

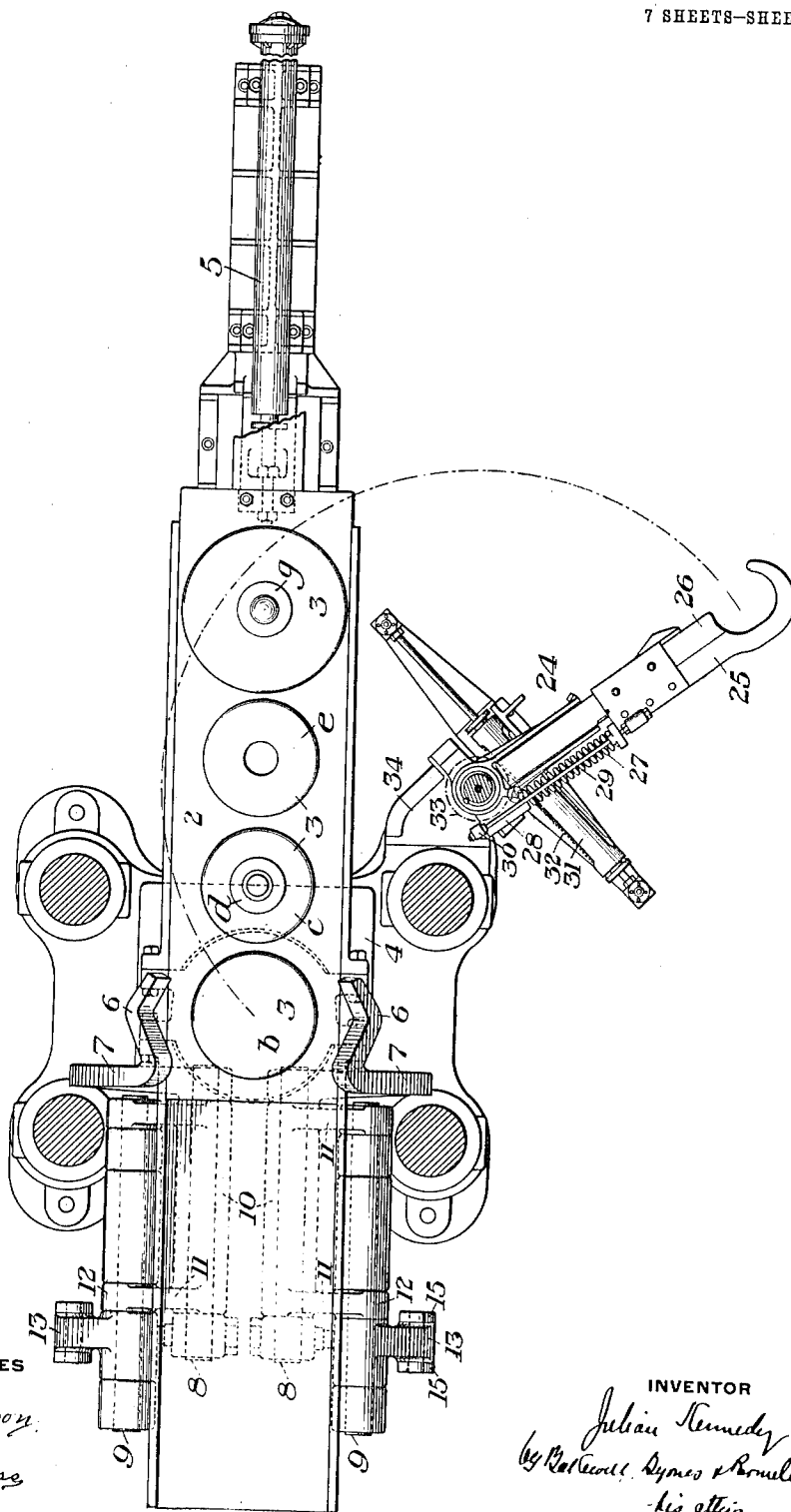
J. KENNEDY.  
METAL MANIPULATOR.  
APPLICATION FILED NOV. 16, 1911.

1,073,607.

Patented Sept. 23, 1913.

7 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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7 SHEETS—SHEET 2.

