

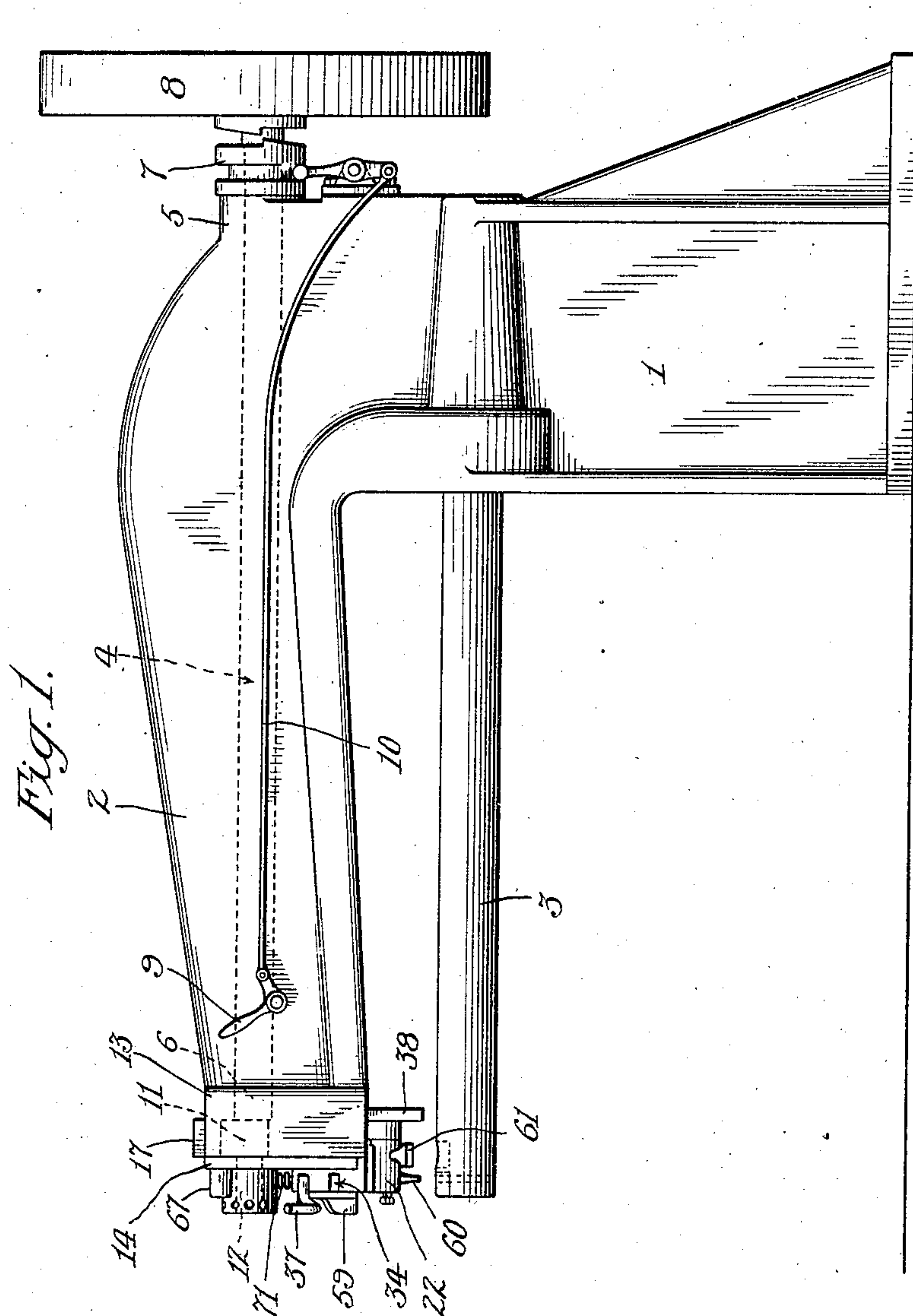
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J. R. FRENCH.
PUNCHING AND RIVETING MACHINE.

