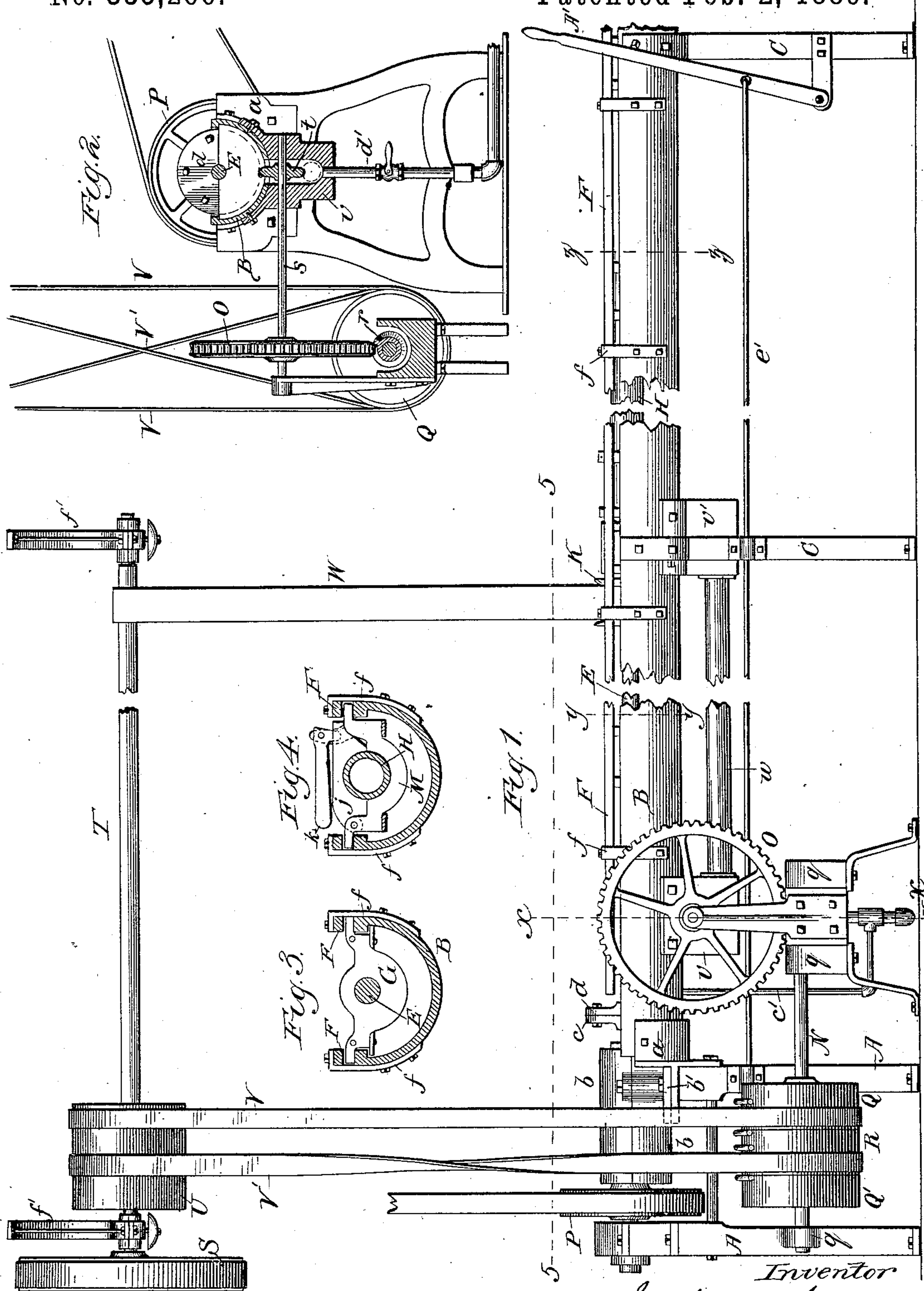


3 Sheets—Sheet 1.

# MACHINE FOR POLISHING THE INTERIOR OF METAL TUBES.

Patented Feb. 2, 1886.



Witnesses.  
 Will R. Gushundo.  
 W. Rossiter.