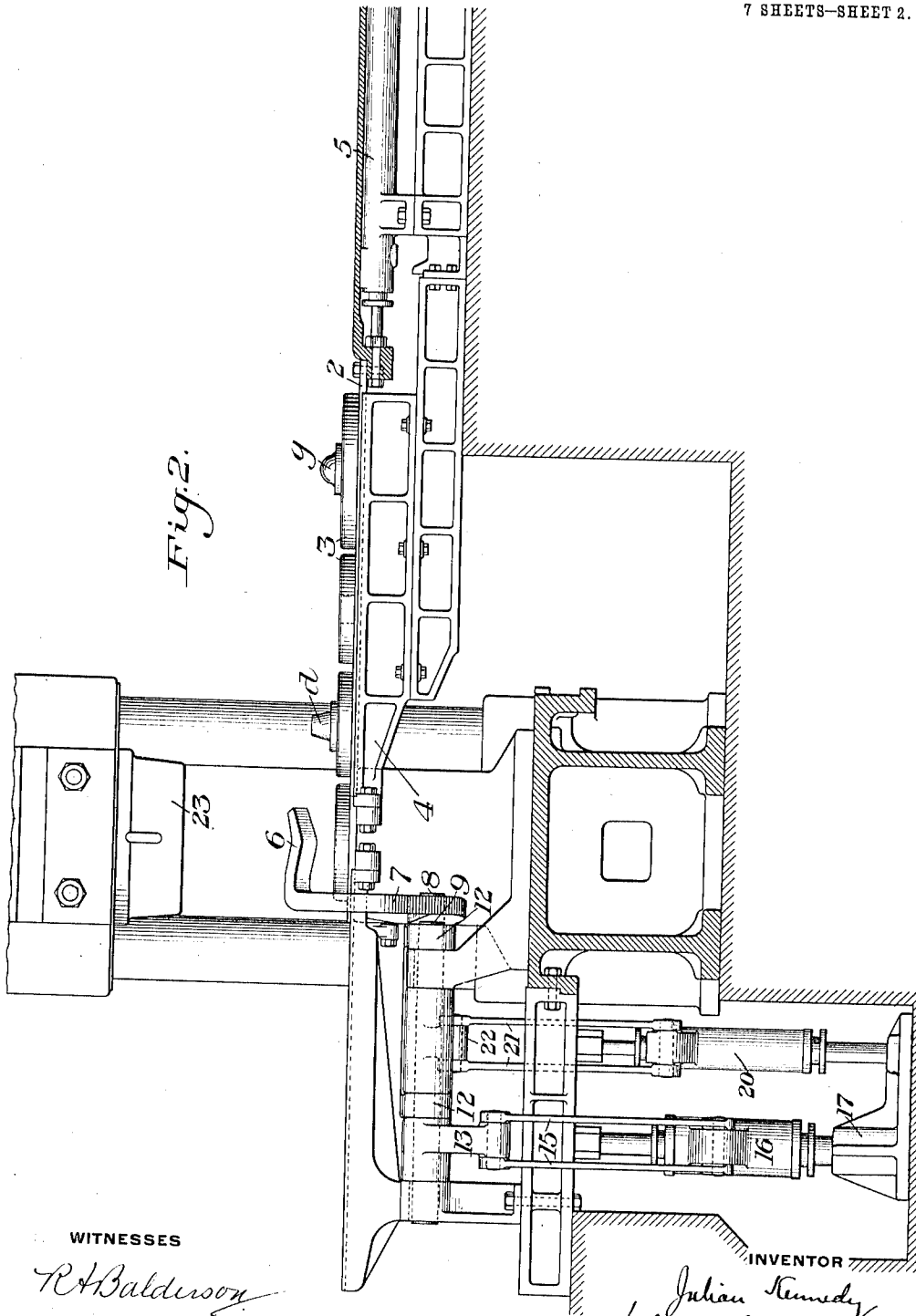


Fig. 2.

