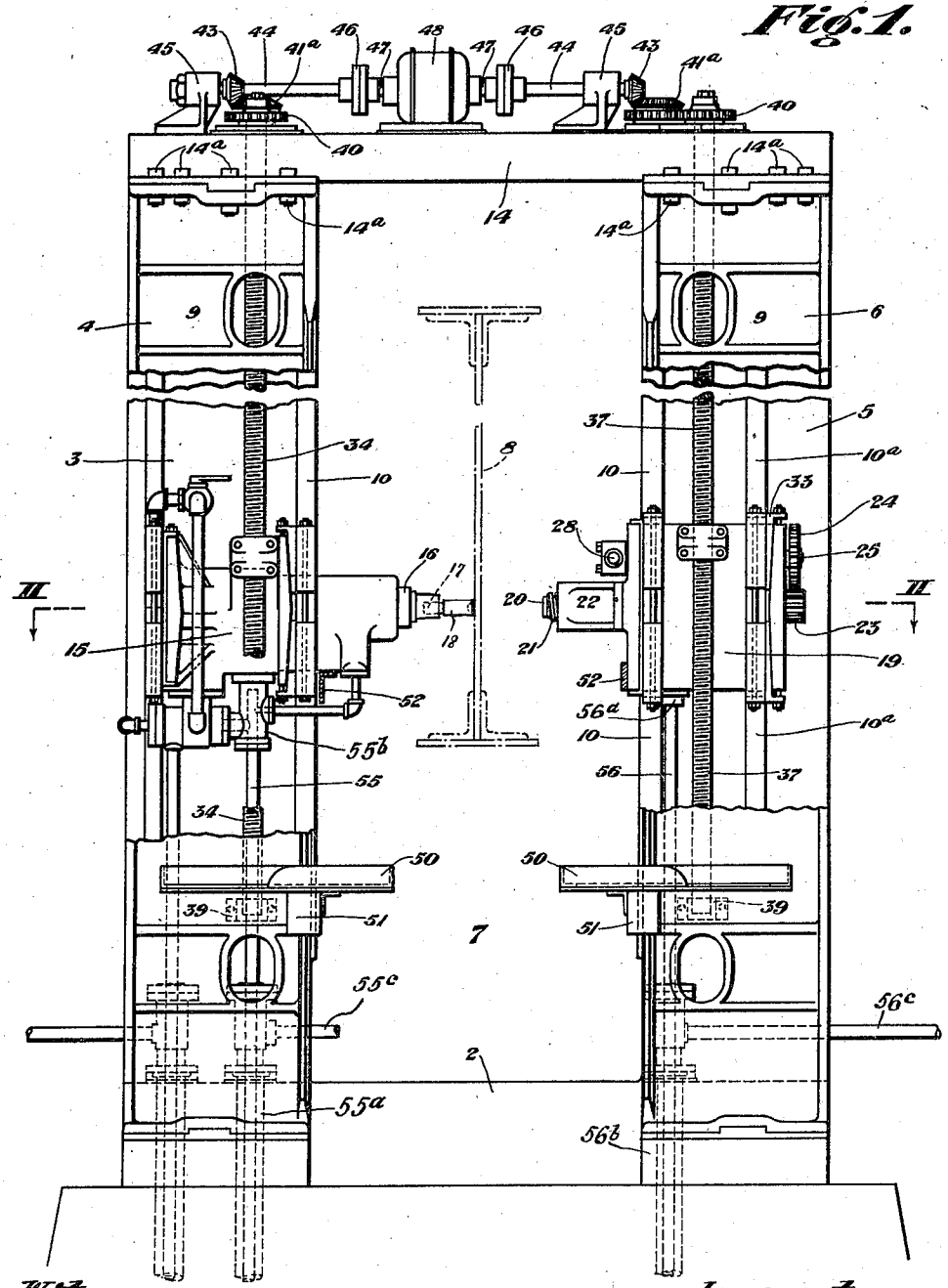
July 24, 1923. 1,463,146

J. L. BERNARD

RIVETER

Filed Dec. 4, 1920 4 Sheets-Sheet 1

Fig. 1.