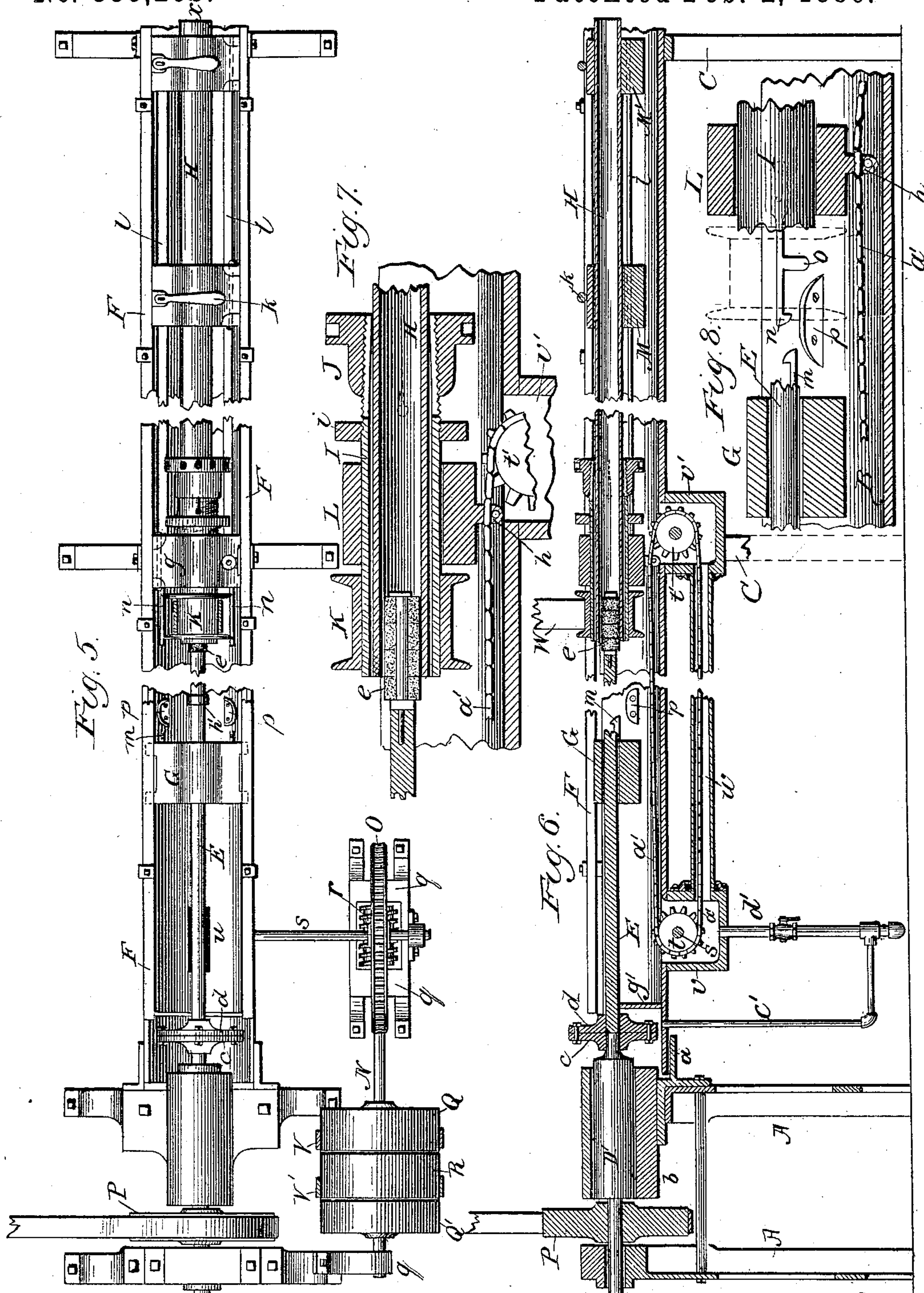
5  
Inventor  
Saml. M. Adams  
By, West & Bond  
Atty.

3 Sheets—Sheet 2.

# MACHINE FOR POLISHING THE INTERIOR OF METAL TUBES.

No. 335,266.

Patented Feb. 2, 1886.



Witnesses.  
 Will R. Pundhunder.  
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Saml W Adams  
By, West & Bond Attys



(No Model.)

3 Sheets—Sheet 3.

S. W. ADAMS.

MACHINE FOR POLISHING THE INTERIOR OF METAL TUBES.

No. 335,266.

Patented Feb. 2, 1886.

Fig. 11.

