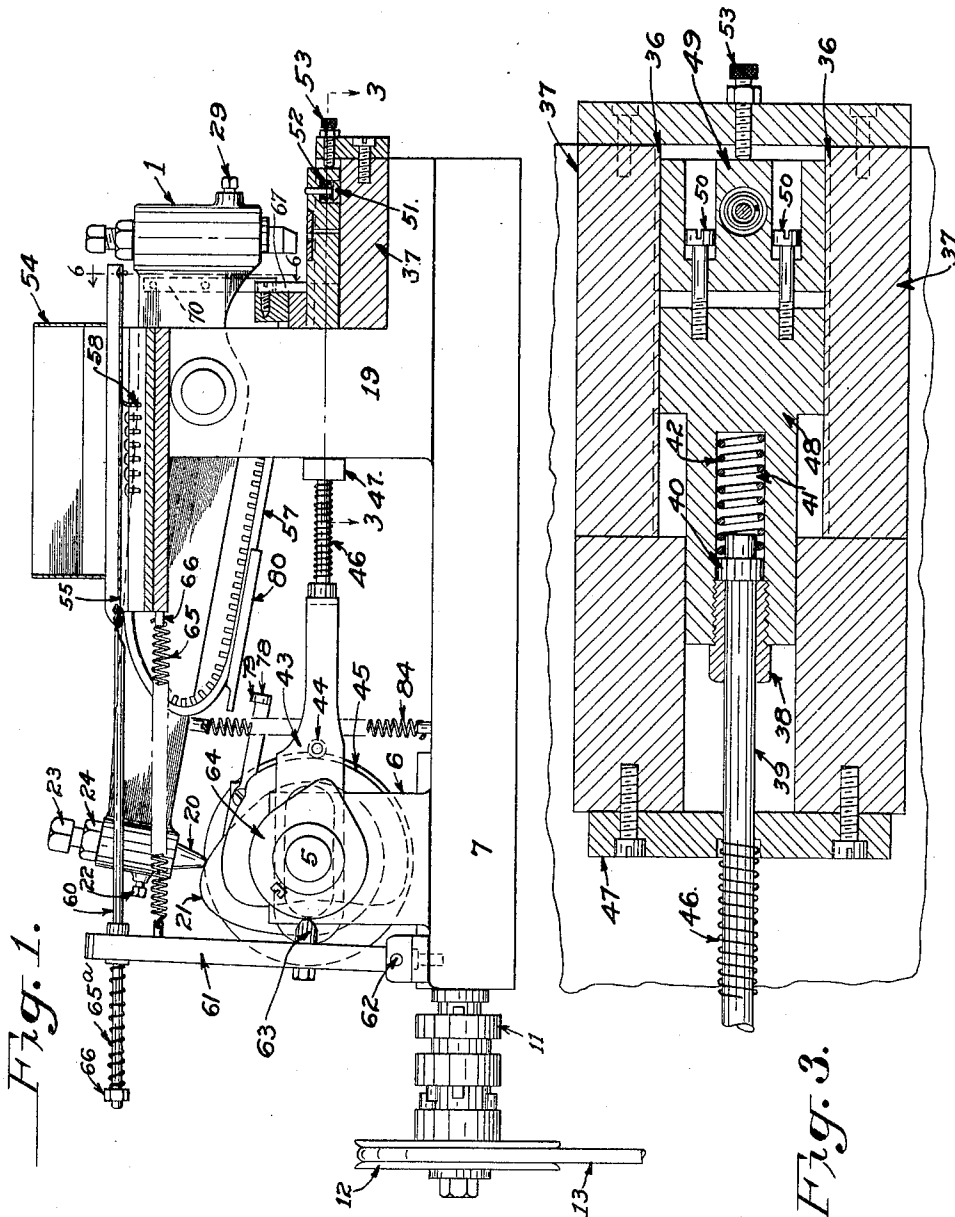


J. E. MAYO.
MACHINE FOR ATTACHING STUDS TO STRIPS.
APPLICATION FILED JAN. 22, 1912.

1,084,218.

Patented Jan. 13, 1914.