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RIVETER

Filed Dec. 4, 1920 4 Sheets-Sheet 2

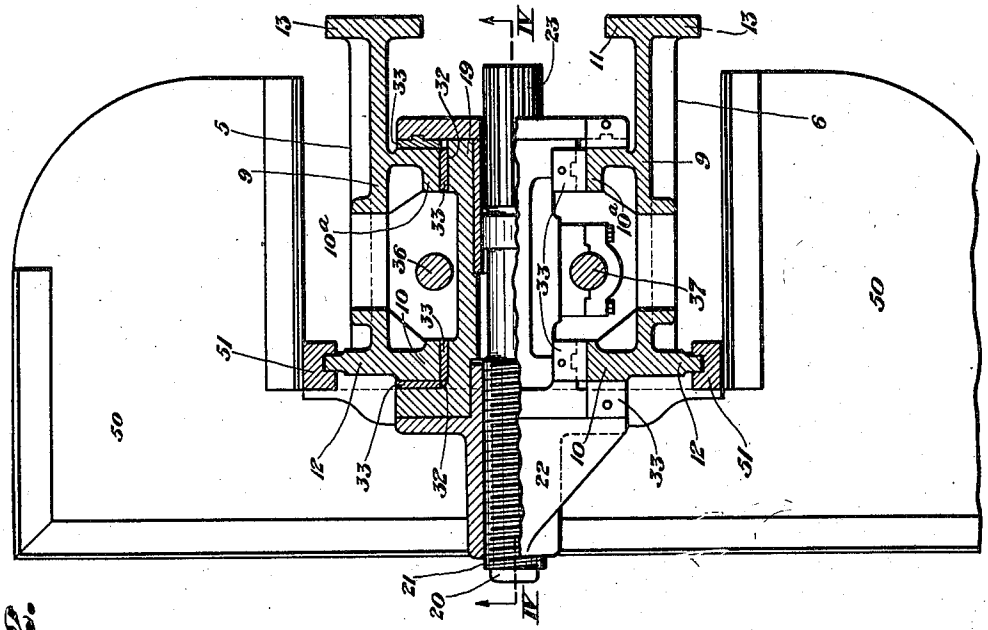
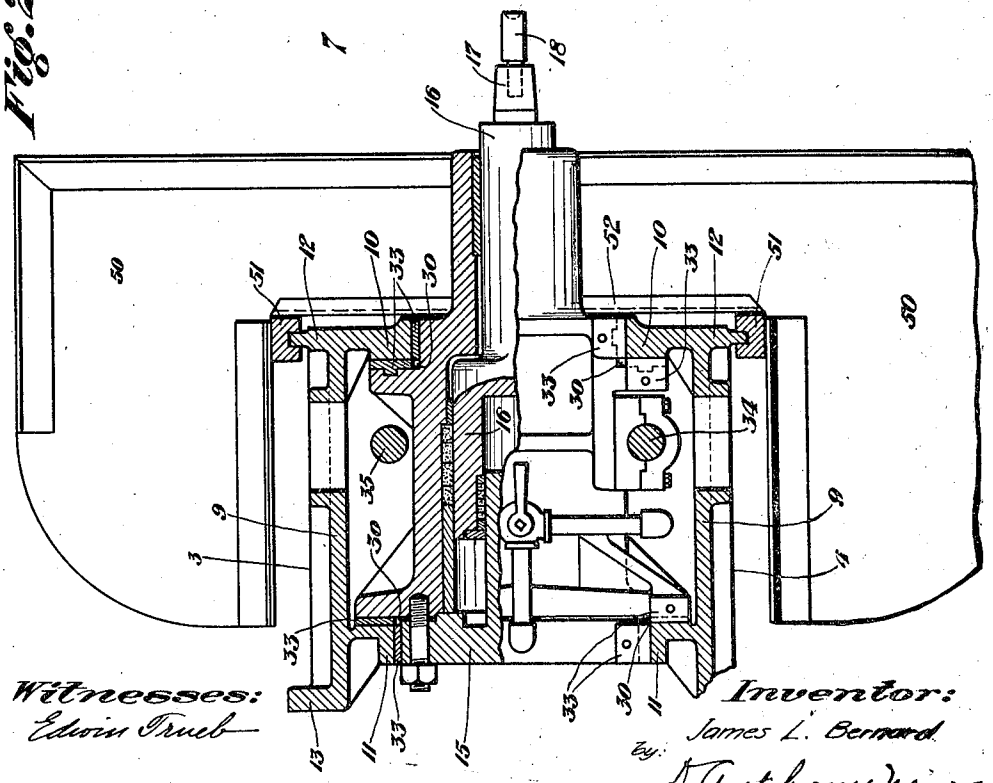


Fig. 2.