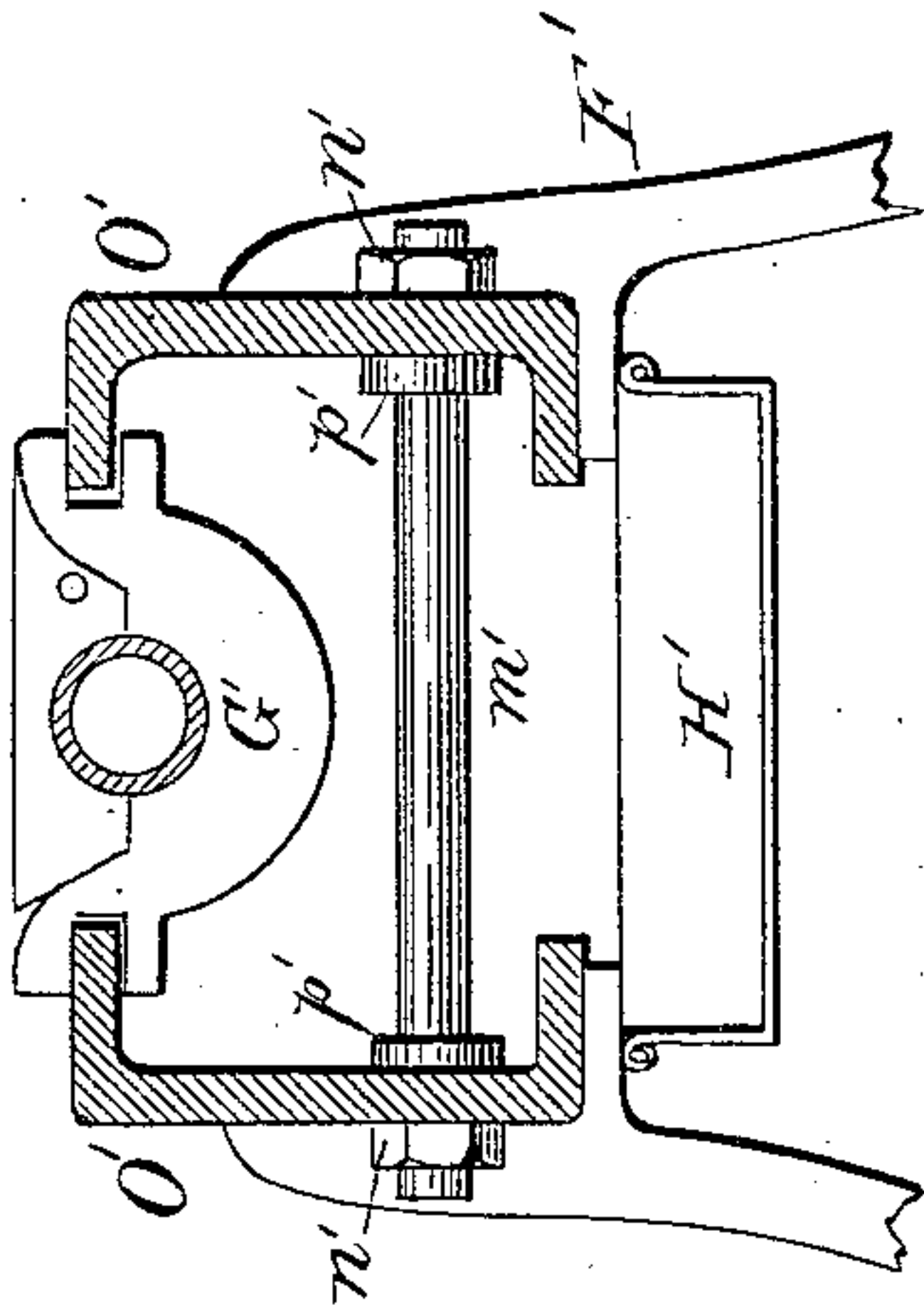


Fig. 12.