3 SHEETS—SHEET 1.



WITNESSES
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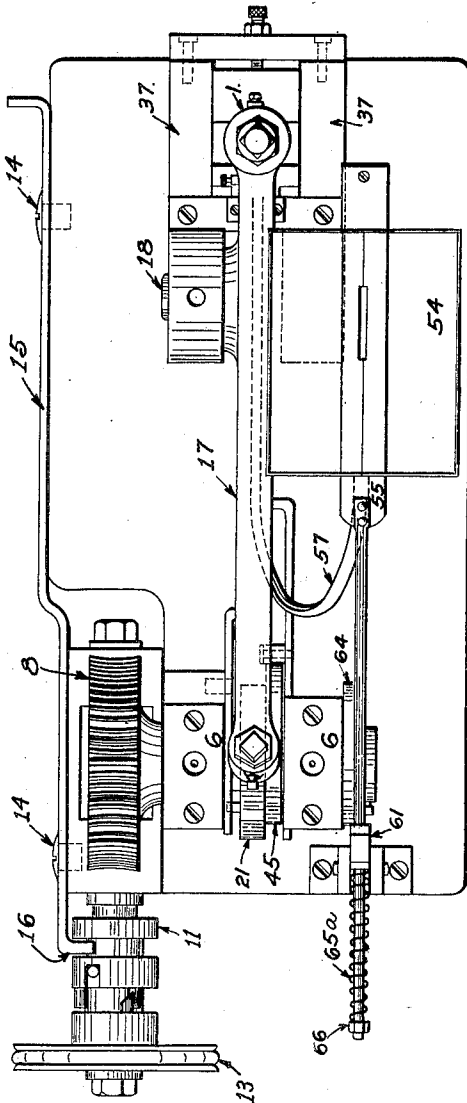


Fig. 2.

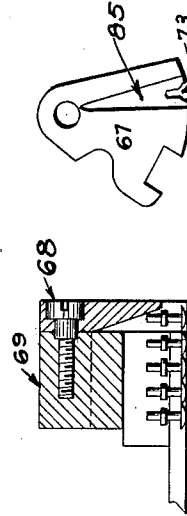


Fig. 10. Fig. 11.

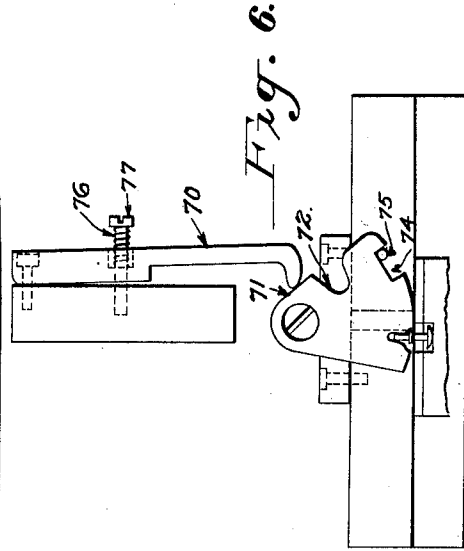


Fig. 6.

WITNESSES

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3 SHEETS SHEET 3.

