(No Model.) 4 Sheets—Sheet 1.

# W. J. DALY.

## PIPE THREADING MACHINE.

No. 396,988. Patented Jan. 29, 1889.

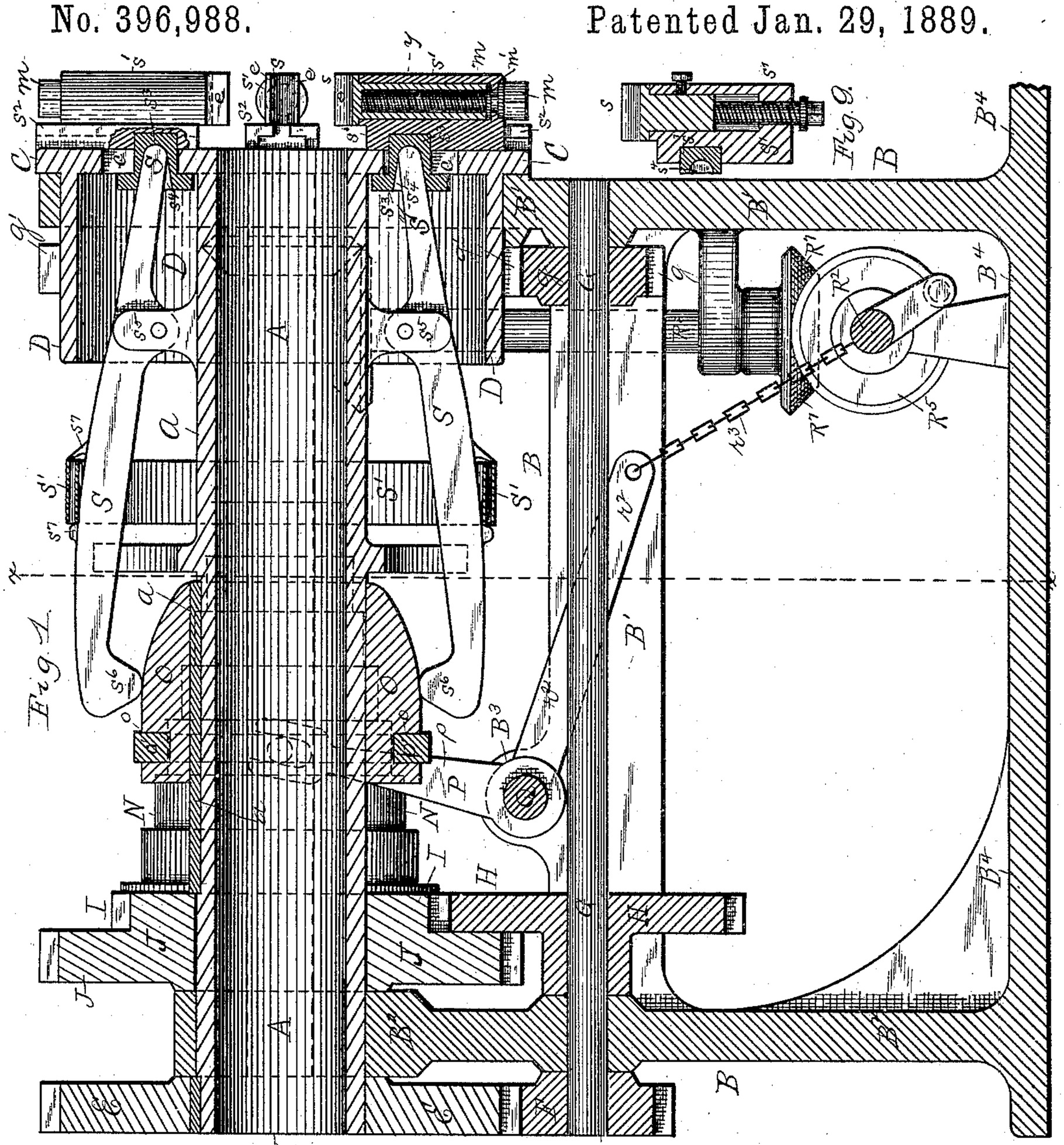

Fig. 1.

