

J. R. FRENCH.
PUNCHING AND RIVETING MACHINE.
APPLICATION FILED JUNE 18, 1908.

923,350.

Patented June 1, 1909.

Fig. 1.

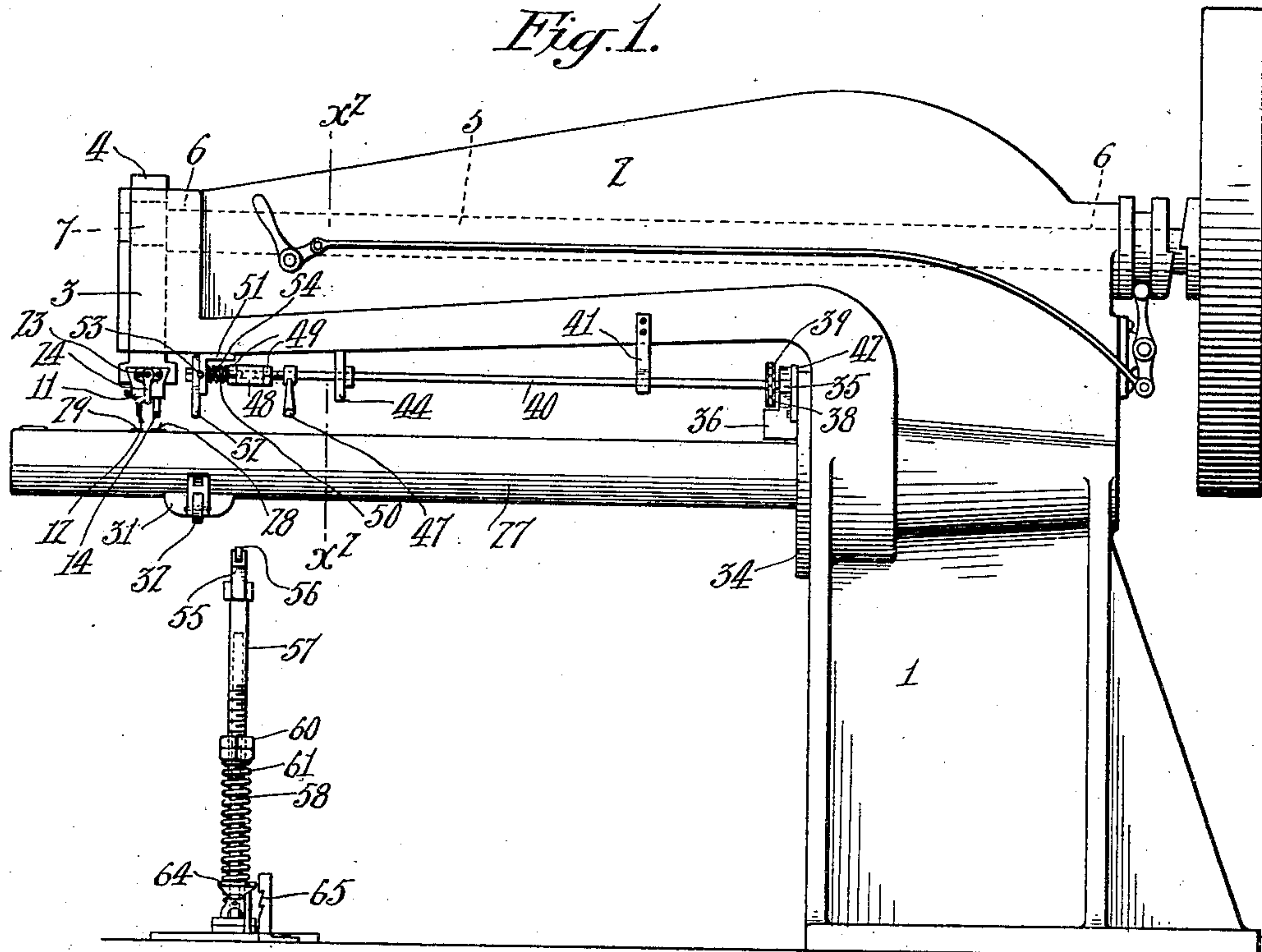
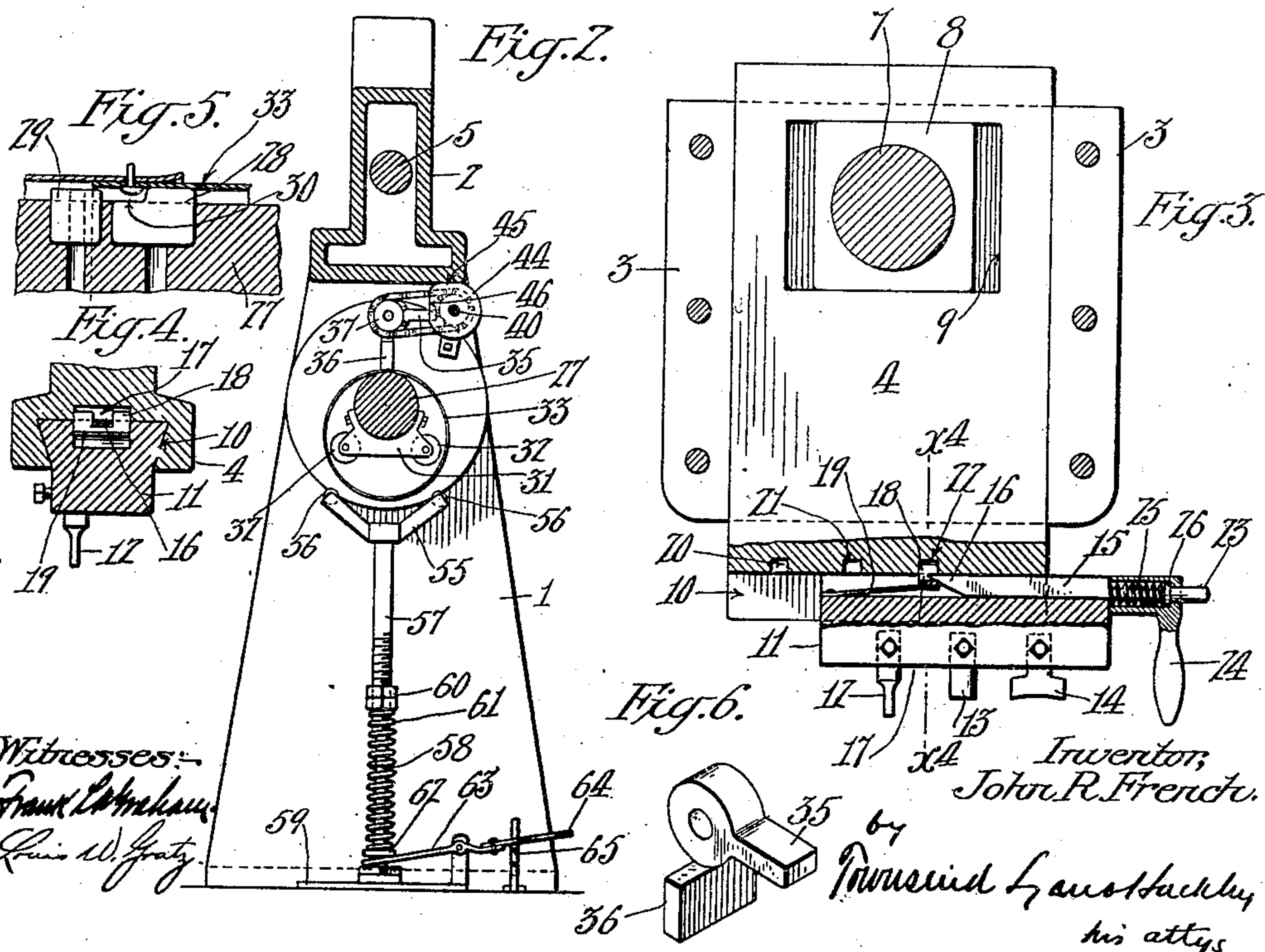