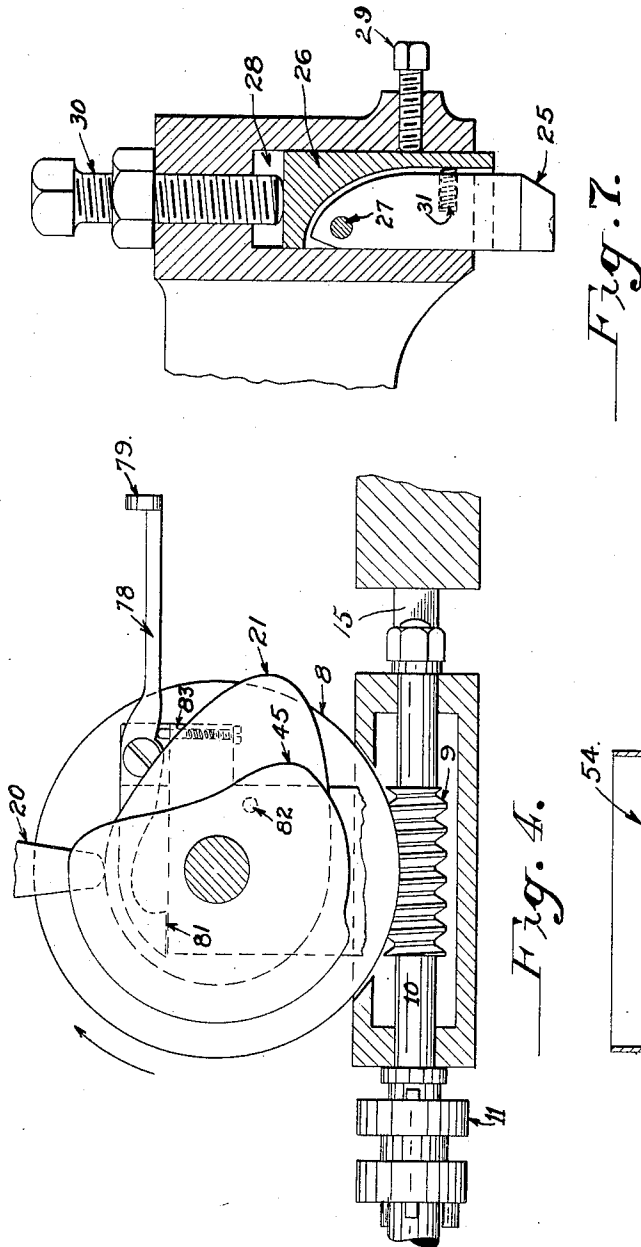


Fig. 7.

Fig. 4.

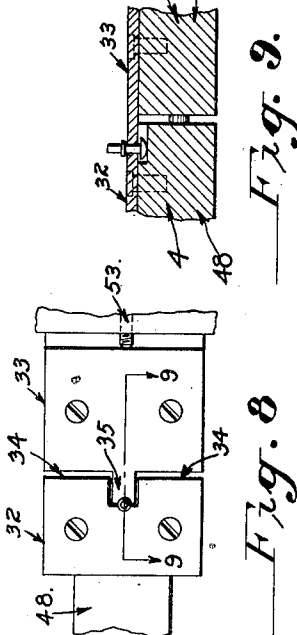


Fig. 9.

Fig. 8.

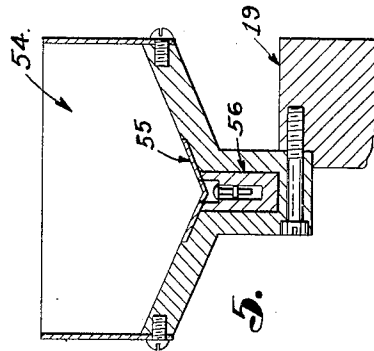


Fig. 5.

WITNESSES

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UNITED STATES PATENT OFFICE.

JUNIOUS EMMETT MAYO, OF MEADVILLE, PENNSYLVANIA, ASSIGNOR TO THE SPIRELLA COMPANY, OF MEADVILLE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

MACHINE FOR ATTACHING STUDS TO STRIPS.

1,084,218.

Specification of Letters Patent.

Patented Jan. 13, 1914.

Application filed January 22, 1912. Serial No. 672,587.

To all whom it may concern:

Be it known that I, JUNIOUS EMMETT MAYO, a resident of Meadville, in the county of Crawford and State of Pennsylvania, have invented a new and useful Improvement in Machines for Attaching Studs to Strips, of which the following is a specification.

This invention relates to machines for attaching studs to strips, particularly corset stays.

The object of the invention is to provide an improved construction and arrangement of machine of the character stated which is semi-automatic in operation and will rapidly and effectually secure the studs to the corset stays.

The invention comprises the construction and arrangement of parts herein described and claimed.

In the drawings, Figure 1 represents a side view partly in section of a machine constructed according to my invention; Fig. 2 is a top view of the same; Fig. 3 is a horizontal cross sectional view through the feeding slide and its operating parts on the line 3-3, Fig. 1; Fig. 4 is a vertical cross sectional view through the main operating shaft, showing the driving worm and worm wheel shaft; Fig. 5 is a cross sectional view through the feeding hopper; Fig. 6 is a detail view showing the stud transfer gate and its operating means; Fig. 7 is a detail view of the upsetting die and plunger; Fig. 8 is a plan view of the upper face of the gripping dies; Fig. 9 is a vertical cross sectional view of the same; Figs. 10 and 11 are detail views of the stud transfer gate.