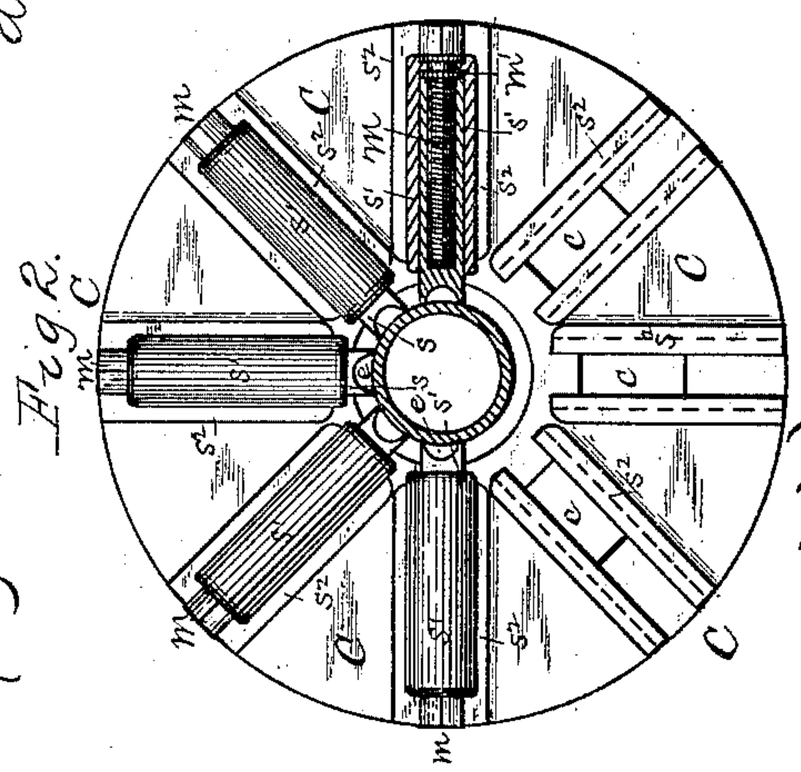

Fig. 2.

Fig. 9.

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(No Model.)

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# W. J. DALY.

## PIPE THREADING MACHINE.

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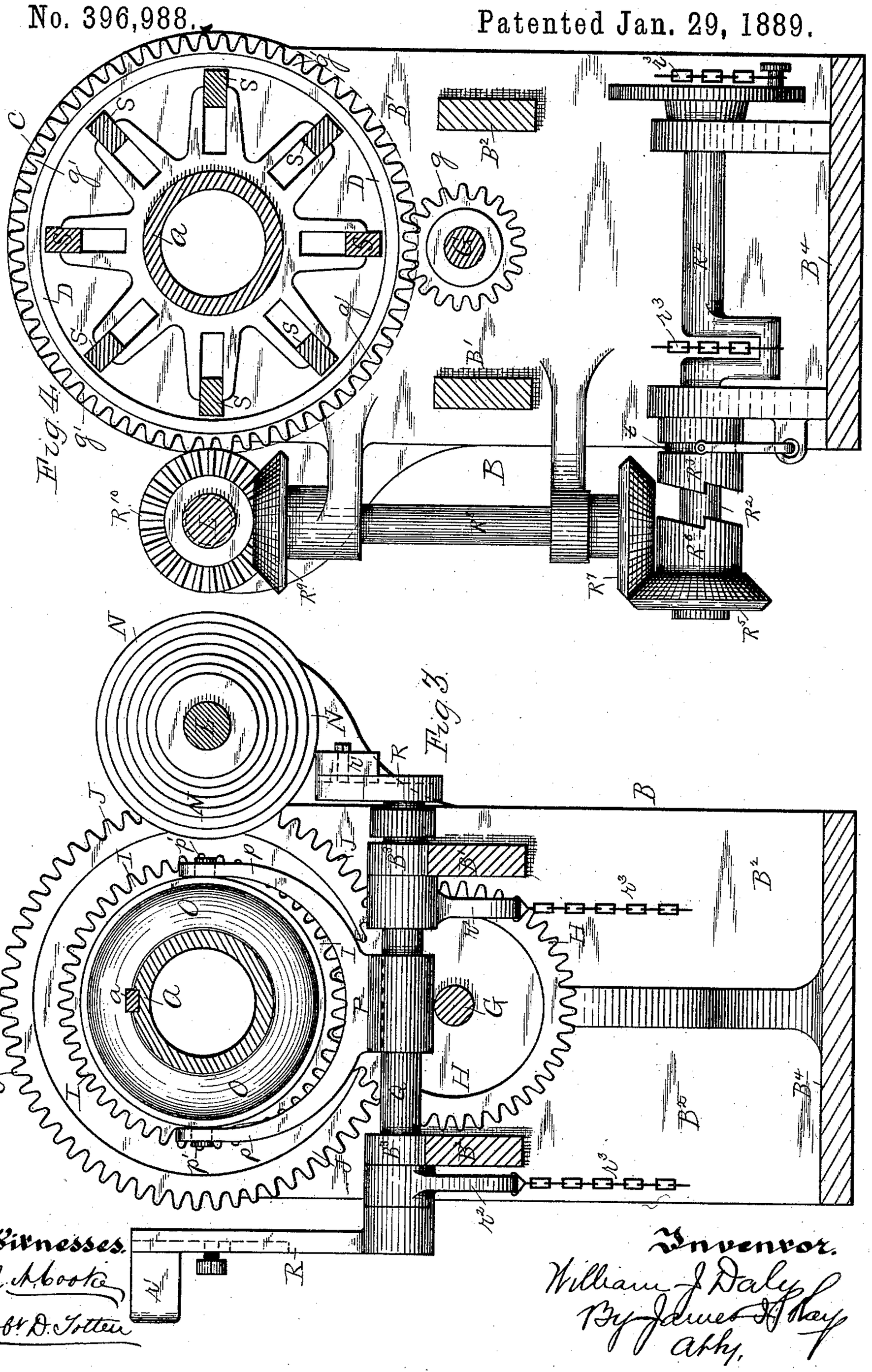