WITNESSES

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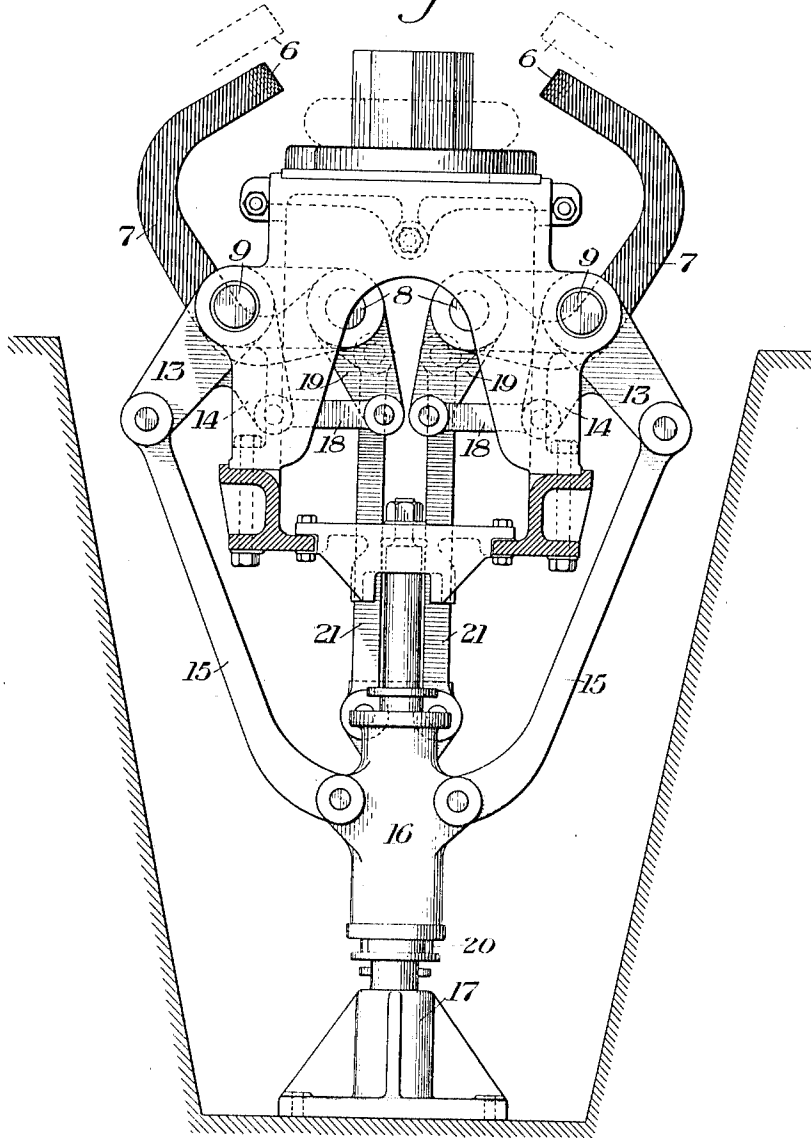
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7 SHEETS—SHEET 3.

*Fig. 3.*



WITNESSES

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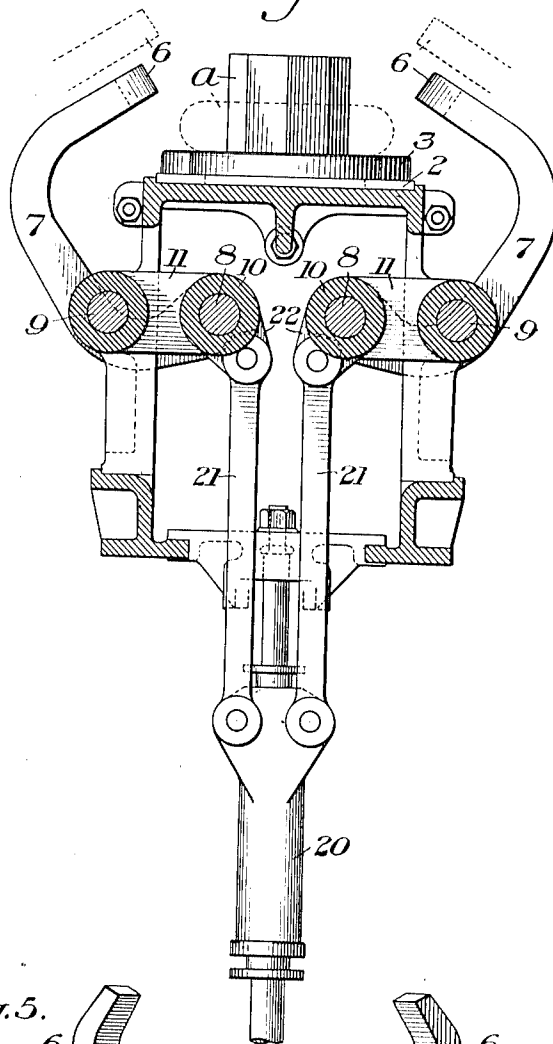
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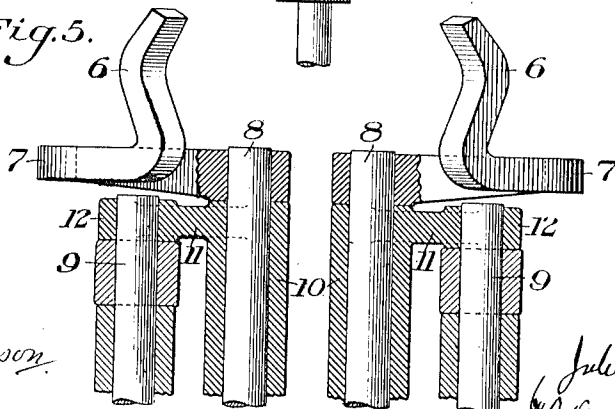
Patented Sept. 23, 1913.

