

(No Model.)

E. CARTWRIGHT.
DROP SHEARS.

No. 539,573.

Patented May 21, 1895.

Fig. 1.

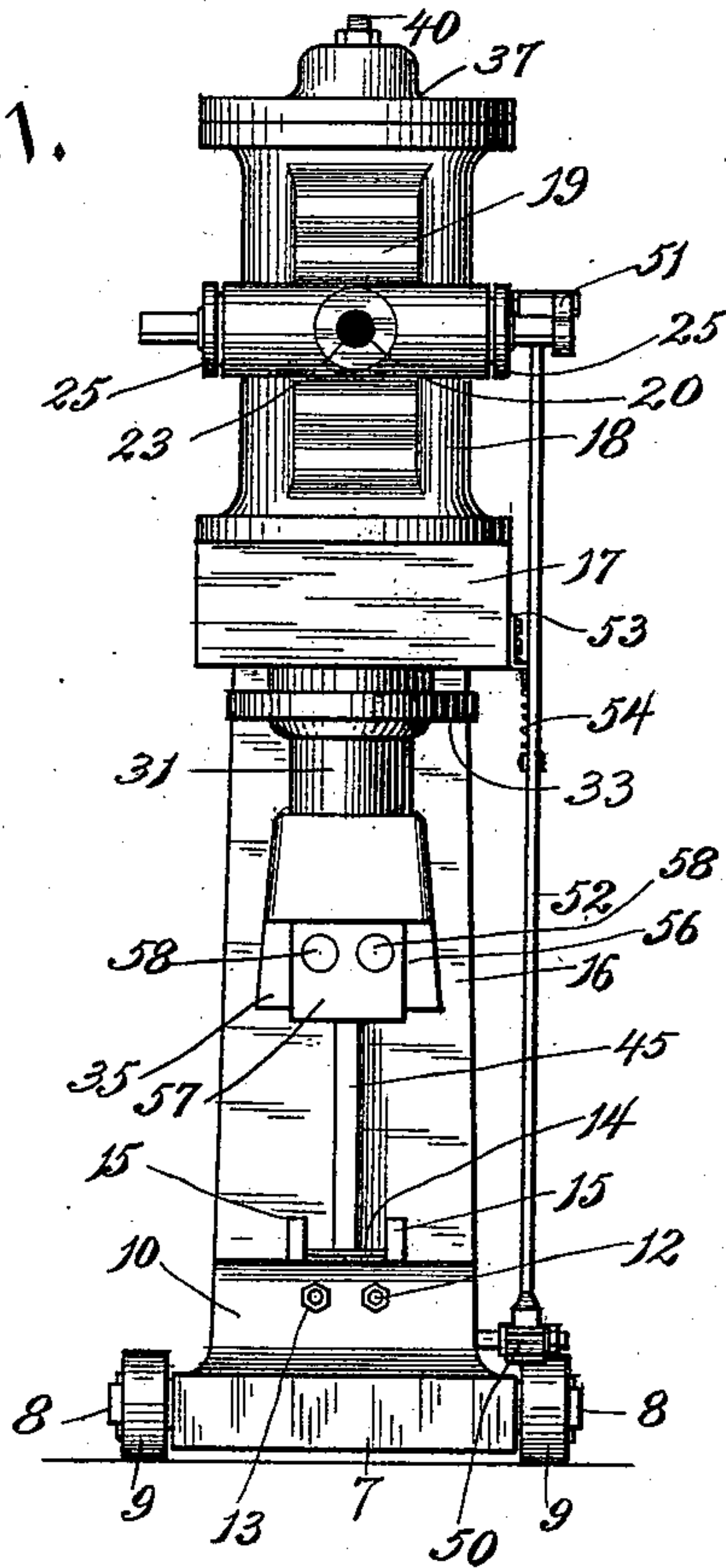


Fig. 2.

