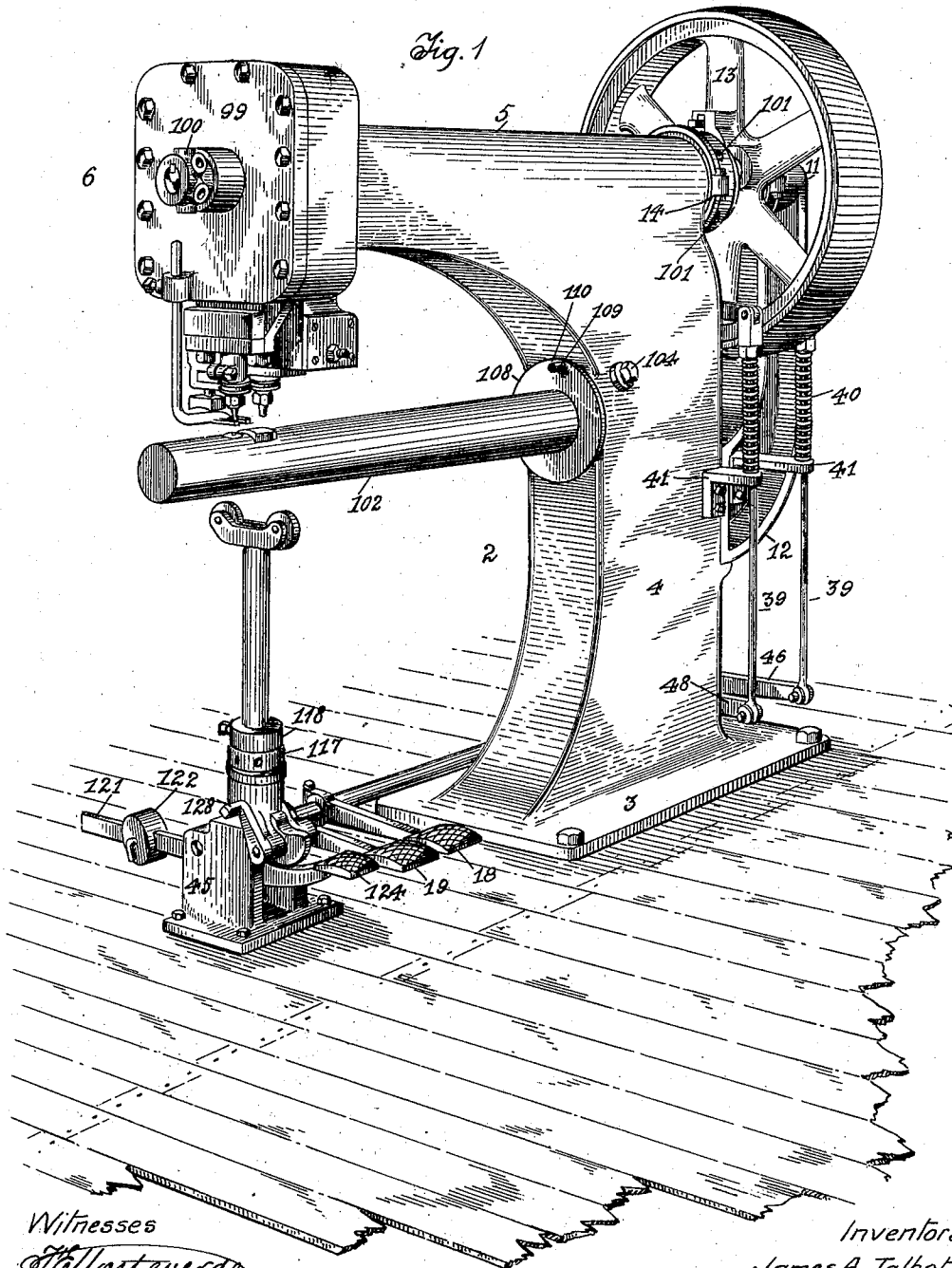


J. A. TALBOT & H. E. BRETT.
 COMBINED PUNCHING AND RIVETING MACHINE.
 APPLICATION FILED MAR. 10, 1909.

980,450.

Patented Jan. 3, 1911.