Fig. 4.



Fig. 5.

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(No Model.) 4 Sheets—Sheet 3.

# W. J. DALY.

## PIPE THREADING MACHINE.

No. 396,988. Patented Jan. 29, 1889.

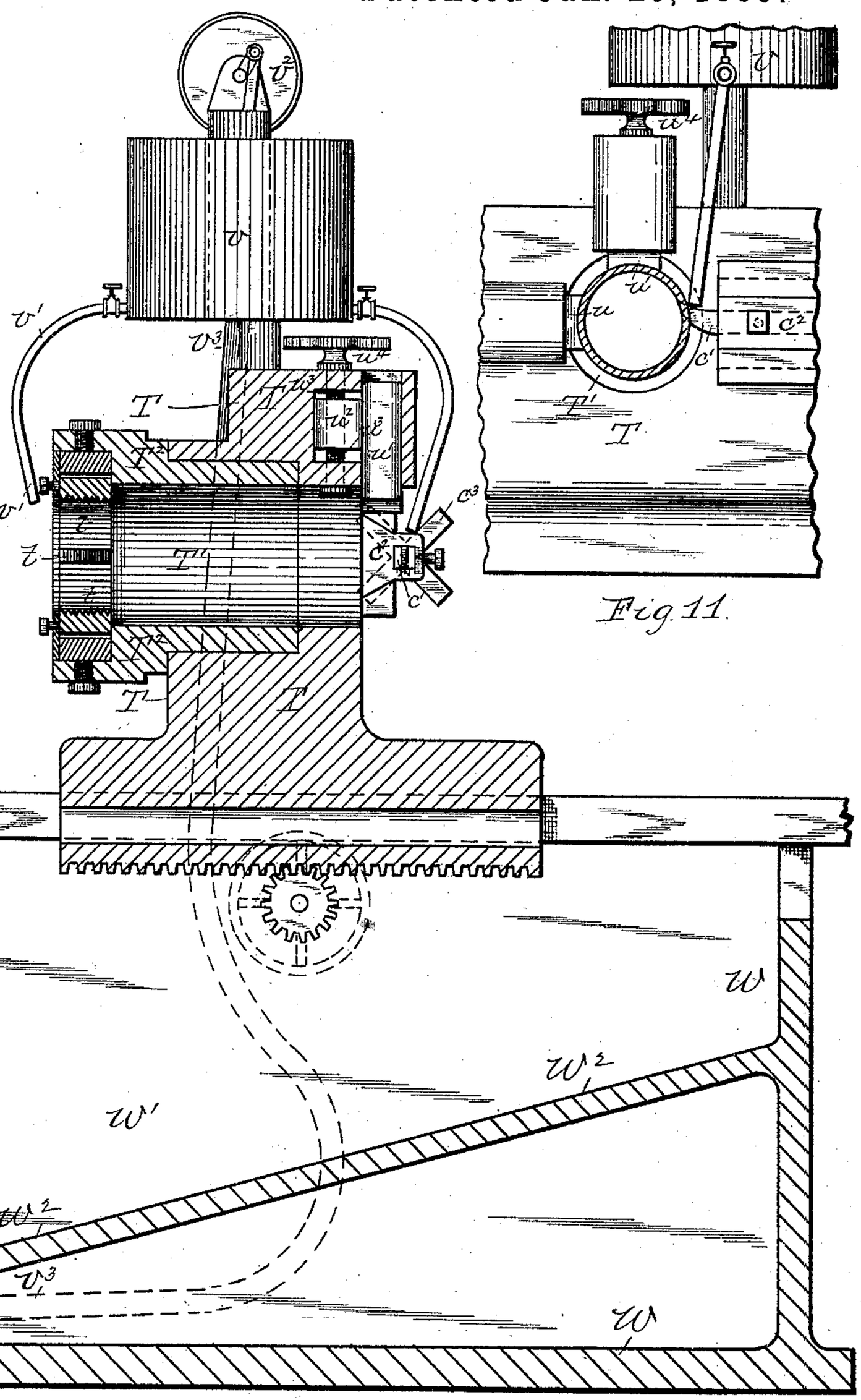

Fig. 5.