Fig. 2.



UNITED STATES PATENT OFFICE.

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PUNCHING AND RIVETING MACHINE.

No. 923,350.

Specification of Letters Patent.

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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 and State of California, have invented new and useful Improvements in Punching and Riveting Machines, of which the following is a specification.

This invention relates to punching and riveting machinery, and one object of the invention is to provide a novel carrier for holding the necessary tools used for performing the various operations, whereby the particular tool desired for performing a certain operation may be quickly moved into operative position by shifting the carrier.

Another object is to provide gages enabling accurate positioning of the article being operated upon, and a further object is to provide an auxiliary stripper which coacts with said gages.

The machine is designed primarily for punching and riveting pipe, and a further object of the invention is to provide a vertically movable support for the pipe, whereby the latter may be held at the desired elevation, and another object is to provide a main stripper which will also act as a guide while the pipe is being turned on the stake.

The accompanying drawings illustrate the invention, and referring thereto:—Figure 1 is a side elevation of the machine. Fig. 2 is a cross sectional view on line x^2-x^2 Fig. 1. Fig. 3 is an enlarged face view of the head, showing the tool carrier in vertical section, the crank for operating the head being also shown in section. Fig. 4 is a vertical section on line x^4-x^4 Fig. 3. Fig. 5 is an enlarged view of the anvil, showing the position of the pipe thereon during the action of laying the outside lap. Fig. 6 is a perspective view in detail of the gages.

1 designates the main frame of the machine having an overhanging arm 2, the end of which is provided with vertical ways 3 in which a head 4 is mounted to slide vertically. The arm 2 is hollow, as indicated in Fig. 2, and a shaft 5 extends therethrough being mounted in suitable journals 6 at each end of the arm, and the shaft 5 has a crank 7 which projects into a block 8, the latter being arranged to slide in a slot 9 formed in the head 4 to reciprocate the head as the crank revolves. The lower end of the head 4 is formed with a dovetail way 10 in which a tool carrier 11 is slidably mounted.

Various tools may be attached to the tool carrier in any desired manner, for example, the tool carrier may be provided with sockets which receive a punch 12, a riveting tool 13 and a lap laying tool 14. Slidable in the upper part of the carrier 11 is a release rod 15 having a tapered end 16 which projects into a notch 17 formed in a bolt 18 which is secured to a flat spring 19. The lower face of the head 4 is provided with three notches 20, 21 and 22 either of which is adapted to be engaged by the bolt 18 and thereby lock the tool carrier. The release rod 15 has a stem 23 which projects through a handle 24 attached to the tool carrier, and a coil spring 25 is interposed between a flange 26 on stem 23 and the adjacent end of the tool carrier so that the release rod 15 is normally held retracted. The stem 23 is arranged so that it lies under the thumb of the operator when his hand is on the handle 24, and by pushing in the stem 23 the inclined end 16 of the release rod presses down the bolt 18 from its engagement in a notch, whereupon the tool carrier 11 may be slid transversely of the head 4 by operating the handle 24.

Fig. 3 shows the bolt 18 in engagement with the notch 22 which brings the punch 12 into operative position. When the tool carrier 11 is shifted and bolt 18 engages notch 21, the riveting tool 13 is in operative position, and when the tool carrier is shifted so that bolt 18 engages notch 20 the lap laying tool 14 is in position. It is apparent that either one of the tools may be very quickly brought into operative position by pushing in the stem 23 and moving the carrier by means of the handle 24. Projecting from the frame 1 and arranged below the overhanging arm 2 is a stake 27 to which is secured an anvil 28 and a female die 29. As clearly shown in Fig. 5, the anvil 28 has a notch 30.

A main stripper is arranged under the stake 27 and comprises a bracket 31 which is attached to the stake and carries rollers 32, which rollers prevent the pipe, indicated at 33 Fig. 2, from sticking to the punch and rising with it. The rolls 32 also act as guides for the pipe as it is being turned around on stake 27. A face plate 34 encircles the stake 27 at the frame 1 and affords an abutment against which the section of pipe to be riveted may be rammed in forcing it on to the section or sections previously riveted. To hold and position the pipe for the punching, riveting or lap laying operations, gages are

employed comprising a narrow gage 35 and a wide gage 36, shown in detail in perspective in Fig. 6, which are secured to a sprocket 37, so that by rotating sprocket 37 either of the gages may be moved into position over stake 27, or both gages may be turned away from the stake. Sprocket 37 is connected by chain 38 with a sprocket 39 mounted on a shaft 40, the latter being mounted in journals 41, 42. A cam plate 44 is secured to the shaft 40 and has two flat faces 45 and 46, as shown in Fig. 2, either of which when in contact with the overhanging arm will prevent the shaft and gages from accidentally turning. The shaft 40 has sufficient flexibility to allow it to spring laterally as the cam presses it out when it is turned to bring either of the flat faces into contact with the overhanging arm 2. When the flat face 45 is in contact with the arm the wide gage 36 is in operative position over the stake 27 and when the flat face 46 is in contact the narrow gage 35 is in operative position, and when either gage is in position it acts as a stop for the edge of the pipe. The shaft 40 may be turned by a handle 47. When both gages are turned out of the way the end of the pipe can abut against the face plate 34. When the narrow gage 35 is turned into position the end of the pipe will abut against the same and lie farther away from the face plate 34, while when the wide gage 36 is in position the pipe will be held still farther away from the face plate. The proper gage is turned into position before the end of the pipe is moved against it and the inward movement of the pipe is arrested by the end of the pipe striking the wide or narrow gage as the case may be, and thus the pipe is properly positioned longitudinally for the operations of laying the lap or punching or riveting.