5 SHEETS—SHEET 1.



Witnesses

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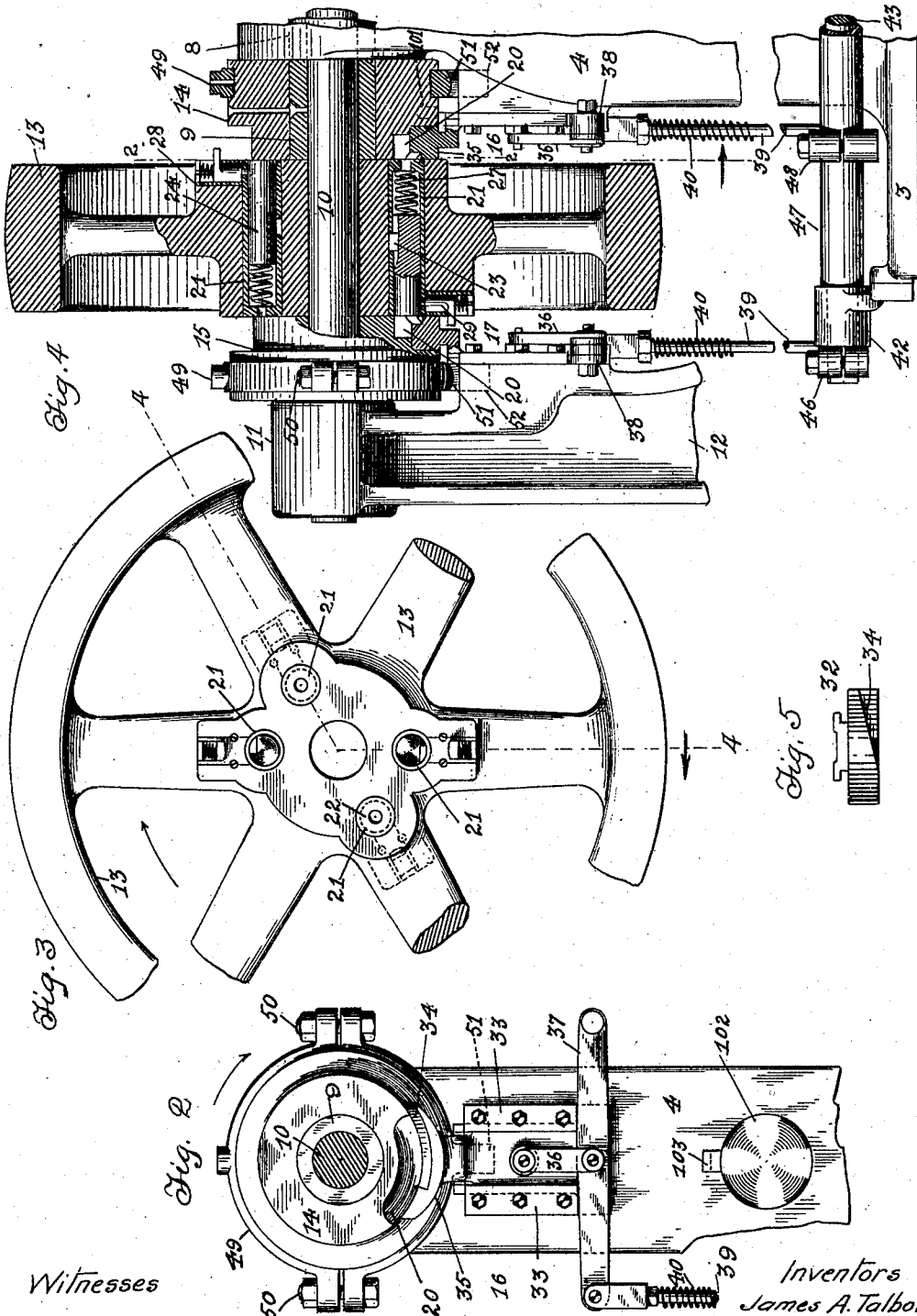
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5 SHEETS—SHEET 2.