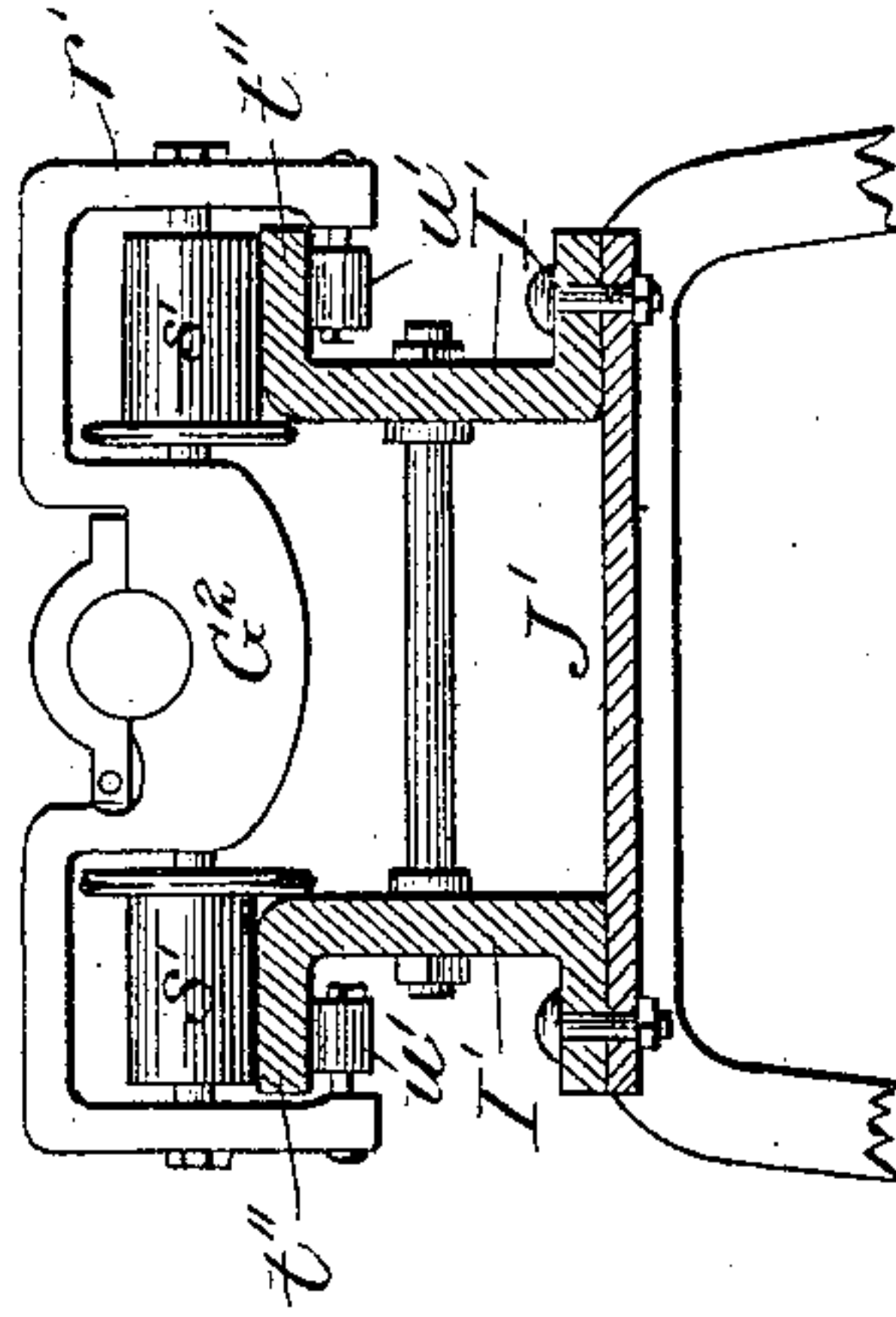


Fig. 9.