Witnesses:
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RIVETER

Filed Dec. 4, 1920 4 Sheets-Sheet 3

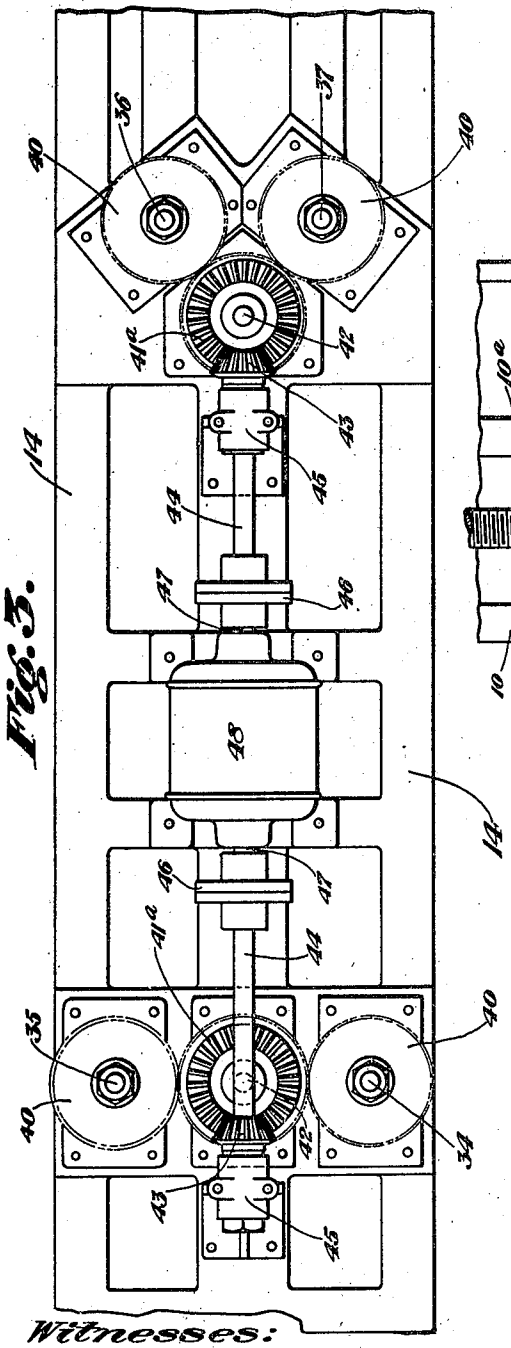


Fig. 3.

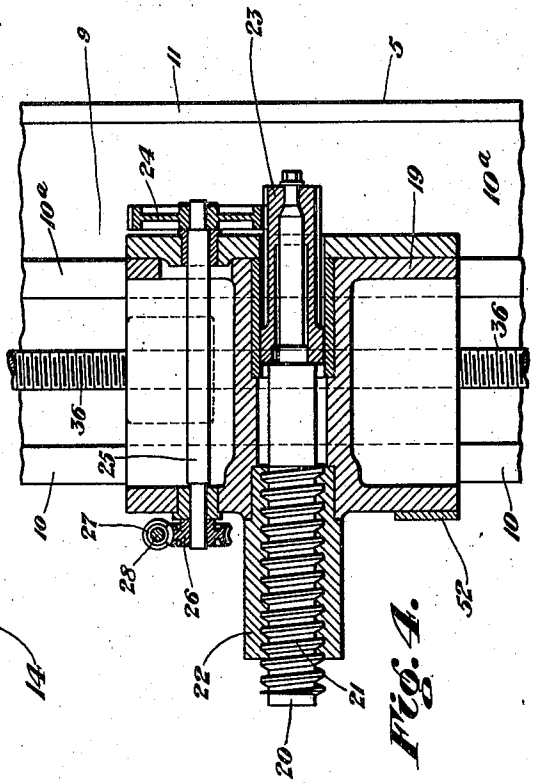


Fig. 4.