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UNITED STATES PATENT OFFICE.

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PUNCHING AND RIVETING MACHINE.

No. 877,419.

Specification of Letters Patent.

Patented Jan. 21, 1908.

Application filed November 14, 1906. Serial No. 343,443.

To all whom it may concern:

Be it known that I, JOHN R. FRENCH, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles, State of California, have invented a new and useful Punching and Riveting Machine, of which the following is a specification.

This invention relates to punching and riveting machines and the main object of the invention is to provide a punch or die-press having a turret adapted to carry a series of thrust tools or punches, any of which may be brought into operative position by turning the turret.

The turret in addition to being revoluble has a bodily reciprocatory movement with means for reciprocating it continually or by single strokes, and a further object is to provide means for automatically arresting the bodily movement of the turret at the completion of a full single stroke.

Another object is to provide an automatically operated stripper; a further object being to automatically cause said stripper mechanism to be rendered inoperative when the turret is turned into certain positions and to render the stripper mechanism operative when the turret is turned into other positions.

Another object is to mount the turret in such a manner that its axial pin will be relieved of shock when the machine is in operation, and to cause the shock of impact which the turret sustains when a tool strikes the work, to be transmitted directly from the turret to the carrier.

Another object is to provide for readily detaching the turret from its carrier, when desired, without the removal of any nuts or bolts or other retaining devices, and to hold the turret securely locked in place when in position in the carrier.

Another object is to provide means for readily shifting the turret into different positions and to securely lock the turret when in any one of its positions.

Further objects of the invention will be brought out in the following description.

Referring to the accompanying drawings:—
50 Figure 1 is a side elevation of a machine embodying my invention. Fig. 2 is an enlarged detail view in section on line x^2-x^2 Fig. 3. Fig. 3 is a front elevation of the turret, and the adjacent mechanism. Fig. 4 is a section

on line x^4-x^4 Fig. 2. Fig. 5 is a section on line x^5-x^5 Fig. 3.

1 designates the base frame having an overhanging hollow arm 2. Extending from the frame 1 along underneath the overhanging arm 2 is an arbor 3, the end of which is equipped with female dies, anvils or other devices which passively coact with the thrust tools carried by the turret.

Extending through the hollow arm is a shaft 4, the rear end of which is mounted in a bearing 5 in the arm 2, its forward end being mounted in a bearing 6 in the arm 2. The shaft 4 is provided with suitable clutch mechanism 7 for throwing the shaft into or out of operation. 8 is a pulley for driving the clutch. The clutch may be operated by a hand lever 9 located near the front end of the arm 2 and connected with the clutch by an operating rod 10. The front end of the shaft 4 is provided with an eccentric 11, and the shaft 4 has an extension 12 of reduced diameter beyond the eccentric 11.

A head 13 is formed in the front end of the arm 2 and has a removable front plate 14 attached thereto by screws 15. As shown in Fig. 4, the head 13 is recessed and formed with parallel vertical ways 16. Mounted to slide on the ways 16, and inclosed by the front plate 14, is a reciprocating carrier 17, the upper end of which is formed with a transverse slot 18, which receives a squared bushing or sliding box 19 which is mounted on the eccentric 11. The lower portion of the carrier 17 is provided with a concave recess which embraces an arc of more than one-half a circle terminating at points 20, as shown in Fig. 3, and the upper concave wall of the recess forms an abutment 21 having a broad face of great area for the purpose of receiving the shock of impact which the turret 22 sustains when in operation. The turret 22 comprises a circular revoluble block with a broad face which is seated in the concave recess in the carrier, and when in position therein is retained by reason of the concave wall of the carrier extending over half the circumference of the turret, (but not retained solely thereby as will be seen further) the edges 20, as shown in Fig. 3, being somewhat below a horizontal line drawn through the axis of the turret. The turret 22 is provided with a segmental rib or flange 23, which as shown in dotted lines in Fig. 3, extends

through about an arc of 45 degrees, and the carrier 17 is provided with a concentric groove 24 which receives a retaining flange 23 and as the groove 24 extends through the entire arc embraced by the concavity of the carrier, the ends of the groove are thus open, hence by revolving the turret sufficiently the retaining flange 23 will be turned entirely out of its seat in the groove 24, thus leaving the turret free to be withdrawn from its carrier on a line parallel with its axis.