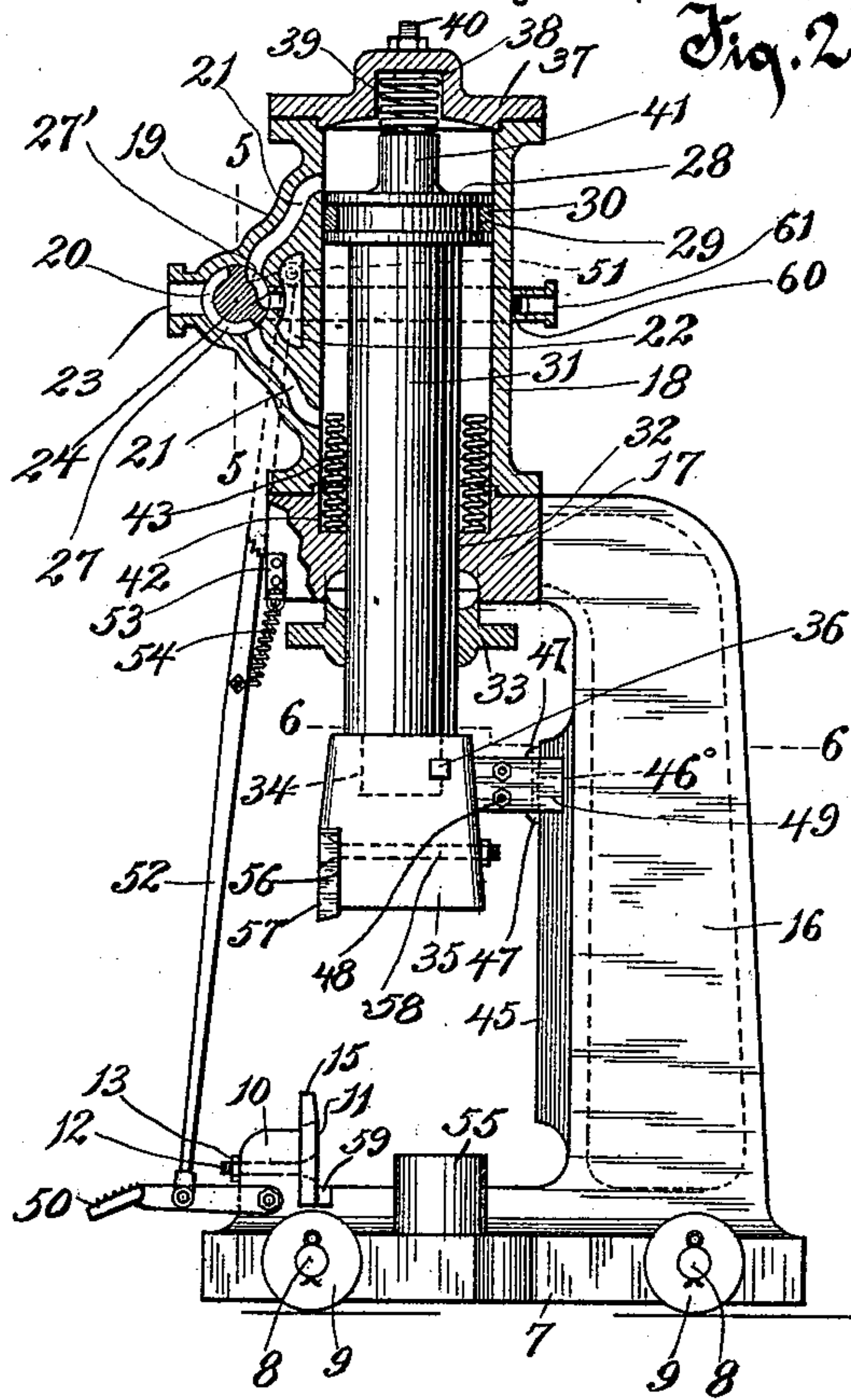


Fig. 3.