7 SHEETS—SHEET 4.

*Fig. 4.*



*Fig. 5.*



WITNESSES

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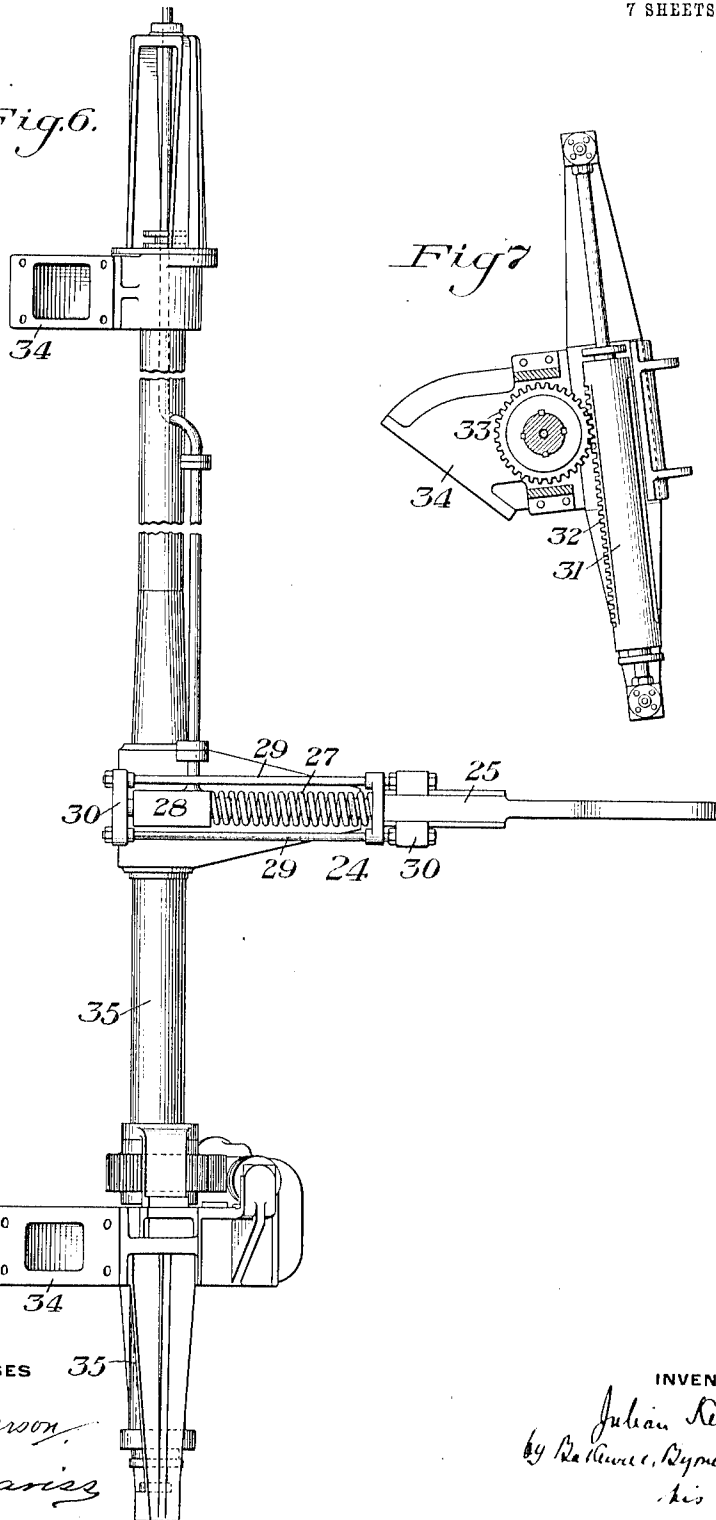
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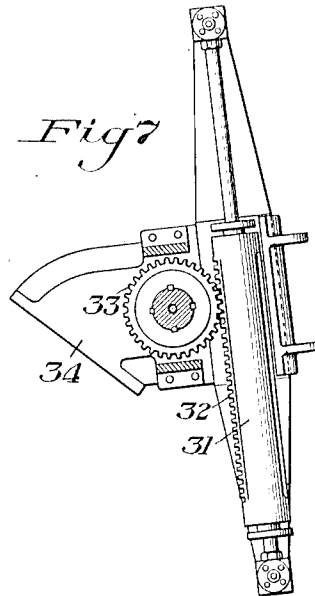
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7 SHEETS—SHEET 5.