Fig. 11.

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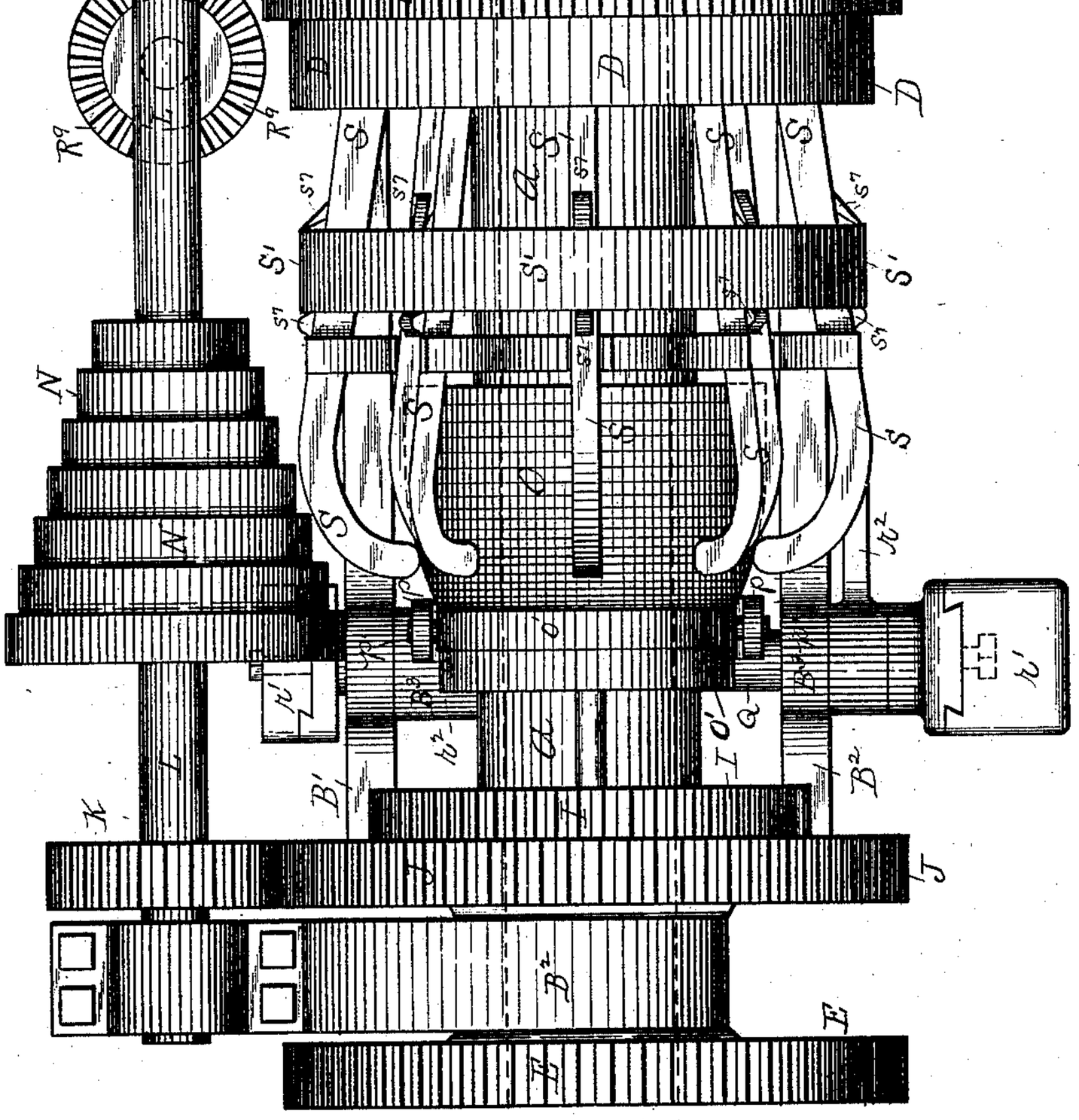
(No Model.) 4 Sheets—Sheet 4.

# W. J. DALY.

## PIPE THREADING MACHINE.

No. 396,988. Patented Jan. 29, 1889.