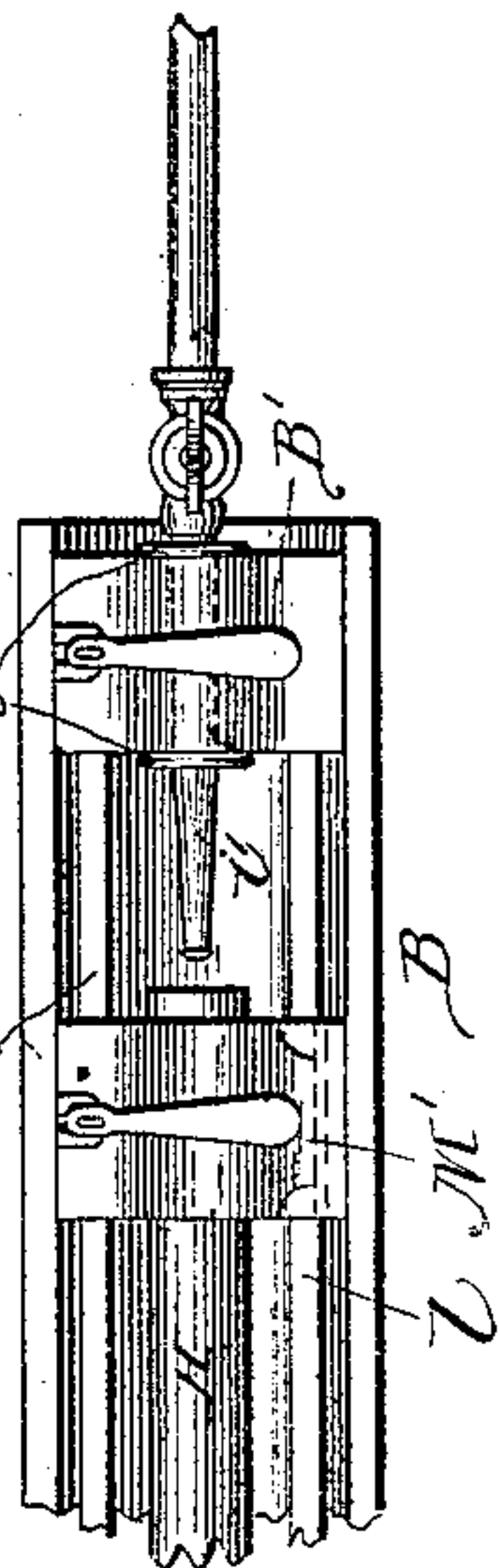
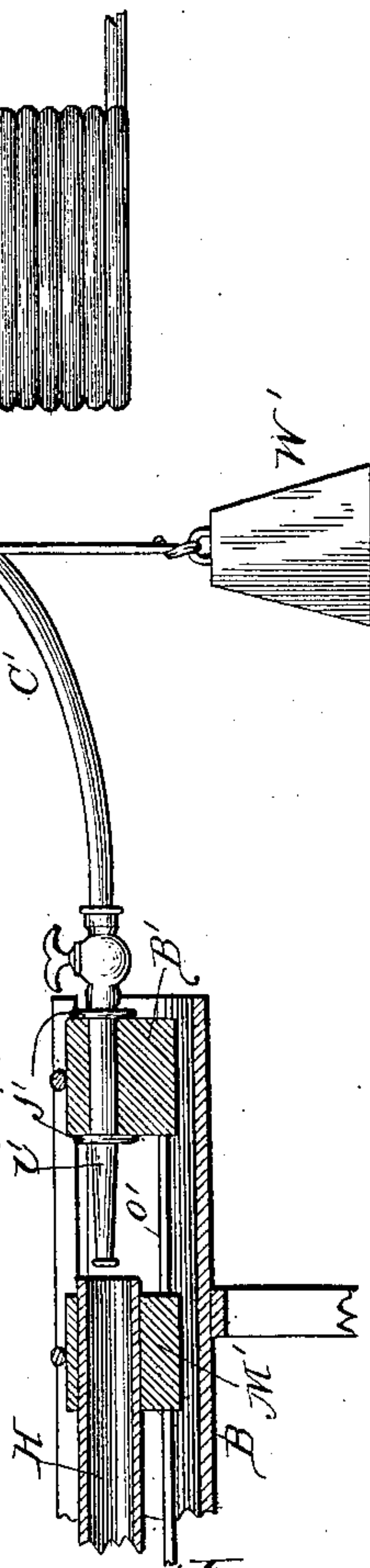


Fig. 10.



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Will R. O'Connell  
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By Will & Bond Atty



# UNITED STATES PATENT OFFICE.

SAMUEL W. ADAMS, OF CHICAGO, ILLINOIS.

## MACHINE FOR POLISHING THE INTERIOR OF METAL TUBES.

SPECIFICATION forming part of Letters Patent No. 335,266, dated February 2, 1886.

Application filed December 16, 1884. Serial No. 150,499. (No model.)

*To all whom it may concern:*

Be it known that I, SAMUEL W. ADAMS, residing at Chicago, in the county of Cook and State of Illinois, and a citizen of the United States, have invented a new and useful Improvement in Machines for Polishing the Interior of Metal Tubes, of which the following is a full description, reference being had to the accompanying drawings, in which—  
10 Figure 1 is a side elevation. Fig. 2 is a section at line *x x* of Fig. 1, looking to the left. Fig. 3 is a section at line *y y* of Fig. 1. Fig. 4 is a section at line *z z* of Fig. 1. Fig. 5 is a plan view of the part below the line 5 5 of Fig. 1. Fig. 6 is a central vertical section at *x' x'*, Fig. 5. Fig. 7 is an enlarged detail in section of the principal part of the pipe-carriage. Fig. 8 is an enlarged sectional detail. Figs. 9 and 10 illustrate one way of supplying water to the pipe while being polished. Figs. 11 and 12 illustrate modifications.

The object of my invention is to provide a machine adapted to rapidly polish the interior of metal pipes, which I accomplish as illustrated in the drawings, in which—

A A represent parts of a strong frame at one end of the machinery.