*Fig. 6.*



*Fig. 7.*



WITNESSES

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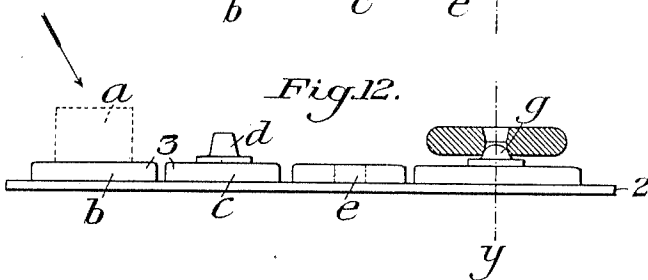
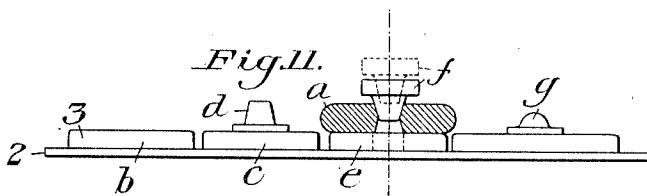
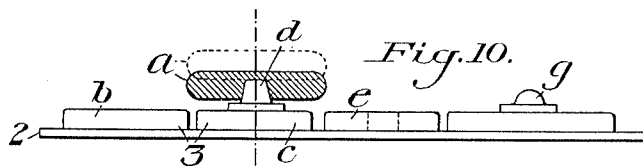
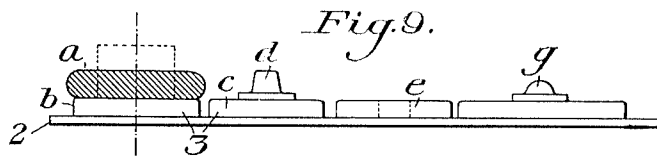
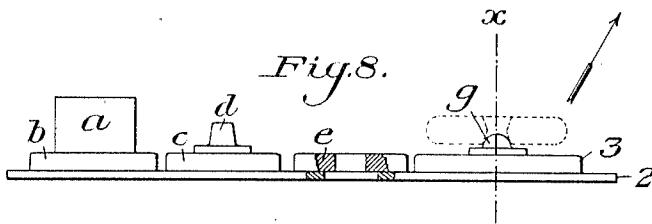
*Julian Kennedy*  
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7 SHEETS—SHEET 6.



WITNESSES

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7 SHEETS-SHEET 7.