Witnesses

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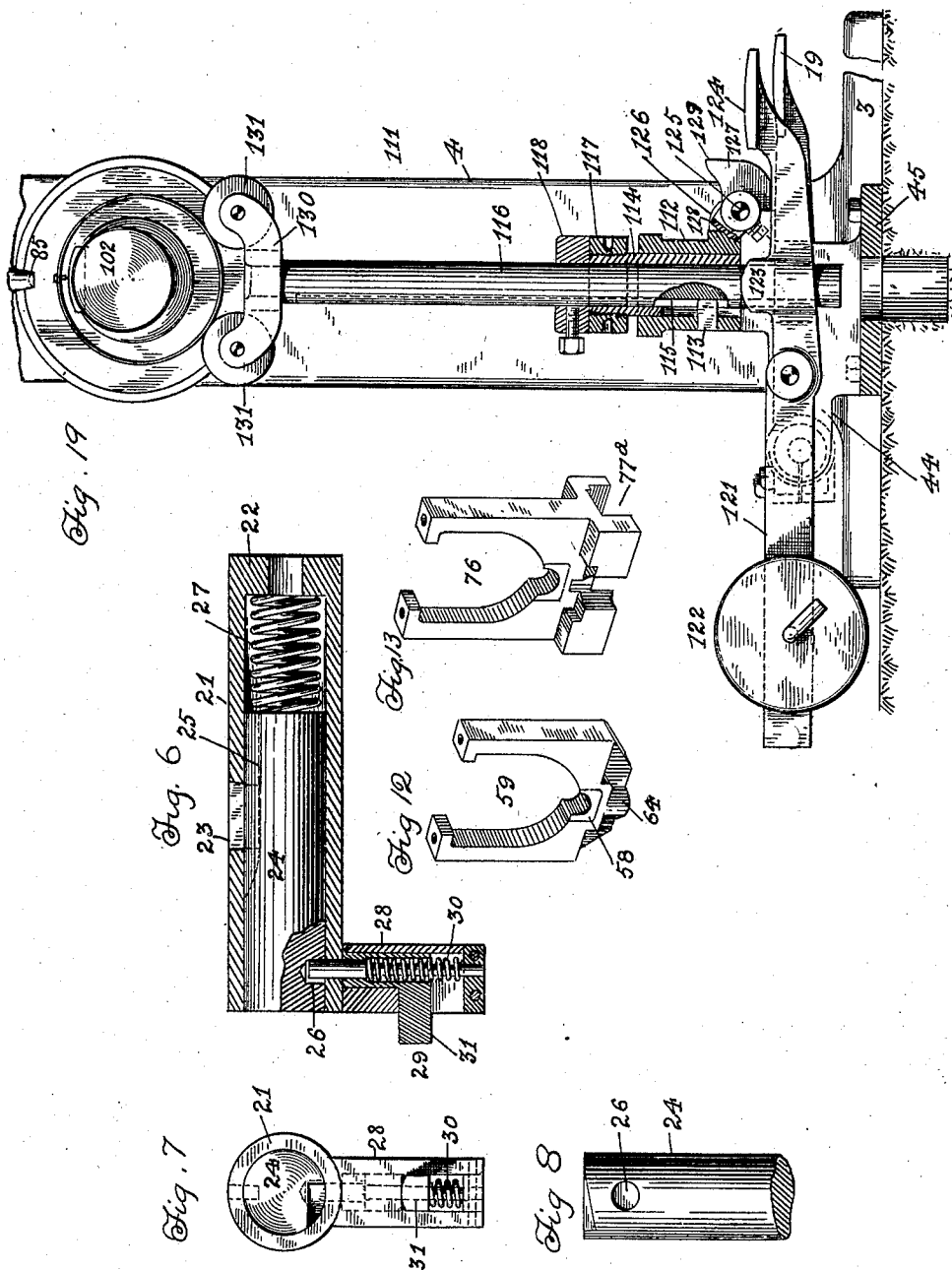
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5 SHEETS—SHEET 3.



