

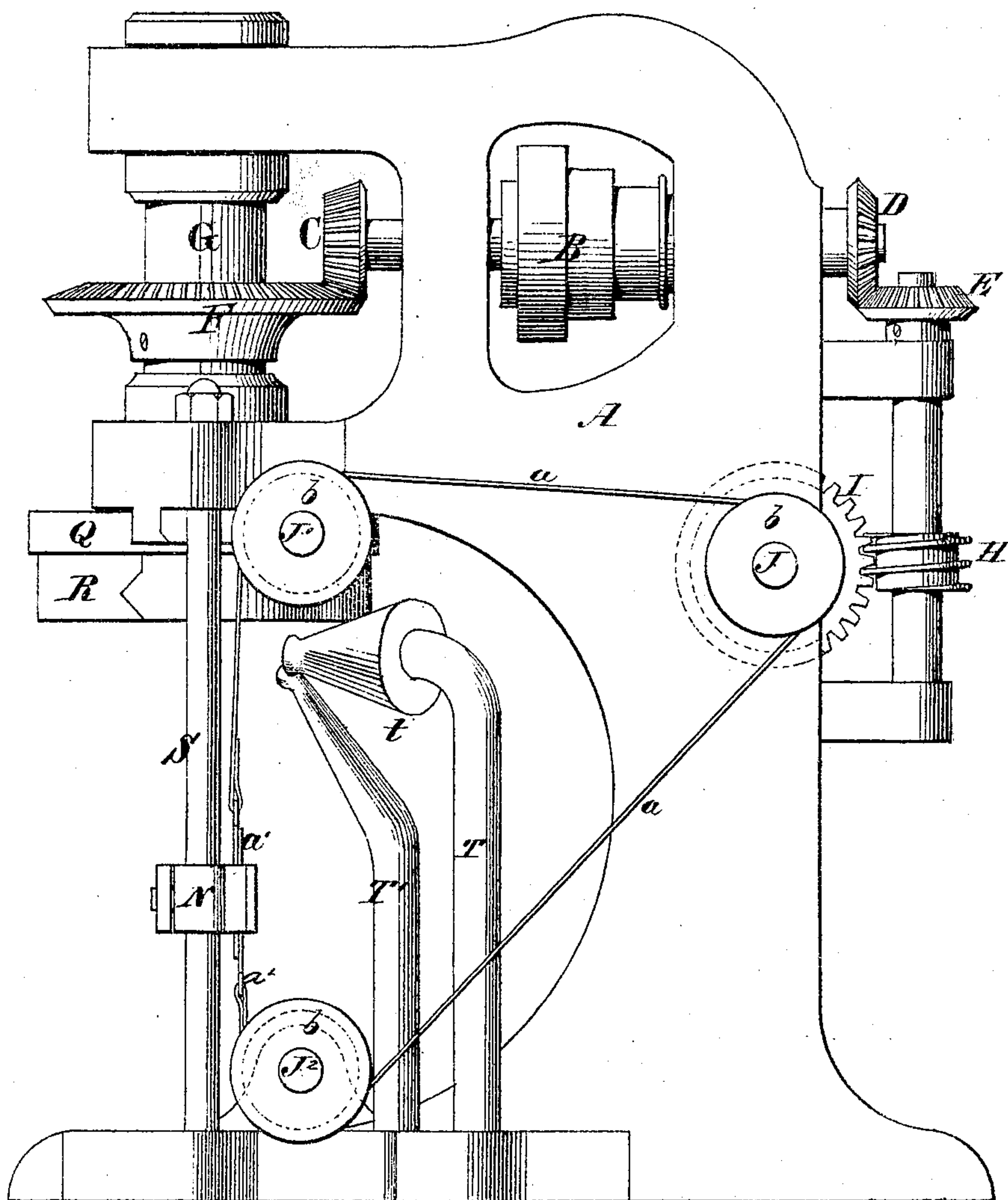