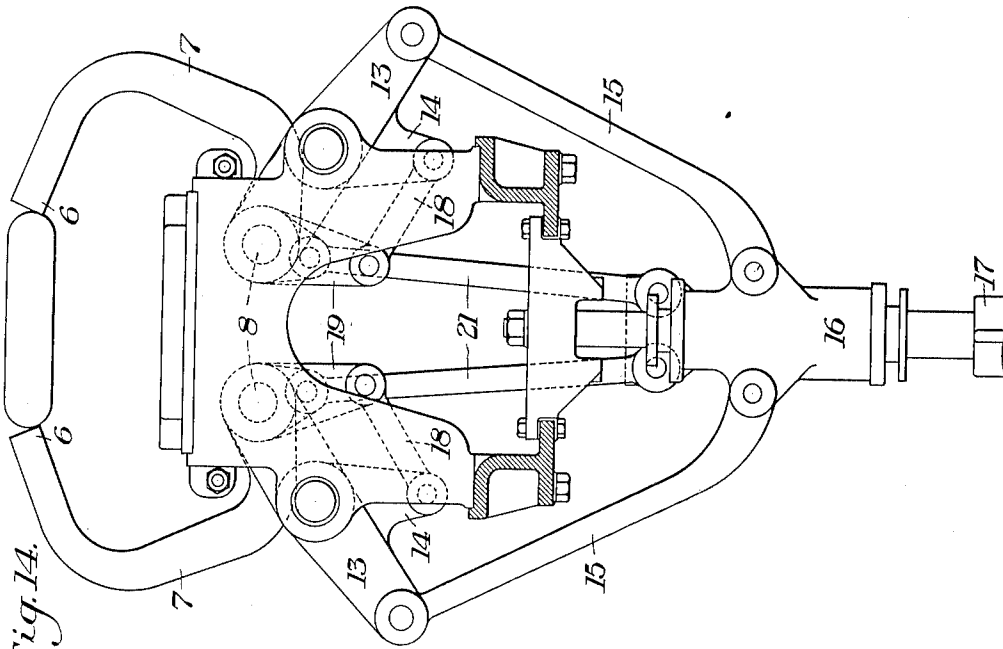


Fig. 14.

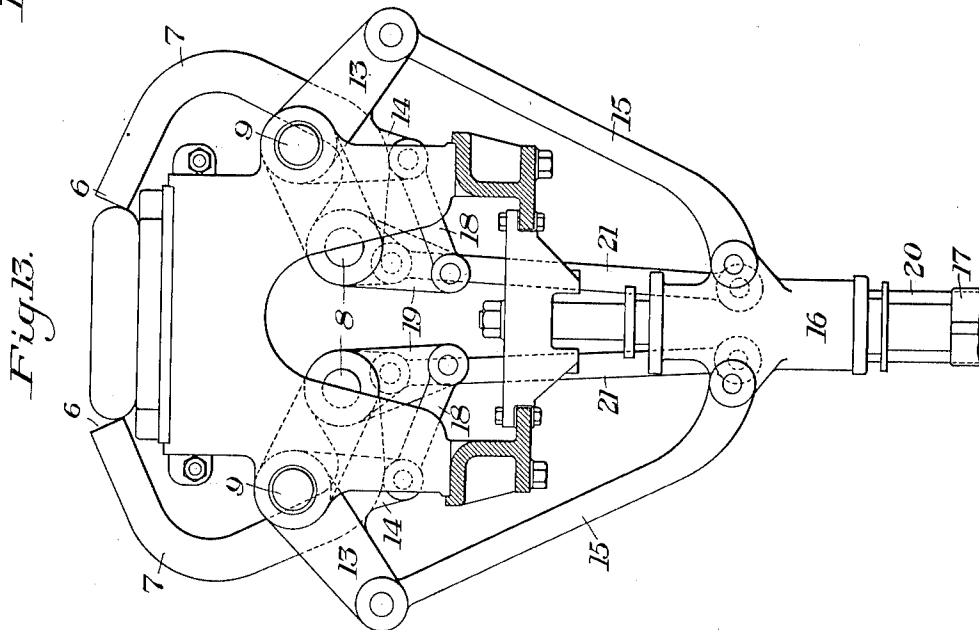


Fig. 13.

WITNESSES

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# UNITED STATES PATENT OFFICE.

JULIAN KENNEDY, OF PITTSBURGH, PENNSYLVANIA.

## METAL-MANIPULATOR.

1,073,607.

Specification of Letters Patent.

Patented Sept. 23, 1913.

Application filed November 16, 1911. Serial No. 660,718.

*To all whom it may concern:*

Be it known that I, JULIAN KENNEDY, a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Metal-Manipulators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a sectional plan view showing a preferred form of my invention as applied to handling tire blanks; Fig. 2 is a partial sectional side elevation of the same; Fig. 3 is an end elevation with the blank in position; Fig. 4 is a vertical cross sectional view showing the lifting cylinder and its parts; Fig. 5 is a detail section showing the arrangement of the gripping arms; Fig. 6 is a side elevation of the crane which I preferably employ for handling the punches or mandrels; and Fig. 7 is a detail view of the jib arm actuating mechanism. Figs. 8, 9, 10, 11 and 12 are diagrammatic views showing different steps in the formation of a tire blank in which my manipulator is used to advantage. Figs. 13 and 14 are similar to Fig. 3 showing the parts in different positions.