Secured rigidly to the end of shaft 40 by a screw coupling 48 and lock nuts 49, is an extension 50 journaled in a bracket 51, and keyed to the extension 50 is an auxiliary stripper 52. A pin 53 is arranged in bracket 51 so that a portion of the face of said pin projects from the face of the bracket and engages a shallow notch formed in the stripper 52, and a coil spring 54 is interposed between one end of the lock nuts 49 and bracket 51, so that the stripper 52 is yieldingly locked against turning by pin 53 when the stripper projects downward. The shaft 40 is capable of a slight longitudinal movement and by turning shaft 40 the spring 54 will yield to permit the shallow notch of stripper 52 to ride off from pin 53 with a cam action which draws the shaft 40 endwise slightly as the stripper rotates with shaft 40. The stripper 52 is employed when the pipe 33 is so thin that it would be apt to bulge on account of its upper wall being drawn up sticking to the punch as the main rollers 32 act only on the lower part of the pipe. With such

pipe, when the auxiliary stripper 52 is in position, the pipe is prevented from distortion and sticking to the punch as the punch moves up.

The pipe may be supported from below, for certain operations, by a fork 55 having rollers 56 which are adapted to contact with the pipe, the fork 55 being supported by a tube 57 which slides over a post 58 which projects up from a floor plate 59. A nut 60 is screwed on the tube 57 and a coil spring 61 is arranged between the nut 60 and a grooved collar 62 which is operated by a pivoted fork lever 63, the latter having a pedal 64 pivoted thereto to swing laterally thereof and adapted to be engaged with a vertical rack 65 by means of which the fork 55 may be held at the desired elevation. It will be noted that the fork 55 is yieldingly supported in the position desired by the coil spring 61, and thus can spring down when the tool forces the pipe against the anvil. The tools 13 and 14 are both arranged in line with each other, while the punch 12 is located in front of the line of tools 13 and 14 so that when the punch 12 is moved to operative position it stands over the female die 29, and when either of the tools 13 or 14 is in position it lies over the anvil 28. The two sections of pipe having been driven together, both gages being free, the pipe is arranged with its inner end resting against face plate 34 and the riveting tool 13 is shifted into position. The upper wall of the pipe lies on the stake 27 with the edge of the inner circumferential seam on anvil 28, and the fork 55 is elevated so that it partially supports the pipe but does not lift it appreciably above the anvil. As the machine is then operated, the riveting tool 13 lays the inside lap as the tool is reciprocated, and the pipe is partially turned by hand during the up stroke of the tool, which turning of the pipe is made easy by reason of its rolling motion on rollers 56. By "inside lap" is meant the overlapping inside pipe end, and by "outside lap" is meant the overlapping outside pipe end. After the inside lap is thus laid the wide gage 36 is dropped into position and the fork 55 is lowered away from the pipe so that the pipe rests closely on the anvil and die 29, and the tool carrier is shifted to bring the punch 12 into operative position, and as the machine operates the punch 12 makes the perforations in the pipe, the pipe being stripped from the punch during the upward movement of the punch by the main stripper rollers 32. After the holes are thus punched the fork 55 is raised and the rivets are inserted in the perforations, the fork being raised so that the pipe may readily be rolled around in putting in the rivets which are inserted from inside the pipe. After the rivets are inserted the fork 55 is dropped and the narrow gage 35 is moved into position which brings the circular line

of rivets over the anvil 28 under the riveting tool 13, and as the machine is then operated the riveting tool 13 strikes and rivets the ends of the rivets while the heads of the rivets which are inside, rest on the anvil 28. One blow of the riveting tool 13 is sufficient for each rivet, the pipe being turned by hand during the upward stroke of the riveting tool to bring another rivet into position. After the riveting operation, the narrow gage being in operative position, the lap laying tool 14 is moved into operative position, and as the machine operates the outside lap is laid by tool 14, thus finishing the operation.

What I claim is:—

1. In a punching and riveting machine, a reciprocating head, a tool carrier mounted to slide transversely on the head, means for locking the tool carrier in various positions on the head, tools carried by the tool carrier, a depending handle on the tool carrier, and a rod extending through the hub of the handle for controlling the locking means.

2. In a punching and riveting machine, a reciprocating head, a tool carrier slidable transversely on the head, a bolt on the tool carrier adapted to engage in notches on the head, and a release rod slidable on the tool carrier and having an inclined end engaging the bolt for operating the bolt.