Witnesses:
Edwin Trueb

Inventor:
James L. Bernard.
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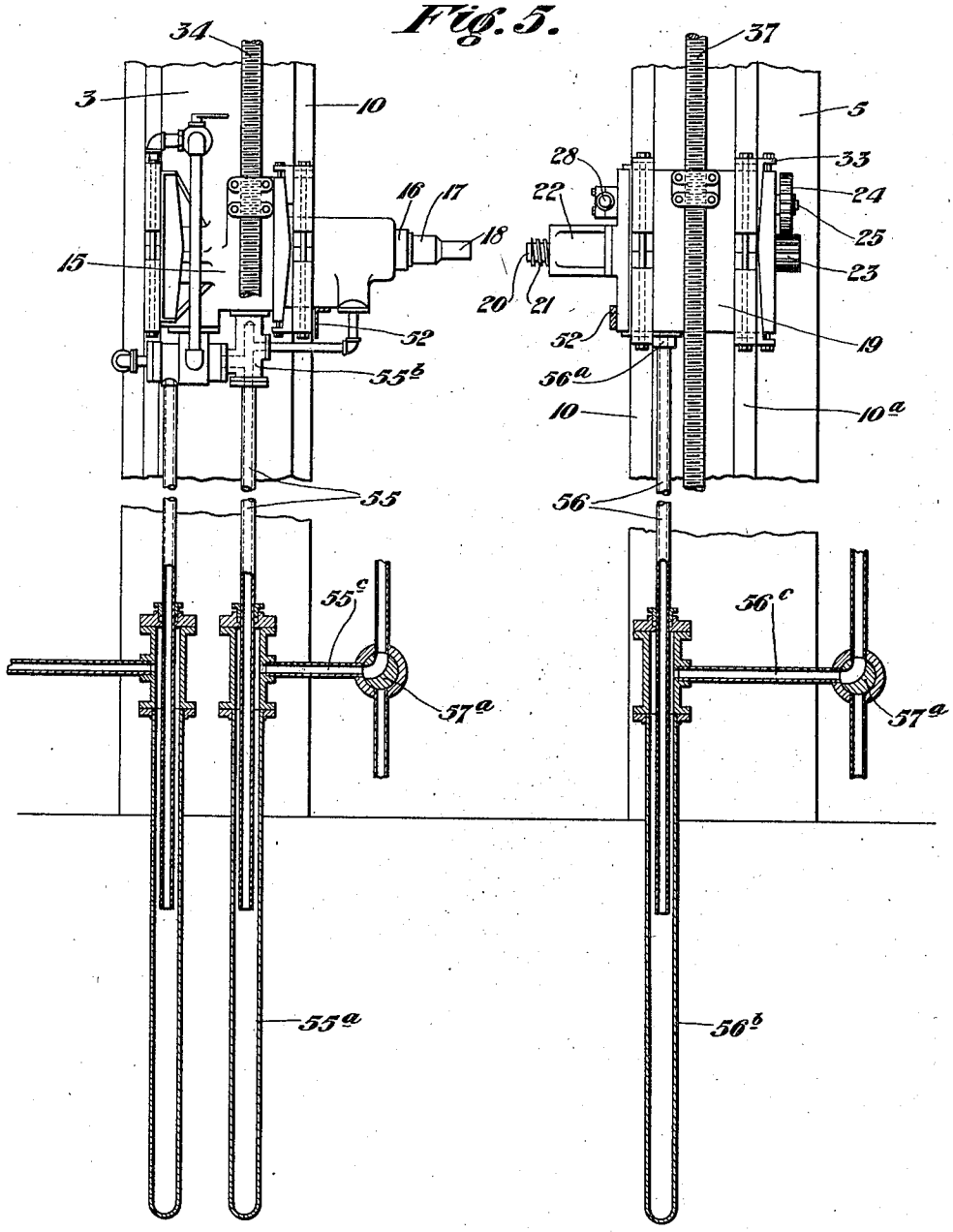
July 24, 1923. 1,463,146

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RIVETER

Filed Dec. 4, 1920 4 Sheets-Sheet 4

Fig. 5.



Witnesses:
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Inventor:
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his Attorney.

Patented July 24, 1923. 1,463,146

UNITED STATES PATENT OFFICE.

JAMES L. BERNARD, OF BEAVER, PENNSYLVANIA.

RIVETER.

Application filed December 4, 1920. Serial No. 428,372.