My invention relates to the handling of metal blanks under forging hammers, presses or the like, and is particularly designed for handling tire blanks under hydraulic presses.

The object of the invention is to provide a simple and efficient mechanism by which the blank being operated upon may be gripped and then lifted vertically and then lowered. These movements are essential in the formation of tire blanks in order to provide different mandrels or punches for operating upon the blank.

In the drawings, in which I show a preferred form of apparatus for carrying out my invention, 2 represents an endwise movable plate which carries a series of anvil blocks 3, and is slidably mounted in guides in a bed plate connected to an anvil base block 4. The outer end of this plate is connected to the piston of a double-acting hydraulic cylinder 5. The anvil blocks 3 on the plate are of different forms, as more fully shown in Figs. 8 to 12, and as herein-after described. After the blank is pressed on one of these blocks, I wish to lift it and

slide the plate 2 endwise to bring another block into position under the blank. For this purpose, I provide the gripper arms 6, 6, which extend laterally along the sides of the anvil block and form part of curved lever arms 7, 7, which are keyed or otherwise secured to the inner adjacent shafts 8, 8. Outside of and parallel to the shafts 8, 8 are other parallel shafts 9, 9, beyond the ends of which the levers 7, 7 project. The shafts 9, 9 may be of the same or different lengths from the shafts 8, 8, but the end portions of the shafts 8, 8 to which the levers 7, 7 are secured project beyond the corresponding ends of the shafts 9, 9. Surrounding the shafts 8, 8 are floating bearing sleeves 10, which are rigidly connected to, or form a part of the extensions or arms 11 which carry bosses 12 mounted on the shafts 9.

To swing the gripping arms of levers 7, I mount on each of the shafts 9 a bell crank lever having arms 13 and 14, of which the arm 13 is connected by link 15 with the movable cylinder element of a single-acting hydraulic cylinder 16, the piston or plunger of which is rigidly secured to the base 17. The arm 14 of the bell crank is connected by a link 18 with a crank lever 19, keyed or otherwise secured to the corresponding shaft 8. It is evident that when pressure is admitted to move the cylinder 16 upwardly, it will, through the bell crank levers, links 18 and levers 19, oscillate the shafts 8 to swing the gripping arms inwardly and grip the blank as shown in Fig. 13.

Now, in order to move the blank vertically while it is gripped, I provide a vertical lifting cylinder 20, located alongside the cylinder 16 and having vertically extending links 21, which are pivotally connected to bearing lugs 22, projecting from collars on sleeves 10 forming the bearings of the shafts 8. Pressure is now admitted to the cylinder 20, which will move the gripper arm supports and the shafts 8 upwardly to bring the grippers together with the blank to the position shown in Fig. 14, the parts swinging about the shafts 9 without affecting the gripping position of the levers 7, which are held closed by pressure in the cylinder 16.

After the mandrel has been gripped and lifted, the piston of the cylinder 5 is actuated to move another anvil block under the blank, and then fluid is exhausted from cylinder 20 to allow the blank to lower on to



this other block. The cylinder 16 is then actuated to release the grippers.

In the preferred operation, the first step in the manufacture is to take a cheese-shaped blank and flatten it into a disk. Looking now at Fig. 8, and assuming that the last operation has been completed on the blank shown in dotted lines, the cheese-shaped blank *a* is applied on the anvil block *b*, and the sliding plate is then moved endwise until the blank *a* is under the main hammer or reciprocating press element 23 of the press. The center line of the reciprocating element or hammer of the press is indicated by the line *x-y* of Figs. 8 to 12. Fig. 9 shows the operation after the press has flattened the cheese-shaped blank into rough disk shape. The grippers are then thrown in, the blank lifted and the plate moved endwise to bring the anvil block *c* with its punch or mandrel *d* under the blank, which is then lowered thereon to the dotted position shown in Fig. 10. The grippers being released, the press is applied to force the blank down over the mandrel, as shown in Fig. 10. The blank is then gripped and lifted, the block moved endwise to bring the anvil block *e* into place, the blank is lowered and released, and the top punch *f* applied and forced down into the blank by the press, as shown in Fig. 11.