Fig. 6.



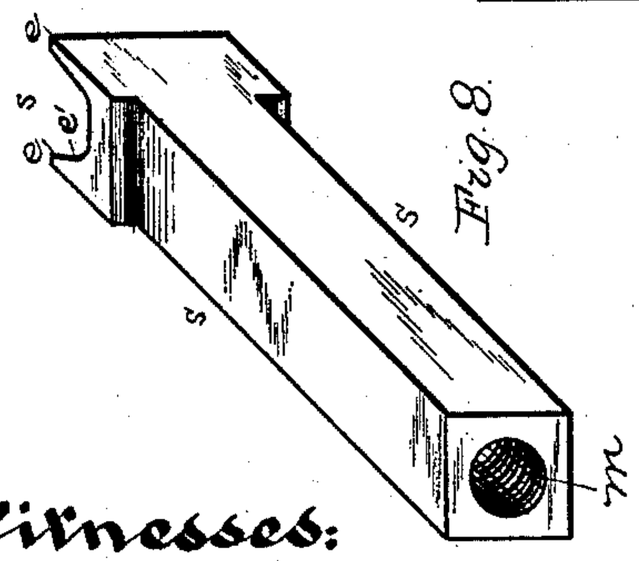


Fig. 8.

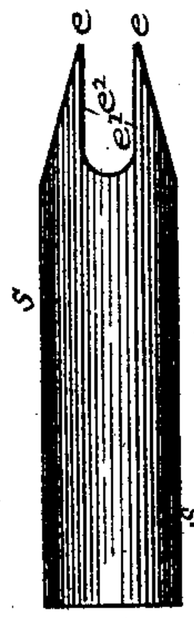


Fig. 10.

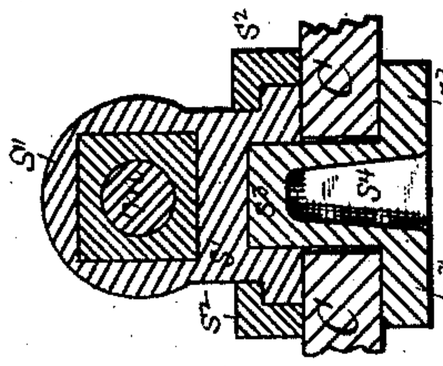


Fig. 7.

Witnesses:
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# UNITED STATES PATENT OFFICE.

WILLIAM J. DALY, OF McKEESPORT, ASSIGNOR OF ONE-HALF TO W. S. FOSTER, OF PITTSBURG, PENNSYLVANIA.

## PIPE-THREADING MACHINE.

SPECIFICATION forming part of Letters Patent No. 396,988, dated January 29, 1889.

Application filed June 14, 1888. Serial No. 277,065. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM J. DALY, a resident of McKeesport, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Pipe-Threading Machines; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to pipe-threading machines, and more especially to an apparatus for securing and gripping the pipe while the cutting operation is in progress. The machines of this class have generally been arranged with the threading devices stationary and the pipe-holding devices rotary; but in such machines the means for centering the pipe to be threaded have been objectionable, in that they required more time and labor than desirable for rapid work and were liable to get out of adjustment and throw the work out of center.

The principal object of my invention, therefore, is to provide an apparatus by which the pipe is accurately centered with reference to the screw-cutting dies and securely held by gripping jaws while said pipe is revolved and fed to the screw-cutting dies, and the pipe is quickly released after the cutting of the same.

To these ends my invention consists in certain improvements and combinations of parts, all of which will be more fully hereinafter set forth.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a longitudinal section of the gripping devices of my improved pipe-threading apparatus. Fig. 2 is a front view of the face-plate, showing the gripping-jaws. Fig. 3 is a vertical cross-section on the line *x x*, Fig. 1, looking toward the rear of the machine. Fig. 4 is a similar view on the line *x x*, Fig. 1, looking toward the front of the machine. Fig. 5 is a vertical central section of the pipe threading and cutting dies. Fig. 6 is a plan view of the gripping apparatus, showing a modified arrangement of the sliding cone. Fig. 7 is a cross-section of one of the grippers and its adjusting mechanism on the line *y y*, Fig. 1. Fig. 8 is a perspective view of the gripping-jaw employed therein. Fig. 9 is a longitudinal section of another means of adjusting the gripping-jaws. Fig. 10 is a view of another form of gripping-jaw, and Fig. 11 is a detail view illustrating the cutting-die and mechanism for supporting the pipe.

Like letters of reference indicate like parts in each.