To all whom it may concern:

Be it known that I, JAMES L. BERNARD, a citizen of the United States, and resident of Beaver, in the county of Beaver and State of Pennsylvania, have invented certain new and useful Improvements in Riveters, of which the following is a specification.

This invention relates to riveters and more particularly to the construction of power riveters used in upsetting one end of the rivets to form a head thereon, in fabricating plate girders and similar structures, bridges, buildings and the like, made of rolled metal plates, beams and other structural metal shapes.

Power riveters as constructed heretofore have an open end and are known as "horseshoe" or "open gap" riveters. The opposite jaws of these riveters form a throat and the power operated rivet snaps are secured in the throat adjacent to the open outer ends of the jaws. Not being fastened or otherwise connected the outer ends of the jaws are free to spring and spread outward so that for heavy work it is not possible to make a riveter of sufficient depth of gap to drive rivets in sections of any great height without making a very cumbersome and costly tool. In riveting pieces of any great height with such apparatus part of the rivets are driven and the girder or other article, being fabricated is then turned up-side down to enable the remainder of the rivets being driven.

With my closed type of stationary riveter any built-up section may be completely riveted with the use of a comparatively light tool and without turning the article being riveted as is necessary with the old open throat or horseshoe type of riveter.

Closed end riveters have been suggested before, but were constructed on a movable and adjustable base so as to move relative to the stationary work. These constructions however, proved unsatisfactory since the movable bases were not solid, and the horizontal thrust due to the riveting had to be absorbed by the moving base elements and then conveyed to a fixed bed. Furthermore these riveters were necessarily made of great width in order to secure the necessary stability.

The present construction of closed riveter has a stationary base, and the work is adapted to be moved relative to the riveter.

The rivet snaps are adapted to be operated by fluid pressure and the riveting and bucking-up cylinders are counterbalanced by the same fluid pressure that operates the snaps.

One object of my invention is to construct a riveter of improved construction having novel means for moving the rivet snaps relative to the jaws into successive rivet driving positions.

Another object is to construct a riveter having improved means for operating the rivet snaps to drive rivets.

Still further objects and advantages of my invention consist in the provision of a riveter having the novel construction and arrangement of parts to be more fully described hereinafter and particularly pointed out in the appended claims.

Referring to the drawings—

Figure 1 is a side elevation of a complete riveter constructed in accordance with my invention.

Figure 2 is a horizontal sectional plan on the line II—II of Figure 1.

Figure 3 is a top plan view.

Figure 4 is a detail sectional view of the bucking-up stake.

Figure 5 is a side elevation, partly in section, of the lower part of the riveter.

Referring particularly to the drawings, the numeral 2 designates the base plate to which columns 3, 4, 5, and 6 are rigidly secured in pairs to form opposite jaws with a throat 7 therebetween in which the girder or other work 8 is positioned and moved during the riveting operations.

The columns 3, 4, 5, and 6 are substantially H-shaped in cross section, comprising a web portion 9, inner flanges 10 and 11, and outer flanges 12 and 13. The columns 5 and 6 are also provided with an additional inner guide flange 10^a.

Secured to the top of the upper ends of the columns or jaw members is a plate or casting 14 which is fastened to the columns by bolts 14^a.

Slidably mounted between the pairs of columns 3 and 4 for vertical adjustment is a double acting hydraulic fluid pressure cylinder 15 having a piston 16 arranged to reciprocate horizontally, the outer end of the piston 16 being provided with a socket 17 adapted to contain an upsetting tool or rivet snap 18.

Slidably mounted between the pairs of columns 5 and 6 for vertical adjustment is a "bucking-up" stake 19 having a bucking-up tool member 20. The member 20 has a screw thread 21 formed thereon which is in engagement with an internally threaded stationary sleeve member 22. The member 20 is adapted to be fed inward or outward by the action of the thread when it is rotated by means of a long open faced pinion gear 23 mounted on its rear end. The gear is in mesh with a pinion gear 24 on shaft 25 which is journaled in and passes through the bucking-up stake 19 and has a worm gear 26 on its forward end in mesh with a worm wheel 27 on power shaft 28.

The bucking-up tool 20 is adapted to hold a "dolly" (not shown) against the head of the rivet being riveted, the dolly being adapted to extend past any flanges or ribs on the piece being riveted and making it unnecessary to make large adjustments of the tool 20.