Witnesses

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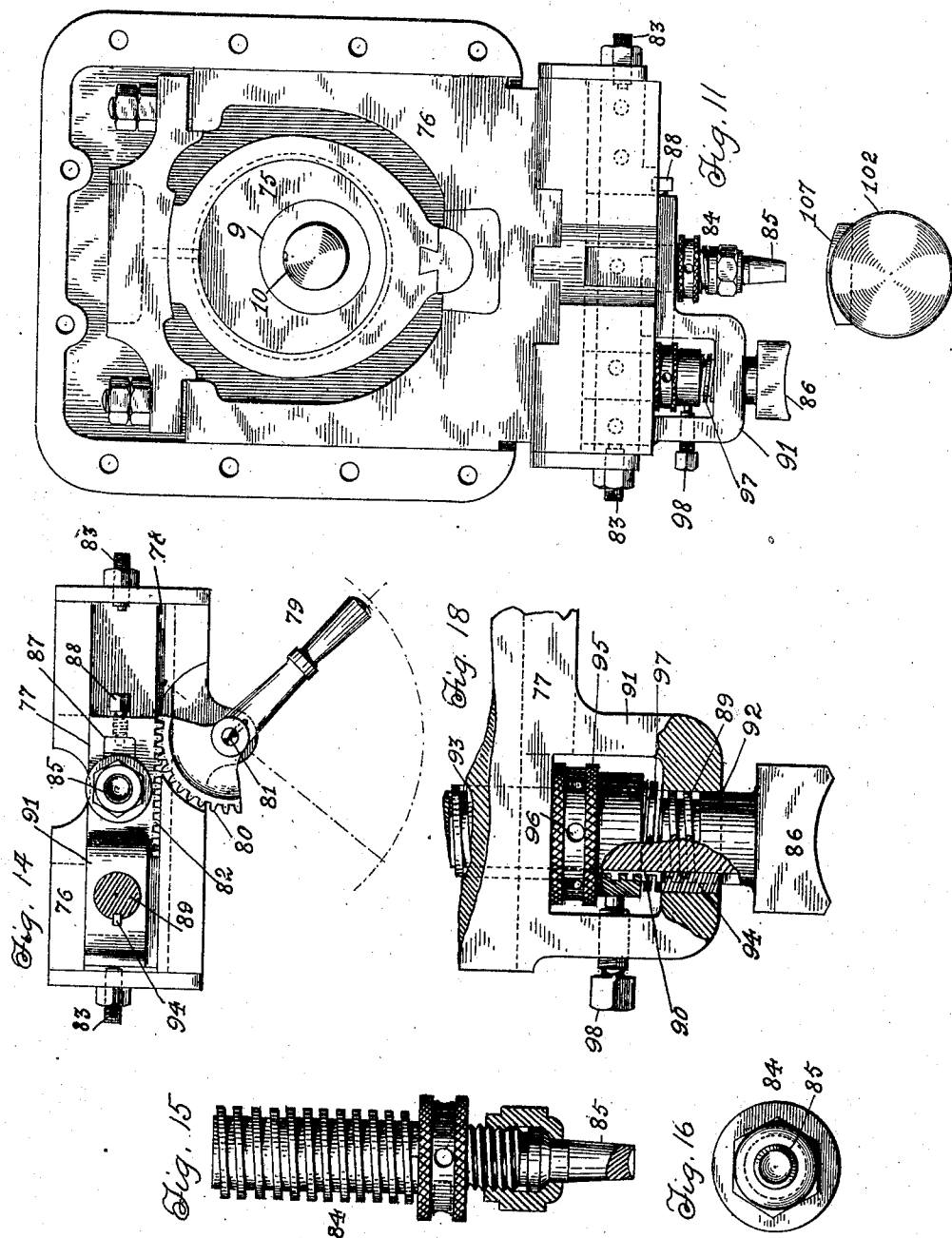
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6 SHEETS—SHEET 5.



Witnesses
Stellvertende.
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Fig. 17

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UNITED STATES PATENT OFFICE.

JAMES A. TALBOT AND HENRY E. BRETT, OF LOS ANGELES, CALIFORNIA.

COMBINED PUNCHING AND RIVETING MACHINE.

980,450.

Specification of Letters Patent.

Patented Jan. 3, 1911.

Application filed March 10, 1909. Serial No. 482,413.

To all whom it may concern:

Be it known that we, JAMES A. TALBOT and HENRY E. BRETT, citizens of the United States, residing at Los Angeles, in the county of Los Angeles, State of California, have invented a certain new and useful Combined Punching and Riveting Machine; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a combined punching and riveting machine, one by which a multiplicity of operations may be performed upon work, without the removal from the machine of tools or appliances, and the substitution of other tools or appliances, or the removal of the work from the machine.