*a* is an angle-iron secured to the frame A.

B is a long trough, one end of which is supported by the angle-iron *a*.

C are supports for the trough B.

D is a short shaft, part of which, D', is enlarged. This enlarged part D' runs in a bearing, *b*, the lower part of which has a flange, *b'*, by which it is bolted to the frame. The two parts of the bearing are also bolted together.

*c* is one half of a coupling, to which the inner end of the shaft D is keyed or otherwise secured.

40 E is a shaft, which is keyed at one end to one half, *d*, of a coupling. The two parts *c* and *d* are folded together.

*e* are emery-wheels secured to the free end of the shaft E.

45 *f* are supports bolted to the trough B and extending above the same, having their upper ends turned inward, as shown in Fig. 3.

F are guide-bars supported a little distance above the top of the trough by the supports *f*.

50 G is a movable bearing, in which the shaft E is supported. The ends of this bearing rest upon the top of the trough and between it and the guide-bars F. (See Fig. 3.)

H is a pipe, the interior of which is to be polished.

I is a sleeve, one end of which is split and screw-threaded.

J is a tapering nut on the end of the sleeve I.

K is a pulley fast on the sleeve I.

L is a movable support for the sleeve I, which can revolve in such support. This support has a hinged cover, *g*, fastened so that it can be easily opened, if desired.

*h* is a downward projection from the bearing L, which engages with a link of the chain *a'*.

*i* is a collar secured to the sleeve I.

M M' are movable supports for the pipe H. The ends of these supports rest upon the top of the trough between it and the guide-bars F. Each support M M' has a hinged cover, *j*, held closed by a cam-lever, *k*.

*l* are two rods connecting the supports L M M' together. The support L also rests upon the top of the trough B.

*m* are two hooks secured to the support or bearing G.

*n* are hooks secured to the support L, and adapted to engage with the hooks *m*.

*o* is a downward projection from the stem of each hook *n*.

*p* are cams secured on the inside of the trough.

N is a shaft supported in bearings *q*.

*r* is an endless screw on one end of the shaft N.

O is a worm gear-wheel, with which the endless screw *r* engages.

*s* is a shaft on which the gear-wheel O is mounted. One end of this shaft is supported in bearings in the walls of the chamber *v*.

*t* is a sprocket-wheel on one end of the shaft *s*.

*u* is a hole in the bottom of the trough, through which the sprocket-wheel *t* projects into the trough.

*v v'* are chambers connected with the bottom of the trough and extending down therefrom.

*w* is a pipe or passage connecting the two chambers *v v'*.

*t'* is another sprocket-wheel mounted on a short shaft supported in bearings in the walls of the chamber *v'*. This sprocket-wheel *t'* extends up into the trough through an opening similar to *u*, which is shown in the drawings, Fig. 6.



$a'$  is an endless chain over the sprocket-wheels  $t$   $t'$ .

$c'$  is a waste-pipe.

$d'$  is an outlet water-pipe.

5  $P$  is a fixed driving-pulley on the shaft  $D$ .

$Q$   $Q'$  are two fixed pulleys on the shaft  $N$ .

$R$  is a loose pulley upon the shaft  $N$ .

$S$  is a driving-pulley upon the shaft  $T$ , supported, as shown, by hangers  $f'$ .

10  $U$  is a driving-pulley on the shaft  $T$ .

$V$  is a belt.

$V'$  is a crossed belt.

$W$  is a belt running over the shaft  $T$  and the pulley  $K$ .

15  $A'$  is a lever, and  $e'$  a rod for shifting the belts  $V$   $V'$ .

A partition,  $g'$ , is placed in the trough near the front end to prevent the water which flows in the trough from flowing to the parts  $c$   $d$ , which, when the machine is in operation, rotate rapidly.

$h'$  is a coupling, which connects the two parts of the shaft  $E$ .

I think it is desirable to provide a small stream of water flowing through the pipe while it is being polished, for the purpose of carrying away the cuttings, and in Figs. 9 and 10 I have shown a convenient way of supplying such water, there not having been room on  
20  
30 Sheets 1 and 2 to show these devices.

$B'$  is a support similar to  $M'$ . It is provided with a cover and is connected with  $M'$  by rods  $o'$ .

$C'$  is a hose, the nozzle  $i'$  of which is, as shown, provided with two collars,  $j'$ , and the part between these collars is to be placed in the support  $B'$ . The hose passes once around the grooved wheel  $E'$ , fixed on a shaft,  $k'$ , supported, as shown, by hangers  $l'$ .