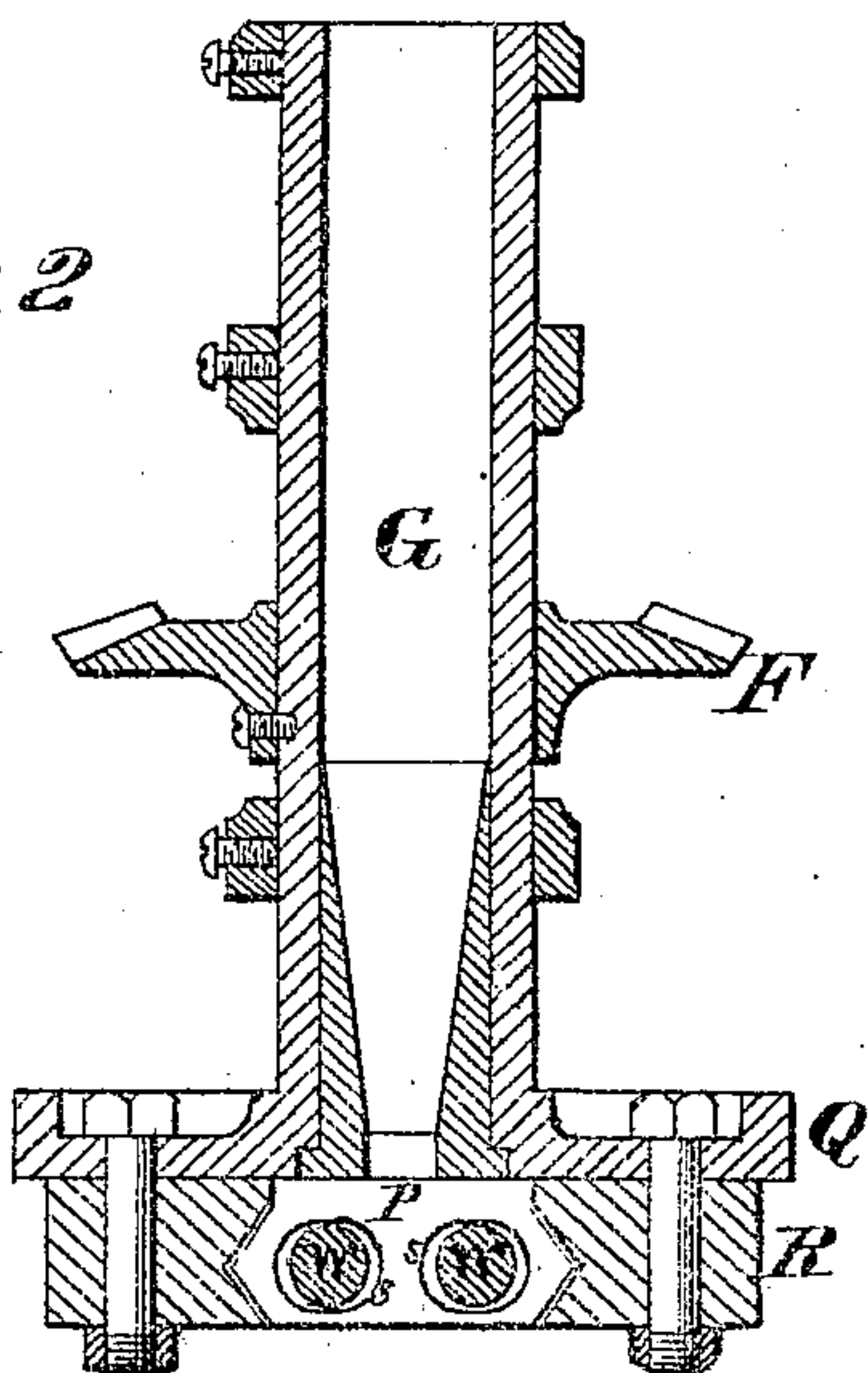
ARTHUR DAVID WILLIAMS.