An object of the invention is to provide a machine of this character in which a plurality of tool operating mechanisms can, at the will of the operator, be severally actuated to perform a variety of operations.

Another object is to enable a single tool operating mechanism to be utilized to carry and separately operate a plurality of tools.

A further object is to construct said operating mechanisms so that the operating points of the various tools are close together. Thus the work will have to be moved a minimum distance where the different operations are performed upon the same part thereof.

A yet further object is—in a machine of this class—to utilize a single clutch wheel to actuate a plurality of tool operating mechanisms.

Still another object is to provide improved means whereby the material operated on may, at the will of the operator, be normally held from contact with the die, or not.

Other objects and advantages of the invention will be apparent, to those skilled in the art, from a consideration of the following description of one form in which the invention may be embodied, taken in connection with the accompanying drawings, in which—

Figure 1 is a perspective giving a general view of the machine; Fig. 2 is a section taken on line 2—2 of Fig. 4; Fig. 3 is a rear elevation of the clutch wheel partly broken away; Fig. 4 is a section on line 4—4 of Fig.

3; Fig. 5 is a plan of one of the clutch cams; Fig. 6 is an enlarged section through one of the clutch pin sleeves; Fig. 7 is an enlarged end elevation of one of the clutch pins, its sleeve and the safety latch; Fig. 8 is a detail of one end of the clutch pins; Fig. 9 is a central vertical section through the head of the machine; Fig. 10 is a front elevation of the same with the front plate removed; Fig. 11 is a similar view, the front crosshead also being removed; Fig. 12 is a perspective of the front crosshead viewed from the rear; Fig. 13 is a perspective of the rear crosshead viewed from the front; Fig. 14 is a bottom view of the rear crosshead; Fig. 15 is a detail partly in section of one of the tool holders; Fig. 16 is a bottom view of the same; Fig. 17 is an elevation of one of the tools; Fig. 18 is an elevation partly in section of another of the tool holders, and Fig. 19 is a similar view of the work-supporting mechanism.

In this particular instance, the invention is shown as incorporated in a stake punch, particularly adapted to punch, rivet and swage the seams of sheet metal pipe. The machine has duplex operating members, one fitted with a punch and the other provided with a rivet set and a swage. The work-support is utilized to hold the inside of the pipe off of the die at the beginning of the operation of heading the rivets, so that the latter can be inserted from the outside of the pipe and be headed on the inside of the pipe.

Referring to Fig. 1, the main frame 2 of the machine has a base plate 3 from which rises a standard 4, carrying on its upper end a horizontal part 5, the front end of which supports the head 6. Part 5 has therein, at its front and rear ends respectively, bearings 7 and 8 for hollow shaft 9. Within shaft 9 is shaft 10, its rear end supported by out-bearings 11 on bracket 12, bolted to standard 4. On shaft 10, between bearings 8 and 11, is loosely mounted a clutch wheel 13, which is of sufficient weight to act as a flywheel and the circumference of which is adapted to receive a driving belt, whereby the machine may be connected to any suitable source of power (not shown).

Referring now to Figs. 2 to 8: At the front side of clutch wheel 13 is located clutch collar 14, rigidly attached to shaft 9; and at the rear side of the clutch wheel is