The machine shown in the drawings comprises essentially three parts, namely, an upsetting plunger 1, stud feeding mechanism, and a die carrying slide 4. The operating parts of these devices are all driven from a common main operating shaft 5, located at the rear of the machine and horizontally disposed in pillow blocks 6 forming bearings therefor and projecting upwardly from the rear end of a base 7. The main operating shaft is provided at one end with a worm wheel 8 driven by a worm 9 mounted for rotation in the frame upon a shaft 10 having a suitable clutch or driving member 11 splined or otherwise secured for rotation therewith. At one end of the shaft 10 is loosely mounted a sheave, pulley or wheel

12, having clutch teeth, and a groove for receiving a belt or chain 13 connected to any suitable source of power for driving the same. Mounted to slide longitudinally upon the frame on studs 14 secured thereto is a slotted controlling rod or bar 15 projecting out to the front of the frame and having an intumed end 16 engaging the annular groove in the clutch 11 for moving the same longitudinally of its shaft to couple and uncouple the main shaft 5 from its source of power.

The upsetting plunger 1 and the dies for holding the stud are mounted to be accessible from the front of the machine. As illustrated, the upsetting plunger forms an enlarged end of a long lever 17 having a stud or shaft 18 projecting from one side thereof into or through an aperture in a standard 19, on the forward portion of the base 7, to form a pivot for the lever. In the rear end of the lever 17 is mounted a bearing block 20, which rests upon the circumference of an egg-shaped cam 21 secured upon the main shaft 5 for rotation therewith. The bearing block 20 is securely held in position on the lever in a cylindrical end portion thereof by a set screw 22, and is adjustable transversely of the lever by means of screw 23 threaded into the lever and bearing against the upper end of the bearing block. Lock-nut 24 is provided to secure the adjusting screw in position.

As illustrated in Fig. 7, the upsetting plunger is provided with an upsetting die 25, which is pivotally mounted in a holding block 26 by means of pin 27. The die 25 is of slightly less width than the slot in the holding block 26 for a purpose about to be described. The holding block 26 is circular in horizontal cross section and is mounted for vertical adjustment in a bore or aperture 28 on the interior of the plunger 1, set screw 29 being provided to hold the die and block in adjusted position. Adjusting screw 30 is provided bearing against the upper end of the holding block 26 to adjust the same.

As is obvious from inspection of Fig. 1, when the rear end of the lever 17 is caused to rise, the plunger 1 is moved downwardly, swinging around the shaft 18 as an axis. The die 25 engages the stud held between the gripping jaws therebeneath to upset the same, and if the die were rigidly mounted in the upsetting plunger it would cause the

stud to be upset sidewise and more metal to flow to one side than to the other. To prevent such operation, the die is pivotally mounted as stated. As the plunger moves downwardly and the die engages with the stud, the die will oscillate about its pivot 27 and move vertically notwithstanding the fact that the plunger moves in an arc around the shaft 18. To return the die to its normal position, in the holding block, a spring 31 is provided, seated in a socket in the front face of the die and bearing against the holding block, as shown.

Gripping dies 32 and 33 are provided, mounted upon the stud carrying slide 4 for holding the stud in position to meet the upsetting plunger. These dies are illustrated in Figs. 8 and 9, and as shown, the die 32 consists of a flat plate having legs 34 embracing the projecting end 35 of the die 33. In the meeting faces of the dies 32 and 33 are provided sockets which correspond in shape to the shaft of a stud and are arranged to hold the same therebetween, as shown in Fig. 9. The dies 32 and 33 are firmly screwed or otherwise secured to the upper face of the carrying slide 4.

As illustrated in Fig. 3, the members of the stud carrying slide 4 are mounted to move in guides or tracks 36 in a block 37 which may be integral with or secured to the standard 19. The rearward end of the slide is reduced as shown, and is provided with a hollow screw or bolt 38, having a bore to form a bearing or guide for an operating rod 39. The forward end of the operating rod 39 is provided with a collar or enlargement 40 projecting into the bore 41 of the reduced portion of the slide and bearing against the compression spring 42 seated therein. At its rear end the rod 38 is enlarged to form a yoke 43, the arms of which embrace a portion of the main shaft 5 and form a guide for the rod. Projecting from one side of the rod is a pin or roller 44 having engagement with the circumference of an irregularly shaped cam 45 fixedly secured for rotation with the main shaft 5. As illustrated in Fig. 2, the operating rod 39 at its forward end is directly underneath the lever 17, and about midway of its length is turned laterally and then rearwardly as shown. A spiral compression spring 46 is provided upon the rod 39 bearing at one end against a member 47 secured to the standard 19 and at its other end against a collar secured to the rod, for moving the same rearwardly and holding the pin or roller 44 against the face of the cam 45.