The bed of the machine supports the frame B of the gripping apparatus (shown in Fig. 1) and forms the bed or foundation, W, on which the threading-dies (shown in Fig. 5) slide, these parts being shown in separate figures to better illustrate them. I will first describe the gripping apparatus supported in the frame B.

The hollow spindle A is mounted and supported on the frame B, and has secured to one end a face-plate, C, with the inwardly-extending flange D, which forms the journal for the spindle in the forward standard, B′, of the frame B, while the other end is mounted in the rear standard, $B^2$, and has secured thereto the gear-wheel E, by means of which said spindle is rotated. Meshing with said gear-wheel E is the pinion F, attached to the shaft G, which is parallel with the spindle A and revolves in suitable bearings in the standards B′ $B^2$, said shaft G carrying the gear-wheel H, which meshes with the gear-wheel I, journaled loosely on the hollow spindle A, said gear-wheel I being cast with or secured to the gear-wheel J, and with it turning loosely on said hollow spindle.

The gear-wheel J meshes with the pinion K on the shaft L, which is mounted in the machine-frame and at one side of and parallel with the hollow spindle A. The shaft L carries the driving-cone pulley N, to which the belts are attached and by which the speed of rotation of said shaft L is regulated.

Fitting around the hollow spindle A is the cone-shaped sleeve O, which is secured to the hollow spindle A and held in position by the feather *a* on the said spindle, which fits in a groove in said cone-shaped sleeve, so that the sleeve rotates with the hollow spindle A and is adapted to slide forward and backward thereon.

Fitting loosely around the cone-shaped

sleeve O near its base and within an annular groove, *o*, in said sleeve is the ring or annulus *o'*. A forked lever, P, secured to the rock-shaft Q, which is mounted in suitable supports, $B^3$, attached to the standards $B' B^2$, engages, by its arms *p*, the annulus *o'* on each side thereof, being secured or pivoted thereto by the pins *p'*, so that by the movement of the lever P the cone-shaped sleeve O is moved forward or backward, as desired, on the hollow spindle A.

On the shaft Q are secured the crank-levers R, the upright arms *r* of said levers carrying the weights *r'* at one end thereof, while the other arms, $r^2$, are connected by chains $r^3$ or other suitable means to cranks or disks on the crank-shaft $R^2$, which is mounted in suitable supports attached to the base $B^4$ of the frame B. On the said shaft $R^2$ is the clutch $R^3$, secured to the shaft by a feather, *t*, fitting in a groove in said clutch, said clutch being adapted to be moved forward and backward on said shaft and to revolve with it, while a beveled pinion, $R^5$, journaled loosely on the shaft $R^2$, has formed on it the corresponding clutch-face, $R^6$, said pinion $R^5$ also meshing with a beveled pinion, $R^7$, on the vertical shaft $R^8$, which shaft is rotated by means of a beveled pinion, $R^9$, secured to its upper end, and said pinion $R^9$ meshing in turn with the pinion $R^{10}$, secured to the horizontal shaft L. Any suitable means of throwing the clutch $R^3$ into connection with the clutch-face $R^6$ may be employed.

The shaft G has secured thereto the pinion *g*, meshing with the gear-face *g'*, surrounding the annular flange D, extending back from the face-plate C, this gear-face and pinion being employed to insure the smooth rotation of the hollow spindle A, the power being applied at the rear end by the gearing F E and at the forward end by the gearing *g g'*, so that the hollow spindle is relieved from substantially all strain in running.

On the face-plate C are the gripping-jaws *s*, arranged, preferably, at regular intervals from each other, said gripping-jaws being adjustably secured to blocks *s'*, which are arranged to slide in suitable guides, $s^2$, arranged radially around the plate C; and in order to operate said guide-blocks *s'* and the gripping-jaws connected thereto they are connected to socket-blocks $s^3$, extending through the radial slots *c* in the face-plate C and secured to the sliding blocks *s'*. In said socket-blocks $s^3$ is the socket $s^4$, into which the end of the lever S fits, said lever being pivoted to the hollow spindle A in the bearing $s^5$ and extending to the rear of said spindle, so that its rear end, $s^6$, is in contact with the cone-faced sleeve O. Each gripper is mounted separately in the manner above described and operated by its separate lever S, and the jaws are adjusted toward and from the pipe by means of the adjusting-screws *m*, the ends of each gripping-jaw *s*, which enters the block *s'*, being formed hollow and internally threaded, while its outer surface is angular, and the jaw slides in a like angular seat in the sliding blocks *s'*. The adjusting-screw *m* engages with the threaded interior of the jaw, and as the adjusting-screw is held from longitudinal motion within the sliding block (by means of a collar, *m'*, on the head of the screw) it is evident that the gripping-jaw can be fed out or in by turning the screw. The jaws may, if desired, have solid shanks fitting in the blocks *s'* and be adjusted by a screw pressing against the base of the shank and be held by a set-screw, as shown in Fig. 9. The jaws are preferably made with two biting edges, *e*, extending longitudinally of the pipe, so that instead of gripping the pipe by being forced laterally or at an angle against it they are so adjusted as to be forced longitudinally, so that the cutting-edges will be parallel with the surface of the pipe and so can hold it from turning without cutting deeply into it.