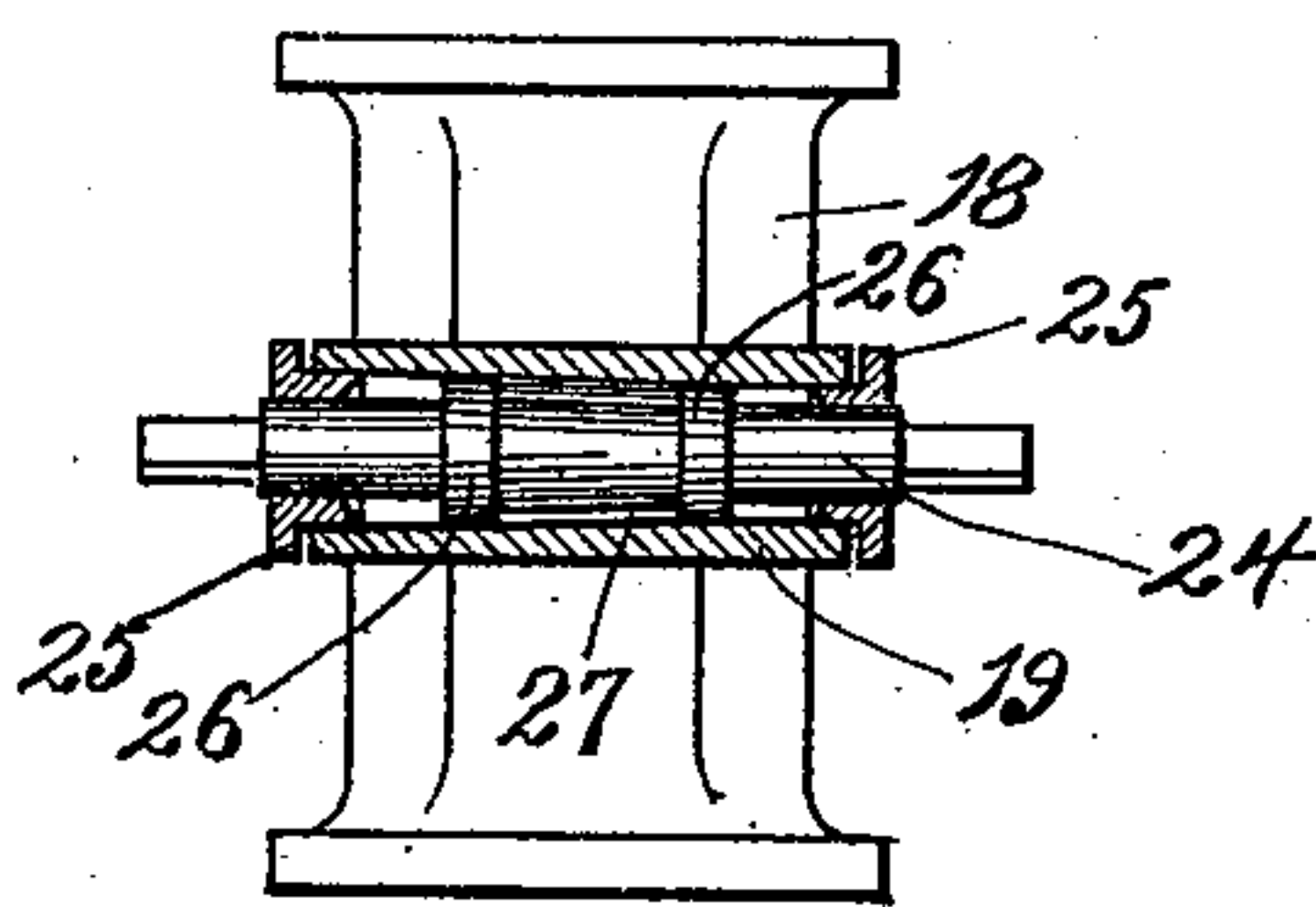