The carrying slide 4 comprises a main section 48, carrying the die 32 referred to, and in advance of this is mounted the auxiliary section 49 carrying the die 33. These sections are connected for limited horizontal movement with relation to each

other. As shown, a pair of screws or bolts 50 are provided having their heads seated in sockets in the auxiliary section 49 and tapped into apertures in the main section 48. The thickness of metal of the auxiliary slide 49 between the heads of the screws 50 and the main slide 48 is less than the length of the shank of the screws between these points. Consequently, the auxiliary section may move with reference to the main section through this distance. The limited movement referred to is provided to permit automatic opening and closing of the gripping or holding dies. To accomplish this function, the auxiliary section 49 is provided with a friction member 51 in its lower face, illustrated as a headed pin seated in a socket in the section, a spiral spring 52 being provided to press the head of the pin 51 down against the face of the block 37. Obviously, as the main section 48 of the slide 4 moves to the left in Fig. 3, the auxiliary section 49 will drag behind the same until the gripping dies are fully open. After the slide has moved to its extreme left hand or rear position, and begins to move forwardly, the auxiliary section 49 will drag or remain stationary until overtaken by the main slide 48, consequently closing the gripping dies. The yielding connection between the operating rod 39 and slide 4 is provided to obtain proper registration of the gripping dies and the plunger 1. A stop 53, shown as an adjustable screw, is provided, seated in a supporting block at the front of the base 19, and arranged to engage the end of the slide 4 as the same approaches the forward limit of movement. It is intended that the rod 39 shall move forwardly slightly farther than is necessary to bring the slide 4 into proper position, the stop 53 holding the slide when properly positioned.

To automatically select and feed studs for operation by the mechanism described, I have provided an improved arrangement of parts. As illustrated, a hopper, reservoir or box 54 is provided for holding a quantity of studs and, as shown in Fig. 5, is mounted upon a portion of the standard 19. The bottom of the hopper 54 is inclined toward its center and mounted for sliding movement in grooves in the upper face of the bottom is a thin sheet metal plate 55, having a slot therein through which the studs may pass. Beneath the slot in the plate 55 is mounted a block 56, preferably hardened steel, having shoulders for engaging the heads of the studs which, as shown, are provided with collars below the heads of slightly less diameter. Obviously, as the studs drop through the slot in slide 55, their heads will engage shoulders of the block 56 and they will each hang or be supported thereon, as shown in Fig. 5. The block has communication at its rearward end with a

chute 57 which is curved and gradually twisted through its length in such manner as to bring the studs into position with the heads down, adjacent the holding dies 32 and 33, at their rearward position. Means are provided for moving the studs longitudinally of the block 56 and chute 57 comprising a lip or projection 58 turned downwardly from the lower face of the slide 55. The slide 55 is mounted at one end of an operating rod 60, connected to a lever 61 pivotally mounted at 62 upon a block secured to the rear portion of the base 7. A bearing block 63 is provided which engages with the circumference of a cam 64 mounted to rotate with the main shaft 5. To prevent jamming of the studs in the chute or feeding thereof when the chute is filled, yielding connection is provided between the lever 61 and the slide 55 and comprising a spiral spring 65 mounted upon the rod between the nut 66 and the lever.

At the lower end of the chute 57 is provided a transfer gate 67 for permitting the passage of a single rivet from the chute and causing movement of the same into position between the dies when open. The gate 67 is illustrated in Figs. 6, 10 and 11 and is pivotally mounted, as by screw or stud 68, upon a block 69 secured to the standard 19. The gate 67 oscillates about the stud 68 as a pivot and is caused to move by the engagement of a hook or projection 70 mounted at one side of the upsetting plunger and which engages the inclined surfaces at one side of the gate. At the inner side, the gate is cut away, as shown in Fig. 11, to provide a pocket 85, which is provided with a slot 73 for the passage of the studs. Its lower curved edge is cut away or provided with a slot 74, the ends of which engage with a pin 75 mounted upon the base and intended to limit movement of the gate. I prefer to mount the hook or projection 70 for limited yielding movement with reference to the upsetting plunger. As shown in Fig. 6, it comprises a rod or bar loosely connected at its upper end to the upsetting plunger and provided with a spring 76 bearing against the hook 70 and the head of a screw or bolt 77 passing through an aperture in the hook and seated in a block attached to the plunger. Obviously, the spring 76 tends to seat the hook or projection against the side face of the plunger.