The fluid pressure cylinder 15 is provided with right-angled guide grooves 30 arranged vertically at each corner and adapted to abut the inner flanges 10 and 11 to take up any wear that may be occasioned by the constant adjusting of the cylinder.

The bucking-up stake 19 has right-angled guide portions 32 at each corner adapted to engage the outer faces and inner edges of the guide flanges 10 and 10^a of the columns 5 and 6. Suitable adjustable gibs 33 are arranged between the faces of the portions 32 and flanges 10 and 10^a to take up wear.

As has been said, the hydraulic cylinder 15 and its associated parts, and the bucking-up stake 19 and its associated parts are vertically adjustable or movable between their respective columns 3 and 4 and 5 and 6. The vertical adjustment is accomplished by means of two pairs of screw threaded adjusting shafts 34, 35, and 36, 37 for the cylinder 15 and bucking-up stake 19 respectively.

The shafts 34—35 pass through and are in threaded engagement with the cylinder 15, and the shafts 36—37 pass through and are in screw threaded engagement with the bucking-up stake 19 and each shaft has its lower end journaled in a bearing socket 39 on the bottom plate 2 and its upper end extending through and journaled in the top plate 14.

Each of the shafts 34, 35, 36 and 37 has its upper end squared and carries a gear 40, the gears 40 of each pair of shafts 34—35, and 36—37 being in mesh with a central double face gear 41^a journaled on a stub shaft 42 and being in mesh with a beveled pinion 43 mounted on a power driven shaft 44 having its outer end mounted in a bearing 45. The inner end of each of the shafts 44 is coupled by coupling members 46 to the motor armature shaft 47 of reversible motor 48, so that when the motor is operated both pairs of shafts 34—35 and 36—37 will be positively and simultaneously driven, in whichever direction desired, and thus either lift or lower the cylinder 15 and bucking-up stake 19 accordingly.

The hydraulic cylinder 15 and the bucking-up stake 19 are each provided with a platform 50 adapted to support the operators. The platforms 50 are each mounted on suitable guides 51 which slidably engage the outer flange 12 of the girder columns, making up the respective jaws of the device, and said guides are suspended from the hydraulic cylinder 15 and bucking-up stake 19, respectively, by cross bars 52, thereby causing said platforms to move vertically with the hydraulic cylinder 15 and bucking-up stake 19.

Water or other fluid is supplied to the cylinder 15 through a pipe 55 which has its lower end telescopically mounted within a pipe 55^a and has its upper end screwed into an inlet member 55^b carried by the cylinder 15. A second pipe 56 has its upper end screwed into a cap member 56^a mounted on the bottom face of the bucking-up stake 19, and has its lower end telescopically mounted within a pipe 56^b. The pipes 55^a and 56^b have their lower ends closed and are provided with inlet pipes 55^c and 56^c, respectively, each of which is connected to supply and exhaust pipes by a three way valve 57^a. The pipes 55 and 56 act as plungers within the cylinder like pipes 55^a and 56^b, and form a fluid pressure or hydraulic counterbalance for the cylinder 15 and attached parts, and the bucking-up stake 19 and attached parts, respectively. Therefore, the outside diameters of said pipes 55 and 56 are such that the water or other fluid pressure on the area of their respective ends will, as closely as possible, balance the weight of the cylinder 15, the platform 50 carried thereby and the operators on said platform, and the bucking-up stake 19, the platform carried thereby, and the operators on said platform, respectively. The operation of the fluid pressure as a counterbalance is similar to the operation of a plunger elevator. It will be understood that while I have described a pipe 56 as connected to the bucking-up stake, this member can be a solid rod, if desired, since its sole function is that of a plunger, while the pipe 55 serves as a conduit to supply fluid to the cylinder 15.

In operation, a girder or other device to

be riveted will be assembled and one end thereof supported on a buggy, while the other end will be supported on a traveling crane, which will move the girder into place between the jaws.

After the article to be riveted is in place, the motor 48 will be started to rotate the screws 34—35 and 36—37, thereby raising or lowering the cylinder 15 and bucking-up stake 19 to its proper position. A suitable dolly is then inserted in the bucking-up tool 20 and said tool and dolly are then adjusted against the head of a rivet.