40  $W'$  is a weight suspended by a strap or rope, which passes around a wheel,  $w'$ , on the shaft  $k'$ .

The end of the hose-nozzle is to be arranged so that the water flowing from it will pass into the pipe  $H$ , and water is to be supplied to the  
45 hose in any convenient manner.

A pipe the inside of which is to be polished can be placed in the machine by opening the covers of the supports  $M$   $M'$  and placing the pipe on such supports, and then pushing it  
50 forward into the sleeve  $I$ , the nut  $J$  having been first loosened, so that the split end of the sleeve will open. When the pipe has been pushed into the sleeve, as shown in Figs. 6 and 7, the end of the sleeve can be clamped  
55 tightly upon the pipe  $H$  by means of the nut  $J$ .

Motion is to be given to the shaft  $T$  and, through the belt  $W$ , which runs over the shaft  $T$  and pulley  $K$ , which is fast upon the sleeve  $I$ , the sleeve will be rotated and with it the  
60 pipe  $H$ . At the same time motion will be communicated from the shaft  $T$ , through the belt  $V$  and pulley  $Q$ , to the shaft  $N$  and worm-gear  $r$   $O$ , driving the sprocket-wheel  $t$ , which will give motion to the chain  $a'$ , which will  
65 cause the support  $L$  to travel forward slowly, and such support coming in contact with the pulley  $K$  will cause the sleeve  $I$  to move for-

ward, carrying with it the pipe  $H$ , upon which the sleeve is clamped. The movement of the shaft  $T$  and the parts driven by it must be  
70 comparatively slow. At the same time a rapid motion should be given to the shafts  $D$  and  $E$ , rapidly revolving the emery-wheels  $e$  inside of the pipe  $H$ , and the pipe  $H$  being gradually carried forward will be polished throughout  
75 its entire length. The shaft  $E$  and the pipe  $H$  are rotated in opposite directions. It is desirable to give a rotary motion to the pipe, otherwise the same would not be uniformly polished in all parts, but the emery-wheels  
80 would probably act mainly upon one side only of the pipe. As the sleeve  $I$  and pulley  $K$  are gradually carried forward by the chain, the belt  $W$  will slide along on the shaft  $T$ . The projections  $o$  on the hooks  $n$  are so ar-  
85 ranged that they will be brought into contact with the cams  $p$  by the forward movement of the support or bearing  $L$ , to which the hooks  $n$  are secured, and the projections  $o$ , riding up over the cams  $p$ , will raise the hooks  $n$  so that  
90 they will pass the hooks  $m$ , and then the forward ends of the hooks will come in contact with the bearing  $G$ , which will then be pushed forward as the sleeve and pipe advance. When the pipe has reached the limit of its movement,  
95 the operator, by means of the lever  $A'$  and rod  $e'$ , can shift the belt  $V'$  to the pulley  $Q'$  and the belt  $V$  onto the loose pulley  $R$ , which will reverse the movement of the chain, and the sleeve  $I$  and pipe will be moved back toward  
100 the outer end of the trough, and the hooks  $n$  engaging with the hooks  $m$ , the bearing  $G$  will be drawn back until the projections  $o$  again come in contact with the cams  $p$ , when the hooks  $n$  will be released from the hooks  $m$ ,  
105 leaving the bearing  $G$  stationary, and then the backward movement of the pipe will be continued until it reaches its limit. The covers of the supports  $M$   $M'$  can then be raised, the nut  $J$  be loosened, and the pipe can be removed. 110

I have described the operation of polishing the pipe without reference to the feeding of water thereto, because the water might be supplied in various ways. I will now describe how water is supplied to the pipe by  
115 means of the devices shown in the drawings. While the pipe is carried forward and polished, as above described, the hose-nozzle will also be carried forward, because its support  $B'$  is connected with the bearing  $M'$ , and these  
120 parts will of course move together. A considerable quantity of hose is provided between the point of supply and the wheel  $E'$ , as shown at  $C''$ , so that as the hose is carried forward it will be unwound from this coil  $C''$ ,  
125 the weight  $W'$  at the same time being raised by the rotation of the shaft  $k'$ . When the pipe  $H$  is returned to the position shown in Fig. 10, the weight  $W'$  will cause the shaft  $k'$  to rotate, and the slack of the hose will be  
130 again deposited upon the floor. The weight is to be of suitable size.

It is not necessary to adopt this specific method of supplying water, because a man or



boy could follow up the pipe H as it advances, holding the end of the nozzle therein; but by adopting devices similar to those described there will be a saving of labor.