To assist in promoting the passage of studs lengthwise of the chute, I have devised an improved form of striker or knocker, comprising a rod or lever 78 pivotally mounted upon a portion of one of the pillow blocks 6 and having a projecting end 79 arranged to engage a plate 80 attached to the under surface of the chute 57. The rear end of lever 78 is hook shaped and is provided with a lower flat face 81 for en-

gagement by a pin 82 projecting laterally from one face of the cam 21 referred to. A spring pressed pin 83 is provided, seated in a portion of the pillow block 6, to yieldingly press the forward end of the lever 78 upwardly.

The operation of my improved stud riveting machine is obvious from the foregoing description taken in connection with the accompanying drawings. Assuming that the slide 4 is at its rearmost position, the upsetting plunger 1 is raised away from the slide with the rear end of the lever 17 depressed by reason of the contour of cam 21 and the force exerted by spring 84. At this time, the gate 67 occupies the position shown in Fig. 6, the flat portion of the gate covering the entrance to the chute and the cutaway portion 85 having carried a stud laterally to the position shown. The gripping jaws are open by reason of the action of the friction member 52 and the stud drops into place in a socket in the rear section of the slide in front of the die 32. Upon further rotation of the shaft 5, the cam 45 forces the rod 39 and slide 4 forwardly, the rear section 48 overtaking the forward section 49 and claspings the stud between the dies 32 and 33. The stud is thus moved forwardly to riveting position, being properly located by the stop 53 which engages the slide 4. As the stud reaches the forward or riveting position, the operator places a strip or stay in position by passing its aperture over the end of the projecting stud. The main shaft 5 now elevates the rear end of lever 17 and the upsetting plunger 1 descends and upsets the end of the stud, securely fastening it to the strip. During the last portion of the movement of the upsetting plunger, the die 25 moves in a practically vertical path by reason of its connection to the holding block 26. During the same period, the hook 70 engages inclined surface 71 of the gate 67, as shown in Fig. 6. At this time the gate cannot be moved by reason of the engagement of the pin 75 with the end of slot 74. Consequently, the hook 70 yields and springs outwardly, its end sliding along the surface 71. After the hook passes the end of surface 71 it engages the reversed inclined surface 72 and the pressure of spring 76 causes the gate to oscillate about its stud 68 to the right in Fig. 6, this bringing the slide in line with the chute 57 and enabling the cutaway portion 85 to receive another stud. The upsetting plunger now rises and during the first portion of its movement, the hook 70 slides along the surface 72, the pin 75 preventing further oscillation of the gate to the right. After the hook passes the end of surface 72, it engages surface 71 and oscillates the gate to the left, as in Fig. 6, thus carrying the selected stud into position for delivery between the gripping jaws

and closing the chute. As the upsetting plunger rises, slide 4 begins to move rearwardly, its forward section 49 being retarded and opening the gripping jaws, enabling the riveted stud to be withdrawn therefrom. When the jaws have moved rearwardly, the selected stud referred to, drops into place in front of the rear section 48 and the machine repeats the cycle. During the aforesaid operations, the slide 55 in the bottom of hopper 54 is moved forwardly and rearwardly to push along in the chute 57 such studs as have dropped through the slot in the slide and the striker or knocker 78 is operated once to tap the chute to assist them in moving along.

My improved machine is semi-automatic in operation, is simple in construction and may be operated to fasten rivets into stays with great rapidity. The controlling rod 15 permits of starting and stopping the machine when desired and the studs are automatically fed within the capacity and speed of operation of the machine.

What I claim is:

1. In a machine of the character described, the combination of a movable upsetting plunger, movably mounted separable means for carrying studs into position beneath said plunger, and means arranged to cause said separable means to open as the same moves away from the plunger.