Improvement in Machines for Twisting Bars of Metal.

No. 119,486.

*Fig. 1*

Patented Oct. 3, 1871.

*Fig. 2**Inventor**Arthur David Williams**by**Mason Fenwick Lawrence**Attorneys.**Witnesses.**R. T. Humphreys.**J. A. Campbell.*

[66.]

ARTHUR DAVID WILLIAMS.

3 Sheets--Sheet 2.

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Fig. 3

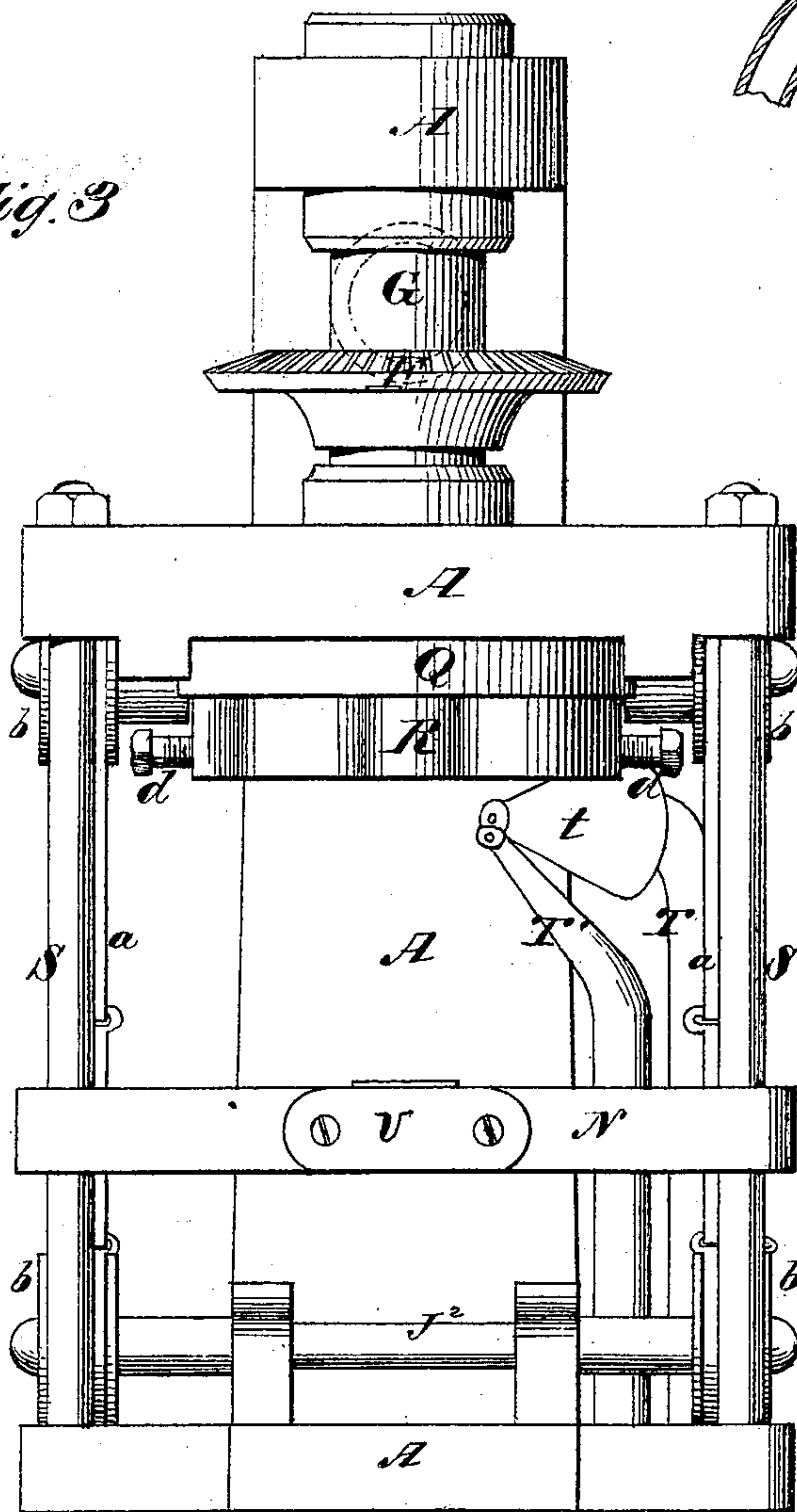


Fig. 5

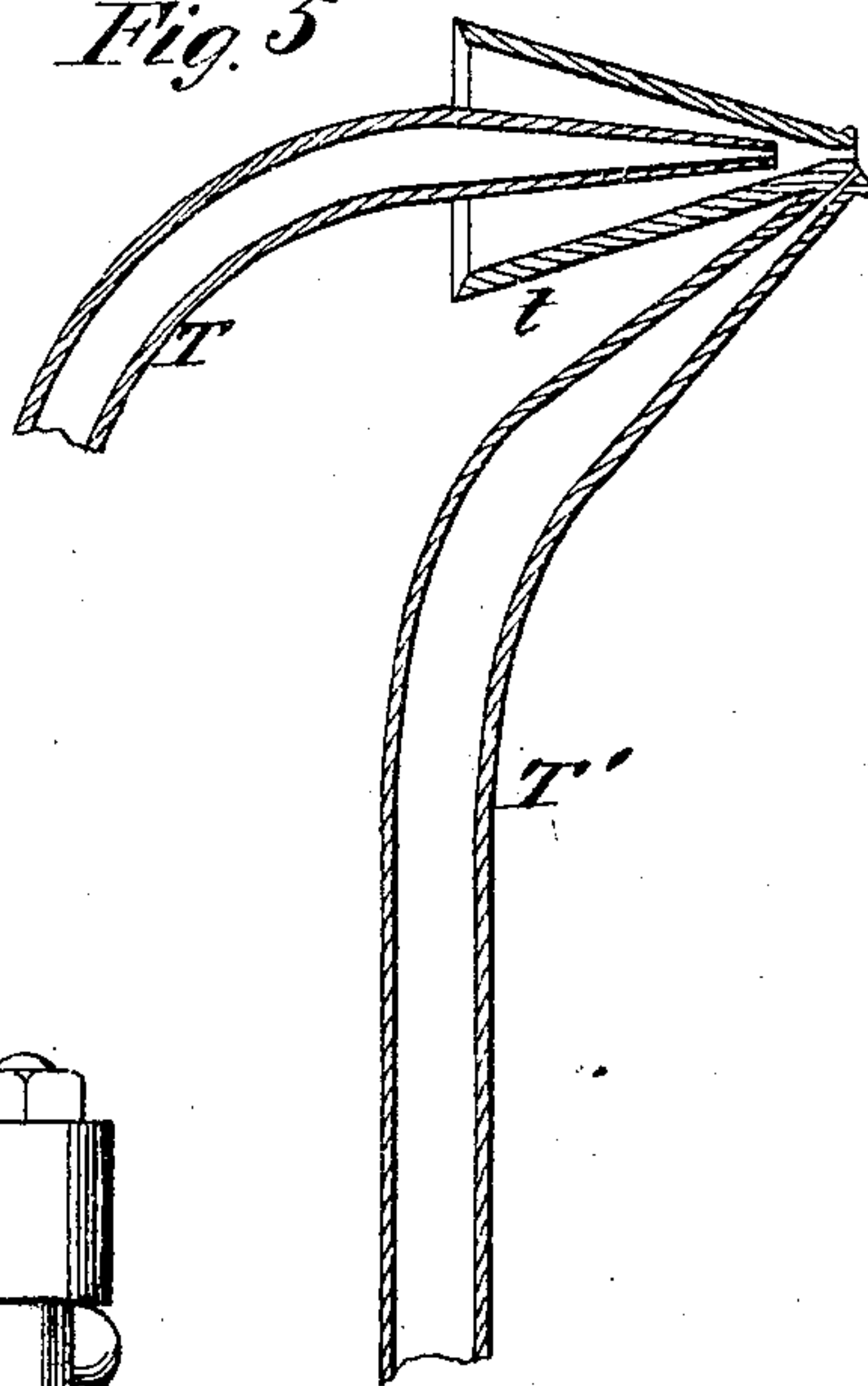
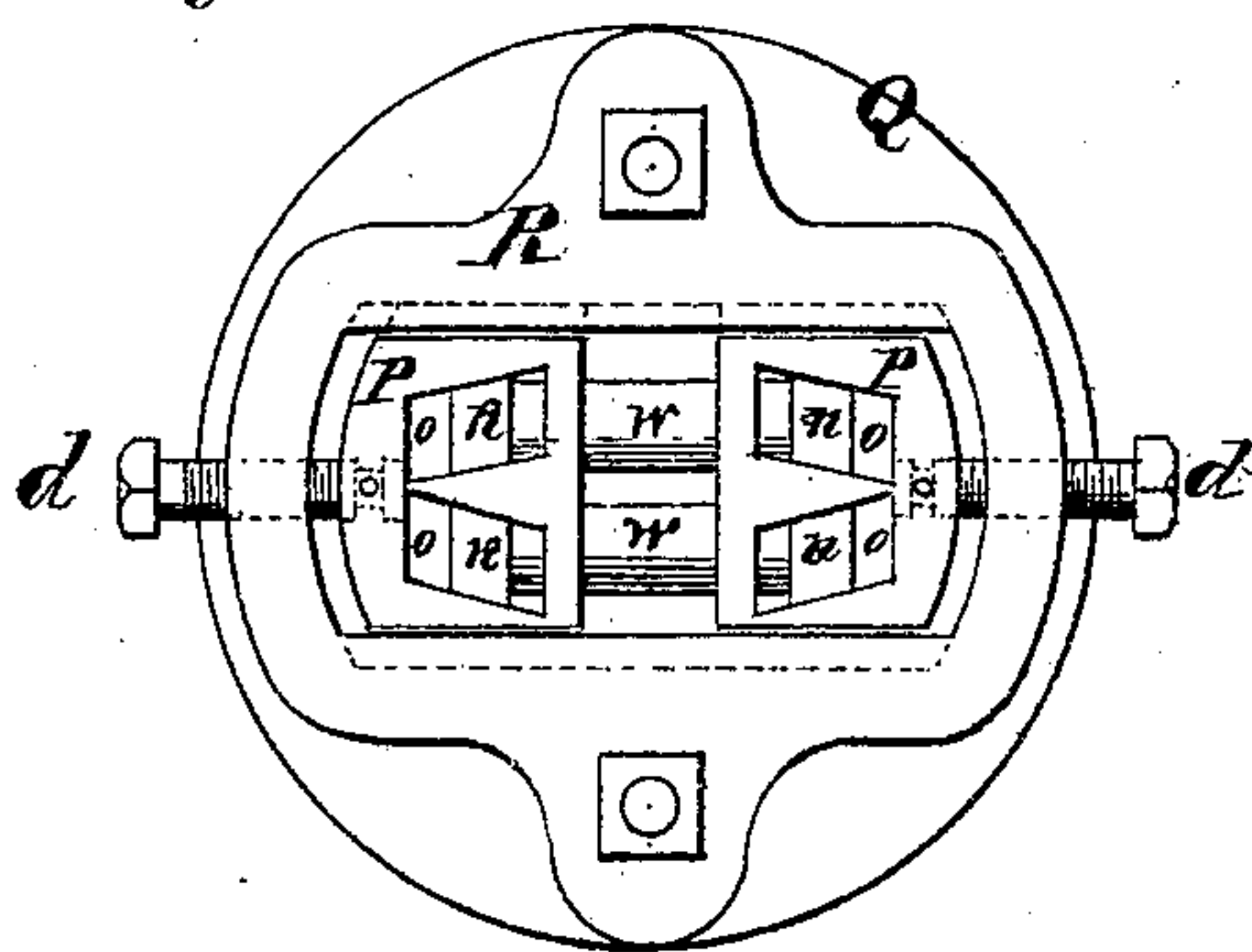