clutch collar 15, similarly attached to shaft 10. These collars, and consequently the shafts 9 and 10, may be operatively connected with the clutch wheel 13 by clutch mechanisms 16 and 17 on the depression of pedals 18 and 19 respectively. Clutch collars 14 and 15 have, in their sides next the clutch wheel, recesses 20, the wall at one end of which may, if desired, receive a wear-resisting piece of hard material. The hub of clutch wheel 13 has therein holes in which are pressed sleeves 21 (Figs. 3 and 4). Each sleeve has at one end an internal shoulder 22 (Fig. 6), and near its middle part a feather 23. As will be seen from Figs. 3 and 4, the open ends of two of the sleeves are toward clutch collar 14 and those of the other two toward clutch collar 15. A clutch pin 24 having a key way 25 and a hole 26 fits slidably in sleeve 21, being pressed outwardly by a spring 27 interposed between its end and shoulder 22. A latch case 28 is let into an extension of the clutch wheel hub, and therein slides safety latch 29, one end of which is normally held in hole 26 of pin 24 by spring 30. Safety latch 29 has a lug 31 which stands out from the face of the clutch wheel and is engaged by clutch cam 32. Clutch cam 32, pertaining to mechanism 16, is slidably mounted in guides 33 on the rear of the main frame 2 of the machine, while that pertaining to mechanism 17 is mounted in guides 33 on bracket 12. Each cam has a surface 34, in form a segment of a helix, which, when the cam is in its upper position, engages the end of any one of pins 24, which may be out, and pushes it inwardly against the pressure of spring 27. That part of the cam designated by numeral 35, in the lower position of the cam, engages and depresses lug 31 against the pressure of spring 30, withdrawing latch 29 from hole 26 and allowing pin 24 to be projected into one of recesses 20. Thus it will be seen that a downward movement of cams 32 connects the clutch wheel 13 with the clutch collar pertaining to that mechanism of which the cam forms a part, and when the cams are in their upper position the clutch wheel is disconnected and turns freely on the shaft 10. Cams 32 are connected by links 36 with levers 37 fulcrumed on brackets 38, which are bolted to the frame, in the case of mechanism 16, or to bracket 12, in the case of mechanism 17, below guides 33. To levers 37 are connected rods 39 upwardly pressed by springs 40, the lower ends of which rest on brackets 41 bolted to frame 2 and bracket 12, as shown in Fig. 1.

The base 3 of the machine carries a bracket 42 (Fig. 4) in which the rear end of a shaft 43 is journaled. The front end of shaft 43 is carried by bracket 44, formed on work-support frame 45. To shaft 43, at its rear end, is attached a lever 46 (Figs. 1 and

4), the end of which is connected to rod 39 pertaining to mechanism 17. At its front end shaft 43 has attached thereto pedal 19. Upon shaft 43 is a tubular shaft 47, to the rear end of which is affixed lever 48, connected to rod 39 pertaining to mechanism 16. The front end of shaft 47 is rigidly connected to pedal 18.

The clutch mechanism above described is the subject of a divisional application filed July 27, 1909, Serial No. 509,901.

In a groove in each of clutch collars 14 and 15 a brake band 49 rests, is tightened by bolts 50 and is kept from rotating by lugs 51, which enter pockets 52 provided in the stationary part of the machine.

The tool operating mechanisms 53 and 54 are located in head 6 (Figs. 9 to 15). Mechanism 53 comprises an eccentric 55 rigidly attached to shaft 10, having eccentric strap 56, the lower end of which, provided with a shoe 57, substantially semi-cylindrical in form and preferably made of wear-resisting material, rests in a step 58, of suitable shape and material, inserted in crosshead 59. The top of eccentric strap 56 is shaped as part of a cylinder, concentric with shoe 57. The top 60 of the crosshead is adjustably attached thereto by studs 61 having thereon nuts 62 and lock nuts 63. The lower surface of the top 60 is shaped to fit the top of eccentric strap 56. The opening in the crosshead is large enough to allow the eccentric strap to oscillate from side to side as eccentric 55 revolves. At the lower part of the crosshead 59 the rear portion is cut away except a semi-cylindrical boss 64, as shown in Fig. 12. Tool socket 65 is attached to the lower face of crosshead 59 by studs 66 and nuts 67, and has a threaded hole in which tool holder 68 fits. Tool socket 65 has lugs 69 (Fig. 9) which may be drawn toward each other in order to lock tool holder 68 from turning. Tool holder 68 is provided with a collar 71, knurled on its circumference, and provided with capstan holes 72. By means of nut 73 a punch 74 may be secured to tool holder 68.