I have shown two forms of biting-edges, such as illustrated in Figs. 8 and 10, in one of which, Fig. 8, the inner faces of the biting-edges are inclined, as at *e'*, and in the other, Fig. 10, the inner faces are parallel, as at $e^2$, the biting-edges thus corresponding to two cold-chisels. I prefer the latter form, as it takes a more direct bite or hold on the pipe.

In order to force the rear ends, $s^6$, of the levers S against the cone-shaped sleeve O, I provide a spring-band, S', of sufficient length to encircle the levers and press against the same. I prefer to make this spring loose and hold it in place by lugs $s^7$ on said levers, so that the spring will press evenly on all of them, and to maintain this pressure even when the levers are expanded I extend the spring twice around the levers, as shown.

Instead of arranging the sliding cone O so as to spread the levers S and force the jaws *s* into the pipe by a forward movement thereof, its position may be reversed and the power applied by drawing the lever in the opposite direction, the levers S being correspondingly lengthened, as shown in Fig. 6.

The pipe cutting and threading apparatus which forms part of my invention, and which is shown in Figs. 5 and 11, is provided with the bed W, forming an extension of the bed on which the frame B rests, and on this bed slides the head or stock T, which is provided with the opening T' in line with the hollow spindle A, and through which the pipe to be threaded passes. At the entering end of the horizontal sliding threading head or stock $T^2$ are the threading-dies *t*, mounted in an ordinary adjusting apparatus, by which they may be advanced according to the depth of thread desired and withdrawn to permit the passage of the pipe to the cutting-dies. The cutting-die *c'* is secured to a slide, $c^2$, and is advanced and retracted by a hand-wheel, $c^3$. Sliding in the head T, opposite the cutting-die *c*, is the holding-die *u*, and above the opening T' is the holding-die *u'*, these dies being provided with nuts $u^2$, sliding in seats in the head, through

which nuts pass the feed-screws $w^3$, which are connected to the hand-wheel $w^4$.

Supported on the head T is the oil-tank $v$, and leading from said tank is the supply-pipe $v'$, which furnishes the oil necessary in the threading operation and allows it to be discharged freely upon the pipe near the cutters. A pump, $v^2$, operated by a crank-arm in the usual way, supplies the oil for the tank $v$ and is attached thereto, while a flexible tube, $v^3$, supplied with a suitable stop-cock, leads from the tank $v$ to the receptacle W′, situated beneath the head T, and into which all the waste oil used in the threading operation drips and is collected. This receptacle W′ has the inclined surface $W^2$ therein, by means of which all the drippings flow to the aperture $W^3$, to which is attached the flexible tube $v^3$, said aperture having as a covering the wire screen $W^4$, which prevents any particles of iron filings or other solid substances from entering therein.

In practicing my invention the pipe to be threaded is inserted in the hollow spindle A, through the rear end thereof, and the end to be threaded extends out beyond the surface-plate C, according to the distance between the revolving gripping apparatus and the threading-die, the pipe being passed through until it also passes through the opening T′ of the sliding cutter-head $T^2$.

When the pipe has been properly adjusted, the hand of the operator is applied to the lever $r$, and said lever is forced forward, thereby forcing the forked lever P and the cone-shaped sleeve O toward the face plate C. By this forward movement of the cone-shaped sleeve O the rear ends, $s^6$, of the levers S travel up the face of the said sleeve and are forced or spread farther apart, while the other ends of said levers are drawn closer together, and through them the gripping-jaws $s$ (suitably connected thereto in the manner hereinbefore described) are driven into the pipe passed through the hollow spindle A, so that the pipe is thus securely gripped on all sides by said gripping-jaws, and at the same time is accurately centered. The end of the pipe to be threaded is thus brought in position for cutting off and turning up the end prior to threading, the head or "back slide" T being moved along its track or way on the bed W until brought to the proper position, and the holding-dies $u\,u'$ are advanced to support the pipe against the pressure of the cutter $c$. Power is now applied to rotate the hollow spindle A, (said spindle being rotated from the power-shaft L through the gearing K J I H, shaft G, and gearing F E and $g\,g'$,) and as the tube is thus rotated within the hollow spindle the cutting-die $c$ cuts off the end of the pipe, which is sustained against the pressure thereof by the holding-dies $u\,u'$, the die $u$ holding the pipe against upward movement and preventing its wabbling, as often happens in the ordinary dies. As soon as the cutting operation is completed, the cutter $c$ and dies $u\,u'$ are withdrawn, the head drawn back beyond the pipe, and the threading-dies $t$ closed. The head is then forced against the pipe until the taps of the threading-dies obtain a hold thereon, when the pipe as it is threaded draws the head forward until the proper thread is formed, and the threading-dies are then opened, the rotation of the hollow spindle stopped, and the operator, by forcing back the lever $r$, draws back the cone-shaped sleeve O, and through the levers traveling thereon releases the pipe from the gripping-jaws $s$, which are withdrawn by the spring $s'$, so that the pipe may then be removed.