In order to bring the punch *f* to its central operative position on the anvil block in the center line of the reciprocating press element, I preferably employ a swinging jib crane, shown at 24 in Figs. 1 and 6. The jib arm 25 of this crane has a recess to receive the punch *f*, which is gripped by any suitable means, such as a fixed arm 26 and a clamping device, consisting of the hook-shaped clamping arm 25. This arm 25 is pressing and holding the punch *f*, for instance, against the fixed arm 26, by means of a small hydraulic cylinder 28, connected to clamping arm 25 by tension rods 29 and cross heads 30. The clamping arm 25 is released by compression helical spring 27.

To rotate the jib arm, I provide any suitable means, such as a double-acting cylinder 31 having a rack 32, engaging a toothed wheel 33 at the base of the jib mast. The jib arm may be raised and lowered by the usual cylinder apparatus 35, forming a crane mast proper. This jib crane is rigidly secured by bearings 34 to the frame of the hydraulic press, as shown in Fig. 1. The jib crane having acted to swing the punch *f* into position and to remove it after it has been forced into the blank by the press, the grippers are again applied to the blank lifted. The plate is then slipped forward to its last position, where the finishing die *g* is provided, and the blank is then dropped on this finishing die and the press applied in the usual manner. It will be noted that the anvil block *e*

is provided with a central hole through which the core punched out of the center of the blank may be discharged. While the last operation is being carried out on the finishing die *g*, a new blank *a* may be applied on the anvil block *b* as shown in Fig. 12.

The advantages of my invention will be obvious to those skilled in the art, since simple, positive and efficient means are provided for gripping, raising, lowering and releasing the blank at the desired periods. Hand labor is done away with, and the operations are accurate and rapid.

Many variations may be made in the form and arrangement of the grippers and the means for raising and lowering them, without departing from the spirit and scope of my invention as defined in the appended claims, since I consider myself the first to provide a gripping apparatus which will grip the blank, raise it in a vertical direction and lower it.

I claim:

1. In a manipulator for presses and the like, a vertically movable gripping mechanism comprising a plurality of grippers, connections arranged to raise and lower the same in unison, and a fluid actuated device arranged to actuate the gripping mechanism, substantially as described.

2. In a manipulator for presses and the like, a gripping mechanism comprising a plurality of grippers, fluid actuated means for operating the grippers, and connections arranged to raise and lower the grippers in unison while retaining them in gripping position, substantially as described.

3. In a manipulator for presses and the like, pivoted levers having gripping arms, fluid actuated connections arranged to raise and lower the gripping levers in unison, and mechanism for actuating the levers arranged to hold them in gripping position during vertical movement, substantially as described.

4. In a manipulator for presses and the like, pivoted gripping levers, fluid actuated connections arranged to raise and lower the pivoted fulcrums of said levers, and actuating connections arranged to move the grippers in unison, said connections being adapted to hold the grippers in gripping position during the raising and lowering of their pivotal fulcrums, substantially as described.

5. In a manipulator for presses and the like, pivoted gripping levers secured to shafts, mechanism for simultaneously moving said shafts up and down, and connections arranged to oscillate said shafts and actuate the grippers in different vertical positions thereof, substantially as described.

6. A manipulator having gripping arms arranged to be moved in unison, shafts on

which said arms are pivoted, swinging arms in which said shafts are pivoted, shafts for the arms, and means for actuating the gripping arms to move them about their axes; substantially as described.

7. A manipulator having gripping arms arranged to be moved in unison, shafts on which said arms are pivoted, swinging arms in which said shafts are pivoted, shafts for the arms, means for actuating the gripping arms to move them about their shafts, and means for raising and lowering said shafts and gripping arms; substantially as described.

8. A manipulator comprising a frame, a plurality of shafts in said frame, swinging arms on said shafts, shafts journaled in the ends of said swinging arms, gripping arms journaled on the last mentioned shafts, means for moving the gripping arms about said shafts, and means for moving all of

said members about the first shafts; substantially as described.

9. A manipulator comprising a supporting frame, supporting shafts in said frame, gripper supporting arms mounted on the shafts, gripper supporting shafts mounted in said arms, grippers mounted on said gripper supporting shafts, a hydraulic cylinder, connections from the cylinder to the gripper supporting arms for moving them, a second hydraulic cylinder, and connections from the second cylinder to the gripper arms for swinging them toward each other; substantially as described.

In testimony whereof, I have hereunto set my hand.

JULIAN KENNEDY.

Witnesses:

H. W. RAUS,  
L. McKITTRICK.