5 I find that long pieces of pipe can be nicely polished throughout their entire length by the described machine. The length of the trough and the size of many of the parts must depend upon the length and size of the pipe to be  
10 polished.

By changing the bearings G and supports M M' pipes of different sizes can be operated upon by one machine.

I do not limit myself to the exact means for  
15 supporting the bearings G and the supports for the pipe while it is being polished, and in Figs. 11 and 12 I have shown two modifications.

In Fig. 11, O' represents two long side pieces  
20 supported by legs F' and, as shown, held in position by bolts m' and nuts n', the bolts having shoulders p'. G' is a bearing similar to G, supported on the flanges at the top of the pieces O'. H' is a trough to carry off water.

25 In Fig. 12, I' are supports for the parts G M M'. G'' is a bearing similar to G, except that it is provided with arms r', which arms support shafts or rods, which carry the rollers s', which rest upon the flanges t'. u' are anti-friction rollers, supported also by the arms r'.  
30 J' is a plate bolted to the longitudinal pieces I', and with them forms the trough. Provision of course must, when necessary, be made for the chain a, similar to that before described.  
35 The trough might be located at some distance below the supports for the bearings G M M', and in that case the parts corresponding with v v' w would not be required.

As shown and described, the trough B serves  
40 two purposes. It supports the movable bearings for the shaft E and the pipe-supports, and also conveys away the water used to carry off the cuttings. The shaft D D' is, in fact, a part of the revolving shaft E; but it is desirable to have the enlargement D', and hence the  
45 couplings c d are used.

This machine is very useful for the purpose of polishing long wrought-iron pneumatic tubes, which, when properly polished, can be  
50 used in the place of the brass tubes heretofore used.

The shaft E may make twelve or more revolutions to each revolution of the pipe H.

What I claim as new, and desire to secure  
55 by Letters Patent, is—

1. The combination, in a machine for polishing the interior of tubes, of a revolving shaft carrying a polishing head or disk at one end with the clamp composed of the sleeve I, having a split end provided with screw-threads and a tapering nut, J, for clamping the split end of the sleeve on the tube being interiorly polished, substantially as described.

2. In a machine for polishing the interior of  
65 metal tubes, a revolving shaft provided at one end with a polishing disk or head, in combination

with a plank to receive and hold a piece of pipe while being polished, and traveling bearings for the revolving shaft and pipe, and supports on which such bearings travel, 70 substantially as and for the purposes specified.

3. In a machine for polishing the interior of metal tubes, a clamping-sleeve, I, provided with a pulley, K, in combination with a movable bearing, L, in which the sleeve rotates, 75 substantially as and for the purpose specified.

4. In a machine for polishing the interior of metal tubes, a revolving shaft provided with a polishing disk or head at one end, in combination with a rotating movable clamp to receive and hold a piece of pipe while being polished and an endless chain to move the clamp and pipe forward, substantially as specified. 80

5. In a machine for polishing the interior of metal tubes, a revolving shaft provided with polishing devices at one end, in combination with a rotating clamp to hold a piece of pipe, a movable bearing, L, for the clamp, 85 a trough, B, provided with chambers v v', connected with each other by a passage, w, and chain a', substantially as and for the purposes specified.

6. In a machine for polishing the interior 95 of metal tubes, the combination of a shaft, E, movable bearing G, hooks m, sleeve I, hooks n, trough B, and cams p, substantially as and for the purposes specified.

7. In a machine for polishing the interior 100 of metal tubes, the combination of a revolving shaft, E, trough B, provided with chambers v v' and connecting-passage w, movable bearing L, chain a', sprocket-wheels t t', shaft s, shaft N, worm-screw r, and gear-wheel O, 105 substantially as and for the purposes specified.

8. The combination, in a machine for polishing the interior of tubes, of a shaft carrying at one end a polishing head or disk, a traveling clamp for holding the tube to be 110 polished, a traveling bearing, M', for the tube, a traveling bearing, B', connected with said bearing M', the hose C', supported by and traveling with the bearing B', and supports on which said bearings travel, substantially as 115 described.

9. The combination of a hose, C', having a nozzle supported in a movable bearing, B', wheel E', wheel u', and weight W', substantially as and for the purposes specified. 120

10. The combination, in a machine for polishing the interior of tubes, of a rotating shaft composed of two sections, D and E, coupled together at their adjoining ends, and a polishing head or disk carried by the section E, with 125 a clamp for holding the tube being polished by the head or disk, substantially as described.

SAMUEL W. ADAMS.

Witnesses:

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