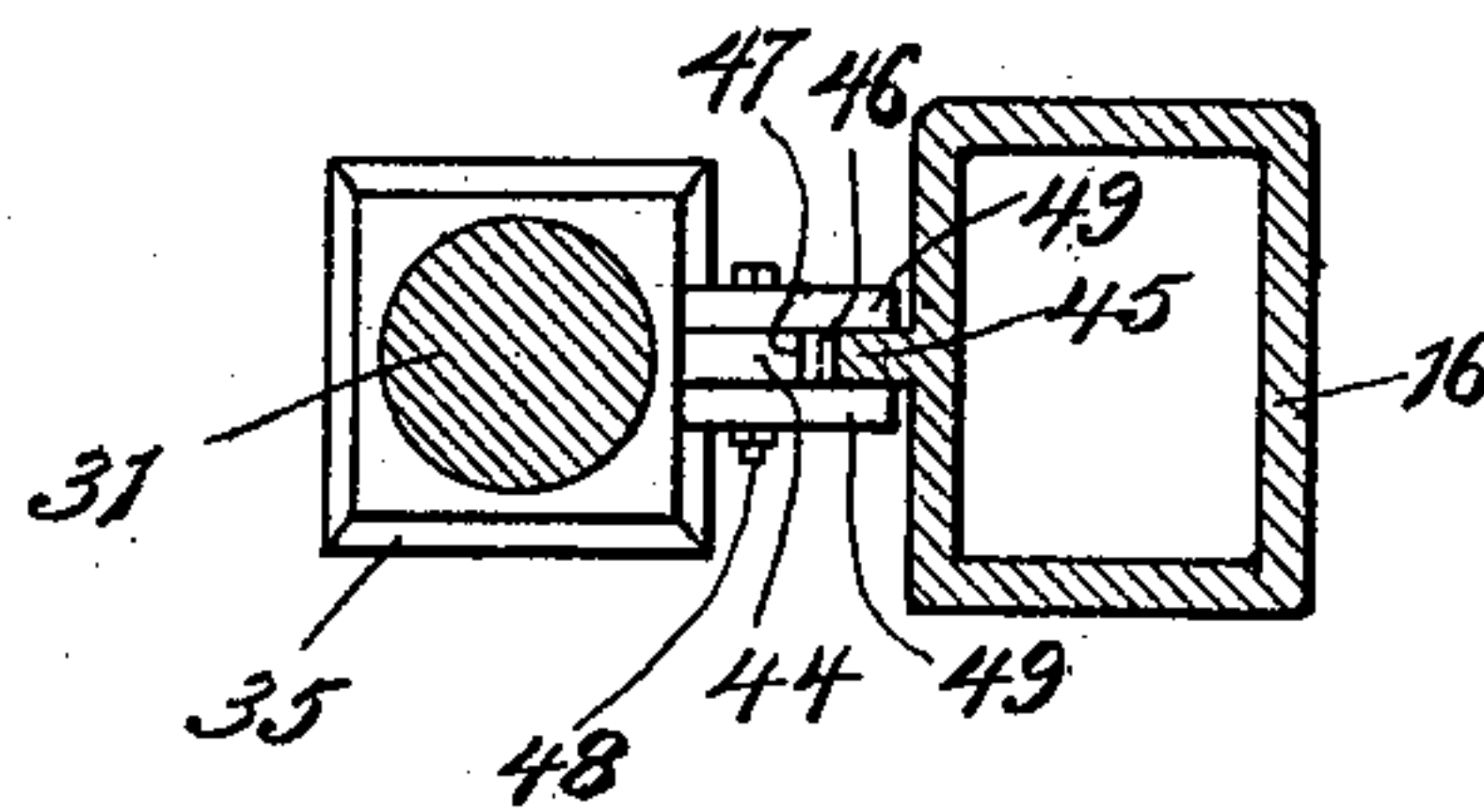