3. In a punching and riveting machine, a reciprocating head, a tool carrier slidable transversely on the head, a spring pressed bolt in the carrier adapted to engage in notches on the head, a handle on the tool carrier, a release rod extending longitudinally in the tool carrier and through the hub of the handle, a flange on the release rod, a coil spring in the hub of the handle bearing against the flange, the release rod having a beveled end engaging the bolt for depressing the bolt when the release rod is shifted.

4. In a punching and riveting machine, a stake, a tool carrier movable toward and from the stake, an anvil on the stake, a die adjacent the anvil, tools carried by the tool carrier, certain of which are in a plane with the anvil and certain of which are in a plane with the die, the anvil having a recess, and means for sliding the tool carrier transversely of the stake to bring a tool into position over the anvil or over the die.

5. In a punching and riveting machine, a stake, a tool carrier movable toward and from the stake, pivoted gages of various widths, means for swinging any one of said gages to position on the stake, and tools on the tool carrier located at definite distances from the respective gages.

6. In a punching and riveting machine, a frame, a stake thereon, a tool carrier movable toward and from the stake, pivoted gages of various widths, and a shaft geared

with said gages for turning any one of said gages into position on the stake.

7. In a punching and riveting machine, a frame, a stake thereon, a tool carrier movable toward and from the stake, pivoted gages of various widths, a shaft geared with said gages for turning any one of said gages into position on the stake, a cam on the shaft having flat faces adapted to bear against the frame to hold the shaft from accidental rotation, the shaft being flexible whereby it may spring laterally to permit the cam to turn.

8. In a punching and riveting machine, a frame, a stake thereon, a tool carrier movable toward and from the stake, a cam on the shaft having flat faces adapted to bear against the frame to hold the shaft from accidental rotation, the shaft being flexible whereby it may spring laterally to permit the cam to turn, an extension on the shaft, and an auxiliary stripper on the shaft adapted to be turned into a position over the stake or into a position away from the stake and held in either position by the pressure of a corresponding flat face of the cam against the frame.

9. In a punching and riveting machine, a frame, a stake thereon, a tool carrier movable toward and from the stake, a shaft, a cam on the shaft having flat faces adapted to bear against the frame to hold the shaft from accidental rotation, the shaft being flexible whereby it may spring laterally to permit the cam to turn, an extension on the shaft, an auxiliary stripper on the shaft adapted to be turned into a position over the stake, or into a position away from the stake and held in either position by the pressure of a corresponding flat face of the cam against the frame, a bracket supporting the extension, a rounded projection from the bracket engaging a shallow notch in the auxiliary stripper, said extension being movable longitudinally in the bracket, and a coil spring yieldingly holding the extension against longitudinal movement to hold the projection in said notch.

10. In a punching and riveting machine, a stake, a tool carrier movable toward and from the stake, a tool on the tool carrier, and a stripper on the under side of the stake comprising a bracket attached to the stake and rollers journaled in the bracket.

11. In a punching and riveting machine, a stake, a tool carrier movable toward and from the stake, a tool on the tool carrier, a stripper on the under side of the stake comprising a bracket attached to the stake and rollers journaled in the bracket, and an auxiliary stripper above the stake comprising a bar adapted to be turned into or out of position over the stake.

12. In a punching and riveting machine, a

stake over which the pipe may be slipped, a tool carrier movable toward and from the stake, a tool on the carrier for operating on the pipe, a fork below the stake for receiving the pipe, and automatic means for yield-
5 ingly supporting the fork to allow the pipe to be depressed against the stake by a tool.

13. In a punching and riveting machine, a stake over which the pipe may be slipped, a
10 tool carrier movable toward and from the stake, a tool on the carrier for operating on the pipe, a fork below the stake for receiving the pipe, a tube on the fork, a post extending from the floor into the tube, a collar slidable
15 on the post, a spring between the collar and tube, and a pivoted forked lever engaging the collar.

14. In a punching and riveting machine, a

stake over which the pipe may be slipped, a tool carrier movable toward and from the
20 stake, a tool on the carrier for operating on the pipe, a fork below the stake for receiving the pipe, a tube on the fork, a post extending from the floor into the tube, a collar slidable
25 on the post, a spring between the collar and tube, a pivoted forked lever engaging the collar, a pedal pivoted to the lever to swing laterally, and a rack adapted to be engaged by the pedal.

In testimony whereof, I have hereunto set
my hand at Los Angeles, California, this 9th
day of June 1908.

JOHN R. FRENCH.

In presence of—

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