The turret 22 has a central circular socket 25 which does not extend entirely through the turret, as shown in Fig. 2, and this socket receives the head 26 of the center pin 27 which is mounted in the carrier 17, there being a bronze bushing 28 lining the socket to prevent undue wearing. The turret 22 may be revolved on the head 26 of the pin 27, and the pin thus serves to guide the turret, although it is obvious that the concave seat in the carrier will serve in a degree to guide the turret. Thus it will be seen that the object of the pin is that of a guide and retainer for the turret, and the object of the concave recess is mainly that of an abutment for receiving the impact sustained by the turret.

The turret 22 is provided with a diametrical slot 29 which receives a locking lever 30 pivoted to a pin 31, which extends radially in the turret, as shown in Figs. 3 and 5. The slot 29 near the end of the locking lever 30 has a pocket 32 in which is a coil spring 33 which bears against the end of the locking lever 30 and serves to depress the latch portion of the locking lever 30, the carrier 17 having a series of notches, in the present case three, as shown 34, 35 and 36, either of which notches is adapted to receive the locking lever 30. The locking lever 30 has an offset extension forming a handle 37 by means of which the locking lever may be withdrawn from engagement with a notch and by which the turret may be turned into the position desired.

A stripper mechanism is provided which comprises a stripper bar 38 which is tapered as shown in Fig. 4, to allow of a necessary slight rocking movement, and is received by a recess 39 formed in the head 13. The upper end of the stripper 38 is connected to a pivoted rock lever 40 mounted on a pin 50, and having a bearing face 51 which is adapted to be operated upon by a pin 52 about to be described. As shown in Fig. 2, the stripper 38 is recessed to receive a coil spring 53, one end of which spring is attached to a pin 54 which is in the end of the arm 2, its outer end being attached to a pin 55 in the stripper 38, so that when the rock lever 40 is out of engagement with the pin 52, the spring 53 will hold the stripper 38 elevated. As shown in Fig. 5, the pin 52 is carried by the carrier 17, and the carrier 17 is counterbored to form a recess 53' which allows the play of a flange

54' formed on the pin 52. A relatively weak coil spring 55' bears against one side of the flange 54' and against the carrier 17. The other end of the pin 52 extends into a tube 56 having a closed round end 57, in which tube is a relatively strong spring 58 which presses against the end of the pin 52. As the carrier is reciprocated it is obvious that when the pin 52 extends under the rock lever 40, as the carrier moves up the rock lever 40 will be tilted and the stripper 38 will be thrust downward into the position shown in Fig. 4 stretching spring 53, and that as the carrier moves down the rock lever 40 is allowed to retract and the stripper will be moved up by the spring 53. It is desirable to render the stripper 38 inoperative when certain tools of the turret are in operative position and to that end a segmental cam plate 59 is secured to the turret (see Figs. 2, 3 and 5). In the present embodiment the turret carries three thrust tools, i. e., a punch 60, a rivet setter 61, and a lap layer or seam setter 62.