After the bucking-up tool and dolly are positioned against the head of the rivet, the fluid is admitted to the cylinder 15, and the plunger 16 and upsetting tool are forced against the rivet shank to upset the same.

While I have shown and described one particular form of my invention, it will be understood that I do not wish to be limited to the specific construction shown, since it is only illustrative, and various modifications may be made without departing from the spirit and scope of my invention as defined in the appended claims.

I claim:—

1. A power riveter comprising a fixed frame having opposite spaced jaws closed at their bottom and top, forming a closed throat therebetween, a vertically adjustable hydraulic cylinder mounted in one of said jaws, an upsetting tool carried by said cylinder, a vertically adjustable bucking-up stake mounted in the other of said jaws, means for adjusting said cylinder and said bucking-up stake vertically, and fluid pressure means for counterbalancing the weight of said cylinder and bucking-up stake.

2. A power riveter comprising a fixed frame having opposite spaced jaws closed at their bottom and top, forming a closed throat therebetween, a vertically adjustable hydraulic cylinder mounted in one of said jaws, an upsetting tool carried by said cylinder, a vertically adjustable bucking-up stake mounted in the other of said jaws, a platform slidably connected with each of said jaws, one of said platforms being suspended from said hydraulic cylinder, and the other of said platforms being suspended from said bucking-up stake, means for simultaneously adjusting said cylinder and said bucking-up stake and their suspended platforms vertically, and means for counterbalancing the weight of said cylinder and said bucking-up stake and the platforms suspended therefrom.

3. A power riveter comprising a fixed frame having opposite spaced jaws closed at their bottom and top, forming a closed throat therebetween, a vertically adjustable hydraulic cylinder mounted in one of said jaws, an upsetting tool carried by said cylinder, a vertically adjustable bucking-up stake mounted in the other of said jaws, a platform slidably connected with each of said jaws, one of said platforms being suspended from said hydraulic cylinder, and the other of said platforms being suspended from said bucking-up stake, means for simultaneously adjusting said cylinder and said bucking-up stake and their suspended platforms vertically, and fluid pressure means for counterbalancing the weight of said cylinder and said bucking-up stake and the platforms suspended therefrom.

4. A power riveter comprising a fixed frame having opposite spaced jaws closed at their top and bottom, forming a closed throat therebetween, a vertically adjustable hydraulic cylinder mounted in one of said jaws, a vertically adjustable bucking-up stake mounted in the other of said jaws, a platform slidably connected with each of said jaws, one of said platforms being suspended from said cylinder and the other of said platforms being suspended from said bucking-up stake, means for vertically adjusting said cylinder and said bucking-up stake and their suspended platforms, a pipe of relatively small diameter having its upper end connected to said hydraulic cylinder to supply fluid for operating the same and having its lower end telescopically mounted within a pipe of relatively large diameter having a closed lower end and having a fluid supply pipe communicating therewith, a second pipe of relatively small diameter having its upper end screw threaded into a cap on the bottom face of said bucking-up stake and having its lower end telescopically mounted within a pipe of relatively large diameter having a closed lower end and having a fluid supply pipe communicating therewith, said first and second named relatively small diameter pipes being adapted to act as plungers within said larger pipes and to respectively, counterbalance the weight of said cylinder and its suspended platform and said bucking-up stake and its suspended platform.

5. A power riveter comprising a fixed frame having opposite spaced jaws closed at their top and bottom, forming a closed throat therebetween, a vertically adjustable hyraulic cylinder mounted in one of said jaws, a vertically adjustable bucking-up stake mounted in the other of said jaws, a platform slidably connected with each of said jaws, power screws for simultaneously adjusting said cylinder and said bucking-up stake vertically, a pipe of relatively small diameter having its upper end connected to said hydraulic cylinder to supply fluid for operating the same and having its lower end telescopically mounted within a pipe of relatively large diameter, a second pipe of rela-

tively small diameter having its upper end screw threaded into a cap on the bottom face of said bucking-up stake and having its lower end telescopically mounted within a pipe of relatively large diameter, said first and second named relatively small diameter pipes being adapted to act as plungers within said larger pipes and to, respectively, counterbalance the weight of said cylinder and its suspended platform and said bucking-up stake and its suspended platform.

In testimony whereof I have hereunto signed my name.

JAMES L. BERNARD.