Fig. 4



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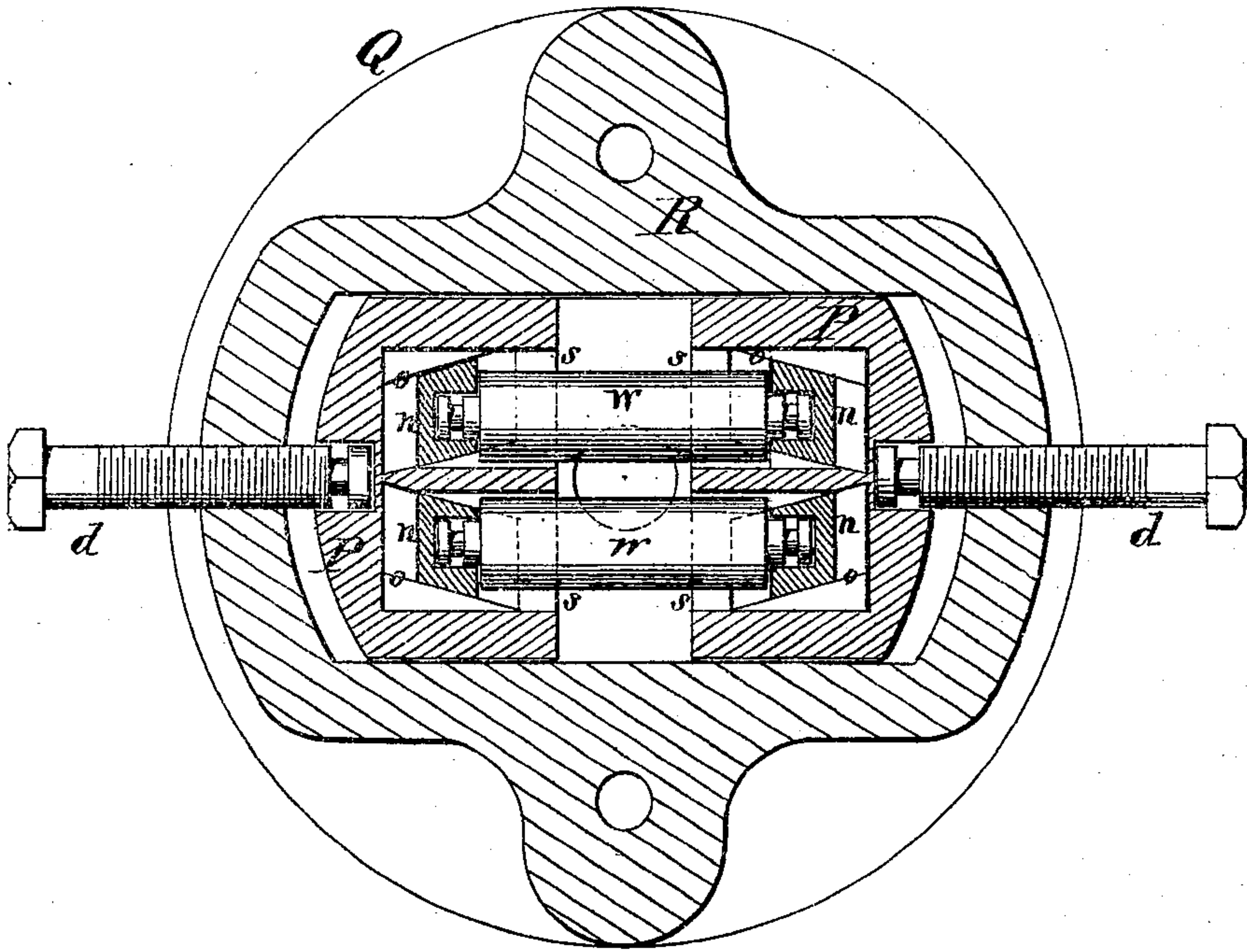
ARTHUR DAVID WILLIAMS.

Improvement in Machines for Twisting Bars of Metal.

No. 119,486.

*Fig. 6*

Patented Oct. 3, 1871.

*Witnesses.*

*R. V. Campbell*  
*J. A. Campbell*

*Inventor*

*Arthur David Williams*  
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*Mason Fenwick Sumner*  
*Attorneys.*



# UNITED STATES PATENT OFFICE

ARTHUR DAVID WILLIAMS, OF SCOTT'S CHAMBERS, PUDDING LANE, LONDON, ENGLAND.

## IMPROVEMENT IN MACHINES FOR TWISTING BARS OF METAL.

Specification forming part of Letters Patent No. 119,486, dated October 3, 1871.

*To all whom it may concern:*

Be it known that I, ARTHUR DAVID WILLIAMS, of Scott's Chambers, Pudding Lane, in the city of London, England, have invented Improvements in Machinery for Twisting Metal Bars and Making Augers and Drills; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing making part of this specification, in which—

Figure 1, Plate 1, is an elevation of one side of the machine. Fig. 2, Plate 1, is a diametrical section through the hollow shaft and roller-chuck by which the bars are twisted. Fig. 3, Plate 2, is a front elevation of the machine. Fig. 4, Plate 2, is a face view of the roller-chuck. Fig. 5, Plate 2, is a sectional view of pipes for introducing the spray through which the bars pass. Fig. 6, Plate 3, is a section taken horizontally through the roller-chuck.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to certain novel improvements in machinery for forming twisted augers and drills. My object is to twist bars spirally by drawing them between rollers which are applied to a hollow chuck, while the ends by which said bars are held and drawn through the rollers are not allowed to revolve, and while the twisted shape given to the bars is properly preserved by injecting a fluid upon them in the form of spray, as will be hereinafter explained.