Mechanism 54 comprises an eccentric 75 affixed to the front end of tubular shaft 9, an eccentric strap similar to strap 56, and a crosshead 76 located at the rear of crosshead 57. Crosshead 76 has a top similar to that of crosshead 57. Crosshead 76 has a transverse opening 77^a in its lower part (see Fig. 13), the material forming the front wall whereof occupying the space at each side of boss 64. A slide 77 is held in opening 77^a by gib 78. By means of handle 79, toothed sector 80 pivotally mounted on stud 81 and rack 82, affixed to slide 77, it may be moved in a direction at right angles to shaft 10. The motion is arrested at either end by set screws 83, so that tool holder 84, similar to tool holder 68, carrying rivet set

85, or swage 86, may be brought into position as required. Tool holder 84 has a shank threaded in a hole in slide 77 and may be locked from turning by means of locking block 87 operated by set screw 88. Swage 86 has a threaded shank 89 provided with a spline way 90. Slide 77 is provided with a stirrup 91 through which is a hole 92, in alignment with a hole 93 in the main part of the slide. Hole 92 is provided with a feather 94 which enters spline way 90. A knurled collar 95 provided with capstan holes 96 is threaded upon shank 89, is held up against the bottom of slide 77 by spring 97, and is held from turning by set screw 98. As will be seen from the drawings, the cross-heads fit closely within head 6, being held therein by front plate 99. A capstan 100 is keyed to the front end of shaft 10 so that the latter may be slowly turned for adjusting the mechanism, and clutch collar 14 is provided with holes 101 for the same purpose.

Standard 4 has a hole passing through it from front to rear (Figs. 1 and 2), in which a stake 102 is held by key 103 and set screws 104. Near its forward end stake 102 carries punching die 105 and set plate 107, which may have a cup-shaped depression therein to form the rivet heads. Where stake 102 is attached to standard 4, the latter is protected by a wear plate 108 (Fig. 1), held in position by pin 109 passing through stud 110.

The work support 111 is shown in Figs. 1 and 19. Frame 45 has a vertical tubular extension 112 provided with a feather 113 which passes through a slot in a sleeve 114, slidable in said extension 112, and enters a spline way 115 in a stem 116 slidable in the sleeve. A collar 117 is screwed upon the top of sleeve 114 and upon it rests collar 118 secured to stem 116. Collar 118 may be placed wherever desired on stem 116, and the height of the stem precisely adjusted by turning collar 117. A lever 121 provided with a counterweight 122 is fulcrumed in frame 45 and has lugs 123 on each side of an opening in the lever, through which stem 116 passes. The lower end of sleeve 114 rests on lugs 123, so that when counterweight 122 is allowed to descend, stem 116 is raised. A pedal 124 is formed on the end of lever 121, by the depression of which stem 116 may be lowered. A short shaft 125 is journaled in brackets 126, formed on frame 45, and has affixed to it trip cam 127 and lever 128. In the position of the parts in Figs. 1 and 19, the lever 121 is free to raise stem 116, but the operator may simultaneously depress pedal 124 and the point 129 of cam 127, whereupon the cam will rotate and hold down that end of the lever 121 to which the pedal is attached. At the same time the upper end of lever 128 moves toward pedal 124 and its weight retains the cam in position.

By pushing back the upper end of lever 128, lever 121 may be released. To the upper end of stem 116 is attached a cross piece 130, supporting at its ends rollers 131.

The mode of operation of the machine just described, may be as follows: The work support 111 being held in its lower position by means of cam 127, as already described, a piece of sheet metal of the required shape and dimensions, rolled into a cylindrical or frusto-conical form, is placed on stake 102 with the overlapping edges uppermost. Pedal 19 may then be depressed, causing punch 74 to descend, perforate the material and return to its position, the clutch pins 24 being pushed back within their sleeves by clutch cam 32 upon release of the pedal and the mechanisms brought to rest by brake band 49. When it is desired to head rivets, the upper end of lever 128 is moved toward counterweight 122, releasing lever 121 and allowing the work support 111 to rise. Rivets are inserted in the holes already formed and brought under set 85. Pedal 18 may now be depressed, operating clutch mechanism 16, which causes set 85 to descend and push the rivet and the work downward upon set plate 107 and head the rivet. The circumferential seams are similarly formed, the lengths of pipe being put upon the stake and driven together against collar 108. By means of handle 79 slide 77 may be moved to bring swage 86 over set plate 107, and the edges of the material pressed together by mechanism 54 upon the depression of pedal 18.