The stripping mechanism is needed to operate only when the punch 60 is in operative position, such as shown in Fig. 3, and therefore the cam plate 59 is formed with bearing faces 63 and 64 which are in two different planes. The segmental cam plate 59 extends through an arc which is ample to maintain its bearing against the round end 57. The bearing faces are so arranged that when the punch 60 is in operative position, as shown, the bearing face 64 bears against the round end 57 and holds the tube 56 in so that the heavy spring 58 is compressed which holds out the pin 52 overcoming the spring 55'. When the turret is turned to bring either the tool 61 or 62 into position, the bearing face 64 rides off from the rounded end 57 of the tube 56 and the tube is thrust out by the spring 58, so that the rounded end 57 rests against the bearing face 63, thus relieving the pin 52 from the pressure of the spring 58, whereupon the weaker spring 55' is allowed to expand and acting against the flange 54' withdraws the pin 52 from under the rock lever 40. The stripper 38 is then held up during the strokes of the carrier by means of the spring 53. When the turret is again moved to bring the punch 60 into place, the tube 56 is forced in by the cam plate 59 and compresses the spring 58 and if the carrier is on the down stroke, as soon as the pin 52 rides below the rock lever 40, the strong spring 58 then expands and snaps the pin 52 under the rock lever 40.

As seen in Fig. 4, a recess 65 is formed in the head 13 to permit the up and down bodily movement of the pin 52. As shown in Figs. 2 and 3, a cam 66 is mounted on the end of the extension 12 of the shaft 4 and rotates therewith under a brake lever 67 which has a shoe 68. The brake lever 67 is connected with a bolt 69 which passes

through a stationary lug 70 formed on the plate 14, and a coil spring 71 is arranged between the other end of the bolt 69 and the lug 70 to normally hold the end of the brake lever 67 in contact with the lug 70. The cam 66 is so proportioned that when the carrier nearly arrives at the upper end of its stroke the cam will bear against the shoe 68 and thus have its movement arrested by the friction produced. By adjusting the tension of the spring 71, the friction may be so regulated as to cause the rotation of the shaft 4 to be stopped (when the clutch is thrown out) when the carrier is at the upper end of its stroke. From Fig. 3, it will be seen that the cam 66 is free from the shoe 68 during the major part of the revolution of the shaft 4, being only in contact therewith during a slight amount of rotation either side of the center when the carrier is retracted. Thus in operation when throwing out the clutch the carrier is arrested automatically in retracted position, and the tool is prevented from making another stroke.

In the present embodiment the machine is designed for punching rivet holes in pipe and for setting the rivets and for "laying the lap" or flattening the seam of the pipe, the mandrel 3 serving as a support for the pipe.

It will be noted that the punch 60 is located farther out on the turret than are the tools 61 and 62. This enables the die to be arranged under the punch and the anvil to be arranged back of the die, so that the hole may first be punched, then the rivet inserted, then the pipe slipped back slightly to place the rivet over the anvil, then by turning the turret to bring the hammer 62 in operative position the rivet may be upset by a single blow of the turret.

While I have shown the machine as designed for making pipe, the spirit of invention can readily be incorporated by one skilled in the art in machines designed for other specific purposes.

What I claim is:—

1. A carrier having a concave recess, a turret fitted in said recess, the recess embracing more than half the circumference of the turret and the lower part of the turret projecting below the carrier, and a pin projecting from the carrier into the center of the turret.

2. A carrier having a segmental concave recess with a concentric segmental groove, a turret fitted in said recess, and having a segmental flange engaging in the groove, said flange embracing an arc less than the arc of the groove for holding the turret in the recess and for permitting the withdrawal of the turret when it is turned in the recess a certain degree.

3. A carrier, a turret mounted thereon, thrust tools carried by the turret and located

in positions having different planes of revoluble movement, supporting means for the work, and devices for coacting with the tools mounted in the supporting means under their respective thrust tools and on a longitudinal line parallel with the axis of the turret.

4. A head, a carrier slidable in the head, a tool holder mounted on the carrier, a rock lever pivoted to the head, a stripper bar connected to the rock lever, and a pin carried by the carrier and coacting with the rock lever for operating the stripper.