The following description of my invention will enable others skilled in the art to understand it.

In the annexed drawing, Plates 1 and 2, A represents a strong frame, in which are the following working parts of the machine: B represents a driving-drum, which is fixed on a horizontal axle carrying on its extremities bevel spur-wheels C and D. These wheels engage respectively with spur-wheels F and E, wheel F being fixed on a vertical hollow shaft, G, and wheel E being fixed on a vertical shaft which carries an endless screw, H. This screw H gears with a helicoidal cog-wheel, I, which is fixed on a shaft, J, which latter carries on each end a chain-wheel, b. In the same planes with wheels b are other chain-wheels b b, applied so as to turn on studs J J<sup>2</sup>. Working on the chain-wheels b are two chains, a a, the ends of which are connected to a traveler, N, by means of adjustable eyes or links, as

shown in Fig. 1, which traveler is provided with a clamp, U, for holding the ends of the bars while they are being twisted. This traveler N works on a pair of vertical guide-rods, S S. The water-pipe T' presents a contracted outlet toward the axis of the hollow shaft G, which outlet is arranged in such relation to the orifice of an injector, T t, that steam or air forced through this injector will convert water issuing from pipe T' into spray, which will be directed against the bar while it is being twisted. If desirable a number of these spray-forming devices may be arranged around a common center coinciding with the vertical axis of the hollow shaft G, so that the twisted bar will be supplied with spray from different points. A centrally-perforated disk, Q, is fixed on the lower end of the hollow shaft G, and to the bottom of this disk a chuck, R, is secured so as to rotate with said shaft and disk. The chuck Q is provided with two rectilinear heads, P P, working in grooves, and made adjustable by means of screws d d. Each one of the heads P has two converging slots, o o, through it, in which are fitted to slide bearing-blocks n n for the ends of two rollers, w w. By means of annular grooves in the reduced ends of the rollers w w and pins which are inserted into the blocks n and received into said grooves, the blocks n n of each roller w are connected to it, as shown in Figs. 4 and 6. The ends of the adjusting-screws d d are connected to the sliding heads P P in the same manner as the rollers w w are connected to their bearing-blocks.

The operation of the machine is as follows: The auger-blank or bar, when heated to the required temperature, is passed through the hollow shaft G and between the chuck-rollers w w. The lower end of the said bar is then clamped in the traveler n, which should have been adjusted up to the chuck before the bar is inserted through the shaft G. Motion being given to the machine by the driving-drum B, it is transmitted to the shaft G and chuck R by the wheels C and F, and to the traveler N by the wheels D E H I b and belts a, the effect of which is that the bar will be drawn slowly down by the traveler at the same time that it is made to revolve on its own axis by the rollers w w in the chuck R. These combined motions give the bar a spiral twist, which is continued uniformly throughout its entire length. The pitch of the twist depends on



the relative velocities of the traveler N and chuck G, which can be varied by chain-wheels, over which the chains *a* work. By means of the outlets in the water-pipes jets of water are continuously directed on the bar as it emerges twisted from between the rollers *w w*, thus maintaining the regularity of the twist throughout the entire length of the bar. For some qualities of metal, instead of the arrangement of water-jets last described I prefer to convert the jets of water or other liquid used into spray, the temperature of which can be regulated at will by any convenient contrivance. The injector shown in the drawing, Fig. 5, will be found to answer an excellent purpose for producing the spray. The steam issuing from the orifice of the pipe T causes a blast of air through the funnel, which impinges on the liquid jets or issues from the pipe T' and converts the same into spray.

I do not confine myself to the construction of the devices herein described for carrying my invention into effect, as other means equivalent thereto may be adopted which will operate on the same principle.

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

1. The chucking apparatus, constructed substantially as described.
2. The combination of the revolving and adjustable chucking apparatus with the traveler N' and moving chain M, substantially as described.
3. The combination, with the chucking apparatus and the traveler N', of the pipe T', substantially as described.
4. The combination, with the chucking apparatus and the traveler N', of the pipes T' & T, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ARTHUR DAVID WILLIAMS.

Witnesses:

CHARLES JAMES WINTERGILL,  
AUGUSTINE LOUIS DUNPHY.

(66)