It is to be understood that in the name given to this invention and throughout the description and claims, the term "punching" is to be taken in a broad sense, as applying to all operations where material is perforated, cut or shaped by machines of this class under pressure. Likewise the terms "punch", "rivet set", "swage", "die", and "set plate", are to be construed broadly as applying to any tool which may be used in any of these operations.

One form of apparatus in which the invention may be embodied has been illustrated and described. It is, however, obvious that various modifications and changes may be made, and the right is reserved to all such as do not depart from the spirit and scope of the invention.

We claim:

1. The combination of a frame, with a head thereon, tool operating mechanisms in said head, operating shafts one within the other connected singly to said mechanisms, and means to independently drive either of said shafts at will.

2. The combination of a frame, with a single head thereon, juxtaposed tool operating mechanisms in said head, operating shafts one within the other connected singly

to each of the mechanisms, a wheel, and clutch mechanism to operatively connect any of said shafts with said wheel.

3. The combination in a work support, of
5 a frame, a stem having a crosspiece attached thereto, a lever mounted on said frame and yieldingly supporting said stem, a sleeve slidable in said frame, and means, including
10 a collar on said sleeve, for adjusting the height of said stem.

4. In a combined punching and riveting machine, in combination, a cross-head, a tool-carrying member on said crosshead capable of movement relative thereto and
15 provided with a rack, a handle and a pivotally mounted toothed sector in mesh with said rack for moving the member, and means for limiting movement of the member.

5. The combination of a lever having a
20 foot-pedal thereon, with a cam adjacent to the foot-pedal and operable by foot simultaneously with said lever to hold said lever in depressed position, and means to trip said cam to release said lever.

25 6. The combination of a lever having a foot-pedal thereon, a shaft mounted to journal adjacent to said foot-pedal, a cam on said shaft operable by foot simultaneously with said lever to hold said lever in depressed position, and a lever on said shaft to
30 trip said cam to hold it in tripped position, substantially as described.

7. In a combined punching and riveting machine, the combination with a frame, of a
35 head thereon, a bracket at the rear of said frame, tool operating mechanisms in said head, bearings on said frame, a hollow shaft journaled therein, a clutch collar fast on said shaft at its rear end and said shaft connected with one of said tool operating mechanisms, a shaft journaled within said hollow shaft and in bearings on said bracket, said
40 last shaft connected with the other of said tool operating mechanisms and also having a clutch collar fast thereon, a clutch wheel loosely mounted on said last shaft between said clutch collars, and mechanism for connecting said wheel with said collars, at will.
45

8. The combination of a frame, with a
50 head thereon, a plurality of tool operating mechanisms in said head, each of said mechanisms including a crosshead having a step therein, an eccentric strap having a curved

upper part and provided with a semi-cylindrical shoe disposed in said step, an eccentric
55 in said strap, and a top on said crosshead adjustably fitting the curved upper part of the strap, a separate shaft connected to the eccentric of each of the mechanisms, and means whereby any of said shafts may be
60 operated at will.

9. The combination of a frame, with a single head thereon, a plurality of juxtaposed crossheads in said head, a clutch
65 wheel, separate operating shafts connected with the crossheads, one of said shafts within the other and concentric therewith, and means whereby any of said shafts may be operatively connected with the clutch wheel
70 at will.

10. The combination of a frame, with a head thereon, a plurality of tool operating devices in said head, separate shafts connected to said devices, a clutch wheel on one of said shafts, and means independent of
75 each other associated with said clutch wheel to operate any of said shafts at will, and actuating mechanism associated with each of said means, including an operating shaft having a foot pedal thereon, the operating
80 shaft of one of the mechanisms being mounted on the operating shaft of the other of the mechanisms and said foot pedals thereon being positioned near to each other.

11. The combination of a frame, with a
85 head thereon, a plurality of tool operating mechanisms in said head, separate shafts connected to said mechanisms, a driving member on one of said shafts, a driven member on each of said shafts, independent
90 means associated with each of the driven members whereby said driving member may be operatively connected therewith, and independently controlled means for actuating said first means.
95

In testimony whereof, we have signed our names to this specification in the presence of two subscribing witnesses at Los Angeles county of Los Angeles, State of California, this 26th day of February A. D. 1909.

JAMES A. TALBOT.
HENRY E. BRETT.

Witnesses:

FRED W. MORRISON,
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