Where a pipe of large dimensions is to be threaded and more power than can well be applied by hand to force the lever $r$ forward is required, a treadle is suitably arranged and connected with the clutch on the crank-shaft $R^2$, so that when the foot is applied to said treadle the crank-shaft will be rotated, and by the strain on the chains the lever $r$ will be forced forward with great power, and consequently the gripping-jaws $s$ caused to bite with corresponding force and hold the pipe firmly.

By the employment of the above-described apparatus I am enabled to produce a pipe with threads of regular form and pitch, on account of the accurate adjustment of the pipe to the screw-cutting device, and as all the levers and gripping-jaws connected therewith are operated by one movement and at the same time the pipe is thus very accurately centered. For pipes that vary in diameter within two or three inches no change or adjustment is necessary in the several parts of the apparatus, and thus much time and labor are saved. Where small pipes are to be threaded, only three or four of the grippers need be employed, the remaining grippers being disengaged from their levers or otherwise relieved.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In pipe-threading apparatus, the combination of the sliding block $s'$, the sliding gripping-jaw $s$, having a shank threaded interiorly and fitting within said sliding block, and the adjusting-screw $m$, engaging with said gripping-jaw and acting to advance or retract the same, substantially as and for the purposes set forth.

2. In pipe-threading apparatus, the hollow spindle A, having the face-plate C, provided with radial guides, in combination with the sliding blocks $s$, carrying the gripping-jaws and connected to the socket-blocks $s^5$, and the operating-levers S, substantially as and for the purposes set forth.

3. In pipe-threading apparatus, the hollow revolving spindle for holding the pipe to be threaded, mounted in the machine-frame B, and having the flange D, forming the journal for the spindle at one end of said frame, in combination with the longitudinal shaft G,

gear-wheels E F, gear-wheel *g*, and gear-face *g'* on said flange D, substantially as and for the purposes set forth.

4. In pipe-threading apparatus, the combination, with the hollow revolving spindle mounted in the machine-frame, of the sliding cone-shaped sleeve O, sliding thereon and connected thereto by a feather, and levers S, pivoted to the spindle and operating the sliding gripping-jaws *s*, and the rock-shaft Q, carrying the arm P, connecting with said sliding cone-shaped sleeve, and having the arm connected by chain with the crank-shaft $R^2$, substantially as and for the purposes set forth.

5. In pipe-threading apparatus, the combination of the hollow revolving spindle A, the cone-shaped sleeve O, sliding thereon, the levers S, connected to the sliding gripping-jaws *s*, and the spring *s'*, extending around and bearing upon the several levers and held in place by lugs or projections thereon, substantially as and for the purposes set forth.

6. In pipe-threading apparatus, the combination of the hollow revolving spindle having the cone-shaped sleeve O sliding thereon, and connections between said cone and the sliding gripping-jaws *s*, in combination with the rock-shaft Q, having arm P, engaging with the cone and arm or lever, and the crank-shaft $R^2$, having its cranks connected to said lever, and mechanism for rotating said crank-shaft connected thereto by a clutch, substantially as and for the purposes set forth.

7. In pipe-threading apparatus, the combination of a hollow revolving spindle adapted to engage with, center, and rotate the pipe, and sliding threading-die in line therewith and having a cutting-die, a holding-die opposite the same, and a holding-die above said cutting-die, substantially as and for the purposes set forth.

8. In a pipe-threading apparatus, sliding gripping-jaws, each having two biting-edges extending longitudinally of the pipe to be threaded, the inner faces of which biting-edges are substantially parallel, substantially as and for the purposes set forth.

In testimony whereof I, the said WILLIAM J. DALY, have hereunto set my hand.

WILLIAM J. DALY.

Witnesses:
ROBT. D. TOTTEN,
J. N. COOKE.