Fig. 4.



Witnesses.

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UNITED STATES PATENT OFFICE.

EDWIN CARTWRIGHT, OF MILWAUKEE, WISCONSIN, ASSIGNOR OF ONE-HALF TO WILLIAM DOYLE, OF SAME PLACE.

DROP-SHEARS.

SPECIFICATION forming part of Letters Patent No. 539,573, dated May 21, 1895.

Application filed December 5, 1894. Serial No. 530,858. (No model.)

To all whom it may concern:

Be it known that I, EDWIN CARTWRIGHT, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a new and useful Improvement in Drop-Shears, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

My invention has relation to improvements in drop shears.

The device is intended especially, although not necessarily, for use in rolling mills for cutting off the split or cold ends of iron or steel bars or billets, while in their heated condition, while in the operation of rolling.

My improvement is designed to accomplish the cutting in an expeditious, efficient and simple manner, and it consists of the devices and parts, or their equivalents, as hereinafter more fully described and claimed.

In the accompanying drawings, Figure 1 is a front elevation of the device. Fig. 2 is a side elevation, partly in section. Fig. 3 is a section on the line 5 5 of Fig. 2, and Fig. 4 is a horizontal section on the line 6 6 of Fig. 2.

Like numerals of reference denote like parts throughout the several views.

Referring to the drawings, the numeral 7 indicates the base of the frame work, said base having journaled therein axles 8, 8, upon which are mounted rollers 9, 9, thereby making the machine portable, and thus readily transferable from one position to another. The base is provided at its forward end with an upward extension 10. Against the inner face of this extension is secured a lower stationary cutting blade 11, being secured, preferably, by means of bolts 12, 12 passing through the knife and the upward extension 10. The ends of the bolts which project beyond the upward extension are threaded to receive locking nuts 13, 13. The heads of the bolts are countersunk in the knife. The cutting edge of the knife, indicated by the numeral 14, projects above the upper edge of the upward extension, and lies between two lugs 15, 15, extending from the body of the blade, at opposite sides, upwardly above said cutting edge. The rear edges of these lugs are beveled, as clearly shown.

From the rear end of the base projects upwardly a standard 16, the upper end of which being bent forwardly at right angles and formed at its extremity with a transverse head 17.

The base, the upward extension 10, the standard 16, and the head 17 are preferably cast in one piece.

Fitted to the upper side of the head 17 is a steam cylinder 18. The front of this cylinder is formed with an extension 19, in the interior of which is provided a valve chamber 20, steam ducts or passages 21, 21 leading to the cylinder proper, and an exhaust chamber 22. A steam inlet opening 23 leads to the valve chamber. This valve chamber, it will be noticed, is slightly tapered. A similarly tapered valve 24 is fitted in the valve chamber. The registering tapers provide for a close fit of the valve to its seat, without at the same time interfering with the free rotation of the valve. The ends of the valve pass through stuffing boxes 25, 25, fitted to the ends of the valve chamber, and the extreme outer ends of said valve are preferably squared. Between medial integral collars 26, 26 of the valve, cavities or recesses 27, 27' are formed.

Within the steam cylinder 18 works a piston 28, said piston provided preferably with an annular recess 29 to receive a suitable packing 30. Depending from the under side of the piston is a piston stem 31, said stem passing through an opening 32 in the head, a stuffing box 33 being arranged at the lower end of the opening to provide a tight joint. The lower reduced end 34 of the piston rod enters a suitable recess in a knife head 35, and is held therein by means of a key 36.

Fitted to the upper end of the steam cylinder is a cap piece 37, said cap piece provided upon its under side with a recess 38 into which fits a spring cushion 39, held in position by means of a bolt 40. An extension 41 from the upper side of the piston is adapted to contact with this spring cushion upon the completion of the upstroke of the piston.

Surrounding the piston stem for a portion of its length, and seated in a socket or recess 42 in the transverse head 17 is a coiled spring 43, which is also adapted to act as a cushion,

and to receive the contact of the under side of the piston upon the completion of the down stroke of said piston.

The knife head has projecting rearwardly therefrom an integral lug 44, which terminates just in front of a vertical guiding rib 45, cast in one piece with the inner face of the standard 16. The end of the lug 44 receives thereon loosely a casting 46, having at its upper and lower ends forwardly-extending lugs 47, 47 which fit against the top and bottom edges, respectively, of the lug 44. Upon opposite sides of said lug 44, and secured thereto by means of bolts 48, 48 are guiding plates 49, 49, which extend rearwardly a greater distance than the lug 44, and bear against opposite sides of the guiding rib 45. By this construction, the knife-head 35 is accurately guided in its vertical movement.

Pivoted to the upward extension 10 of the base is a foot treadle 50, while to either of the squared ends of the valve is secured a crank 51. This crank is connected up to the foot treadle by means of a long link 52.

To the transverse head 17 of the standard is secured an angular bracket 53, to which is connected to one end of a retracting spring 54, the opposite end of said spring being connected to the link 52.

Secured in a suitable recess in the base 7 is a rubber buffer or cushion 55, which receives the impact of the knife-head 35, and prevents jarring or concussion on the down stroke of said knife-head.

The front of the knife-head is cut out to form a recess 56, said recess receiving the upper knife 57, said knife being held in place by means of bolts 58, 58.