5. A head, a carrier slidable in the head, a tool holder mounted on the carrier, a rock lever pivoted to the head, a stripper bar connected to the rock lever, a pin carried by the carrier and coacting with the rock lever for operating the stripper in one direction, and a spring for moving the stripper in the other direction.

6. A head, a carrier slidable in the head, a tool holder mounted on the carrier, a rock lever pivoted to the head, a stripper bar connected to the rock lever, a pin in the carrier, and means for projecting said pin under the rock lever when the turret is in one position.

7. A head, a carrier slidable in the head, a tool holder mounted on the carrier, a rock lever pivoted to the head, a stripper bar connected to the rock lever, a pin in the carrier, means for projecting said pin under the rock lever when the turret is in one position, and means for withdrawing the pin when the turret is moved into another position.

8. A head, a carrier slidable in the head, a tool holder mounted on the carrier, a rock lever pivoted to the head, a stripper bar connected to the rock lever, a pin in the carrier, means for projecting said pin under the rock lever when the turret is in one position, means for withdrawing the pin when the turret is moved into another position, and a spring for returning the stripper.

9. A head, a carrier slidable in the head, a turret mounted on the carrier, thrust tools carried by the turret, a rock lever pivoted to the head, a stripper bar connected to the rock lever, a telescopic device in the carrier adapted to coact with the rock lever, a cam plate carried by the turret and acting against one end of the telescopic device for controlling the same.

10. A head, a carrier slidable in the head, a turret mounted on the carrier, thrust tools carried by the turret, a rock lever pivoted to the head, a stripper bar connected to the rock lever, a telescopic device in the carrier comprising a tube, a pin projecting into the tube and having a flange, a relatively weak spring between the flange and the carrier, a relatively strong spring in the tube bearing against the end of the pin, and a cam plate having bearing faces in two different planes carried by the turret, whereby the cam faces

and springs act to position the tube and pin according to the position of the turret to cause the pin to coact or not to coact with the rock lever.

5 11. In a punching and riveting machine, a turret mounted on the carrier, thrust tools carried by the turret, a locking lever pivoted to the turret to swing in a plane parallel with the axis of the turret, the carrier having a series of notches adapted to receive the locking lever.

12. In a punching and riveting machine, a turret mounted on the carrier, thrust tools carried by the turret, a locking lever pivoted to the turret to swing in a plane parallel with the axis of the turret, the carrier having a series of notches adapted to receive the locking lever, and a spring between the locking lever and turret for holding the lever in a notch.

13. In a punching and riveting machine, a turret mounted on the carrier, thrust tools carried by the turret, the turret having a diametrical groove, a locking lever lying in said groove and pivoted to the turret, the carrier having a series of notches for receiving the lever, and a spring for holding the lever in a notch.

14. A head, a carrier slidable in the head and having a concave recess embracing an arc less than a complete circle and having a groove concentric with the recess, a turret fitting said recess and having a segmental flange engaging the groove, the flange embracing an arc not greater than the uncom- 35

pleted circle of the groove.

15. A head, a carrier slidable in the head and having a concave recess embracing an arc less than a complete circle and having a groove concentric with the recess, a turret fitting said recess and having a segmental flange engaging the groove, the flange embracing an arc not greater than the uncompleted circle of the groove, and a pin on the carrier projecting into the center of the turret.

16. A head, a carrier slidable in the head, a shaft rotating in the head and having an eccentric operating the carrier, a segmental cam carried by the shaft, a pivoted brake lever on the head, and a spring for holding the brake lever in the path of the cam.

17. A head, a carrier slidable in the head, a shaft rotating in the head and having an eccentric operating the carrier, a segmental cam on the shaft, a brake lever pivoted to the head, a lug on the head, a bolt connected to the brake lever and passing through the lug, and a spring between the end of the bolt and the lug for holding the brake lever against the lug and in the path of the segmental cam.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 31st day of October, 1906.

JOHN R. FRENCH.

In presence of—

GEORGE T. HACKLEY,
FRANK L. A. GRAHAM.