2. In a machine of the character described, the combination of a movable plunger, movably mounted separable means for carrying studs into position beneath said plunger, and means arranged to cause opening and closing of said separable means as the same moves away from and toward the plunger.

3. In a machine of the character described, the combination of a main frame, a movable upsetting plunger mounted therein, means for carrying studs into position beneath said plunger, comprising main and auxiliary slides, yielding means for operating said carrying means, means arranged to cause opening and closing of said main and auxiliary slides, and a stop for engaging said slides to locate the same.

4. The combination of a main frame having guides, a movable upsetting plunger, stud supporting and carrying means comprising a main slide movable in said guides, an auxiliary slide connected to said main slide for limited movement with relation thereto, and friction means between said auxiliary slide and the frame for separating said slides as they move away from the plunger, said slides being provided with stud gripping portions.

5. The combination of a main frame having guides, a movable upsetting plunger, stud supporting and carrying means comprising a main slide movable in said guides, an auxiliary slide connected to said main

slide for limited movement with relation thereto, and friction means between one of said slides and the frame.

6. The combination of a main frame, a cam shaft mounted therein, a movable upsetting plunger operatively connected with said shaft, means for feeding studs operatively connected with said shaft, said means comprising a main slide, an auxiliary slide supported in advance of said main slide, and connected for limited movement with relation thereto, and friction means on said slide engaging said frame to resist movement of said auxiliary slide in either direction.

7. The combination with a main frame, and a plunger movably mounted therein, of stud gripping and feeding jaws movably mounted in said frame, means constructed and arranged to automatically open said jaws as they move in one direction and to close them as they move in the opposite direction, yielding means for moving said jaws, and a stop for securing registration between said jaws and plunger.

8. The combination with a main frame, and a plunger movably mounted therein, of stud gripping and feeding jaws movably mounted in said frame, said jaws having a loose connection to permit relative movement therebetween, means arranged to automatically open said jaws as they move in one direction and to close them as they move in the opposite direction, and means for moving said jaws toward and away from said plunger.

9. In a machine of the character described, the combination of a hopper provided with a shouldered way in its bottom, means for moving articles along said way, and a chute at the end of said way and communicating therewith.

10. In a machine of the character described, the combination of an article supply chute, and means for striking said chute to assist in moving articles therealong, comprising a double armed lever, one arm of said lever being arranged to engage said chute for striking the same, a spring connected to said arm, and a cam engaging the other arm of said lever for automatically operating the same.

11. In a machine of the character described, the combination of a hopper, a movable slide in the bottom of said hopper, a way in said hopper having shoulders, said slide being provided with a lip to engage and move articles along said way, yielding means for moving said slide in one direction, and a chute communicating with said way.

12. In a machine of the character described, the combination of a hopper provided in its bottom with a shouldered way, a slotted slide covering said way and permitting the passage of articles thereinto and having a downwardly projecting lip, yielding means for moving said slide to cause said

lip to feed articles along said way in one direction, and a chute communicating with said way.

13. In a machine of the character described, the combination of an article supply chute, a movable upsetting plunger, a slide for carrying articles to position beneath said plunger, and means for transferring articles from said chute to said slide, comprising a movable gate closing the end of said chute, said gate having a stud carrying pocket, and means for moving said gate.

14. In a machine of the character described, the combination of an article supply chute, a movable upsetting plunger, a slide for carrying articles to position beneath said plunger, and means for transferring articles from said chute to said slide, comprising a movable gate closing the end of said chute, said gate having a stud carrying pocket, and means for reciprocating said gate.

15. In a machine of the character described, the combination of an article supply chute, a movable upsetting plunger, a slide for carrying articles to position beneath said plunger, and means for transferring articles from said chute to said slide, comprising a movable gate closing the end of said chute, said gate having a stud carrying pocket and movable from a position in line with said chute to a position over said slide when retracted, and means for moving said gate.

16. In a machine of the character described, the combination of an article supply chute, a movable upsetting plunger, a slide for carrying articles to position beneath said plunger, means for transferring articles from said chute to said slide, comprising a movable gate closing the end of said chute, said gate being provided with a stud carrying pocket and movable from a position in line with said chute to a position over said slide when retracted, said gate being provided with a notch opposite said pocket for permitting the passage of an article therethrough, and means for moving said gate.