In Fig. 2 of the drawings the steam cylinder is shown as receiving steam through the lower duct or passage 21, and exhausting through the upper passage 21. The course of the steam in this position of the parts is first through the inlet opening 23, thence into the cavity 27 of the valve, thence through the lower duct or passage 21 into the cylinder. The exhaust steam which is above the piston is free to pass into the upper duct or passage 21 into the cavity 27', and thence directly into the exhaust chamber 22, from which it is conducted by means of a suitable pipe or outlet. So long as the parts are in the position described, of course the piston will maintain the knife-head 35 and its knife 57 in a raised position. If, now, it is desired to cut off the split or cold end of a bar or billet, said end of the bar or billet is placed across the cutting edge 14 of the lower knife. The foot treadle 50 is then depressed against the action of the retracting spring 54. When thus depressed the valve, through the crank 51 and link 52, is turned so that the cavity 27 of said valve is brought into register with the upper passage or duct 21, and the cavity 27' into register with the lower passage or duct 21. The live steam, therefore, passes into the upper portion of the steam cylinder, and de-

presses the piston, while the exhaust steam passes through the lower passage 21, into the cavity 27', and thence into the exhaust. It is obvious that the knife-head will descend with considerable force and the knife 57 will pass by, and in close proximity to, the cutting edge 14 of the knife 11, thereby making a shear cut, to facilitate which the lower edge of knife 57 is beveled rearwardly, as clearly shown in Fig. 2. The knife-head, as before explained, strikes against the buffer 55 at the completion of its down stroke, and at the same time the under side of the piston contacts with the cushion 43.

When the operator desires the knife-head to again ascend, he removes foot pressure from the treadle 50, and by the action of the retracting spring 54, the valve is brought back to the position shown in Fig. 2, and of course the piston immediately ascends, the extension 41 of the piston finally contacting with the upper spring cushion 39, and thereby relieving the parts of all shock or jar.

The upwardly-extending lugs 15, 15 of the cutting knife 11 are beveled upon their inner edges so as to deflect the upper knife 57 and prevent its ever contacting with the cutting edge 14 of the lower knife.

For the purpose of holding the lower cutting blade more firmly in position, I form a groove in the base 7, which groove is wider than and receives the lower end of said blade. The other portion of the groove is filled by a key 59 which bears directly against the knife.

For conducting the exhaust steam from the exhaust chamber, I prefer to provide an annular tube 60, surrounding the steam cylinder, and in communication with the exhaust chamber. This tube has an extension 61, to which a pipe (not shown) may be coupled for finally conveying away the exhaust steam.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination, of a frame, a steam cylinder mounted thereon, said cylinder provided with an extension having therein a valve chamber with passages or ducts leading to the cylinder, and an exhaust chamber in communication with the valve chamber, a piston within the cylinder provided with a depending piston stem adapted to carry a knife at its lower end a valve within the valve chamber having one or both of its ends squared, a treadle or lever pivoted to the frame, a crank adapted to be applied to the squared end of the valve, or to either of the squared ends thereof, a link connecting this crank with the treadle or lever, and a spring secured at its lower end to the link and at its upper end to the frame substantially as set forth.

2. In a drop shears, the combination, of a frame, a knife secured to the base thereof, said knife provided with lugs extending above the cutting edge of the knife, and having beveled sides or edges, an upper knife, and means for actuating said upper knife, the beveled

sides or edges of the lugs of the lower knife preventing the two cutting edges from contacting, whereby a shearing cut is effected, substantially as set forth.

5 3. The combination, of a frame provided with a longitudinal guiding rib, a cylinder mounted on the frame, a piston within the cylinder provided with a depending piston stem having a head at its lower end, said head
10 adapted to carry a knife and having a lug projecting therefrom, the end of the lug terminating in front of the guiding rib, a casting provided at its upper and lower ends with

lugs bearing, respectively, against the upper and lower edges of the lug of the head, plates 15 secured to said lug of the head and extending to and bearing against opposite sides of the guiding rib, and means for actuating the piston substantially as set forth.

In testimony whereof I affix my signature 20 in presence of two witnesses.

EDWIN CARTWRIGHT.

Witnesses:

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