17. In a machine of the character described, the combination of an article supply chute, a movable upsetting plunger, a slide for carrying articles to position beneath said plunger, means for transferring articles from said chute to said slide, comprising a movable gate closing the end of said chute, said gate being provided with a stud carrying pocket and movable from a position in line with said chute to a position over said slide when retracted, said gate being provided with a notch opposite said pocket for permitting the passage of an article therethrough, and means on the plunger for operating said gate.

18. In a machine of the character described, the combination of an article supply chute, a movable upsetting plunger, a slide

for carrying articles to position beneath said plunger, means for transferring articles from said chute to said slide, comprising a movable gate closing the end of said chute, said gate being provided with a stud carrying pocket and movable from a position in line with said chute to a position over said slide when retracted, said gate being provided with a notch opposite said pocket for permitting the passage of an article therethrough, and means on the plunger for operating said gate, comprising a yieldingly mounted member on said plunger, and having a hooked end arranged to engage said gate for operating the same.

19. In a machine of the character described, the combination of an article supply chute, a movable upsetting plunger, a slide for carrying articles to position beneath said plunger, means for transferring articles from said chute to said slide, comprising a movable gate closing the end of said chute, said gate being provided with a stud carrying pocket and movable from a position in line with said chute to a position over said slide when retracted, said gate being provided with a notch opposite said pocket for permitting the passage of an article therethrough, and means on the plunger for operating said gate, comprising a yieldingly mounted member on said plunger, and having a hooked end arranged to engage said gate for operating the same, said gate having angularly arranged surfaces adapted to be engaged by said hook to move the gate alternately in opposite directions on movement of the plunger.

20. In a machine of the character described, the combination of an article supply chute, a movable upsetting plunger, a slide for carrying articles to position beneath said plunger, means for transferring articles from said chute to said slide, comprising a movable gate closing the end of said chute, said gate being provided with a stud carrying pocket and movable from a position in line with said chute to a position over said slide when retracted, said gate being provided with a notch opposite said pocket for permitting the passage of an article therethrough, means on the plunger for operating said gate, comprising a yieldingly mounted member on said plunger, and having a hooked end arranged to engage said gate for operating the same, said gate having angularly arranged surfaces adapted to be engaged by said hook to move the gate alternately in opposite directions on movement of the plunger, and means for limiting the movement of said gate in both directions.

21. In a machine of the character described, the combination of an article supply chute, a movable upsetting plunger, a slide for carrying articles to position beneath said plunger, means for transferring articles

from said chute to said slide, comprising a movable gate closing the end of said chute, said gate being provided with a stud carrying pocket and movable from a position in line with said chute to a position over said slide when retracted, said gate being provided with a notch opposite said pocket for permitting the passage of an article there-through, means on the plunger for operating said gate, comprising a yieldingly mounted member on said plunger, and having a hooked end arranged to engage said gate for operating the same, said gate having angularly arranged surfaces adapted to be engaged by said hook to move the gate alternately in opposite directions on movement of the plunger, and means for limiting the movement of said gate in both directions, comprising a fixed pin, said gate having a shouldered notch for coöperation with said pin.

22. In a machine of the character described, the combination of work holding means, an oscillating upsetting plunger co-operating therewith, an upsetting die mounted in said plunger, and means for permitting relative movement between the die and plunger as the die engages the work.

23. In a machine of the character described, the combination of work holding means, an upsetting plunger oscillating on a

horizontal axis coöperating therewith, an upsetting die pivotally connected to said plunger, and a spring between said plunger and said die for permitting relative movement of said die and plunger as the die engages the work.

24. In a machine of the character described, the combination of work holding means, an oscillating upsetting plunger co-operating therewith and provided with a socket, a die holding block adjustably mounted in said socket, a die pivoted to said block, and a compression spring between said die and said block for permitting relative movement of said die and plunger as the die engages the work.

25. In a machine of the character described, the combination of work holding means, an oscillating upsetting plunger pivotally mounted to oscillate upon a horizontal axis, an upsetting die pivotally mounted upon a horizontal axis in said plunger, and a spring between said plunger and said die for permitting relative movement therebetween as the die engages the work.

In testimony whereof, I have hereunto set my hand.

JUNIUS EMMETT MAYO.

Witnesses:

J. H. PARDEE,
F. W. WINTER.