(No Model.) 3 Sheets—Sheet 1.

D. O. JAMES.

PIPE THREADING MACHINE.

No. 480,871. Patented Aug. 16, 1892.

Fig. 1.

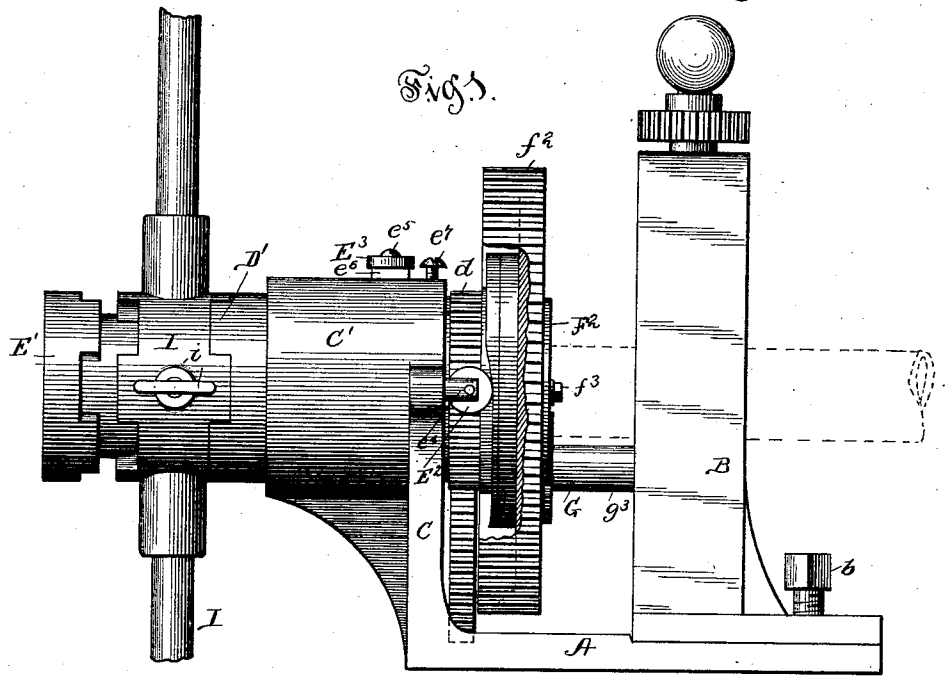
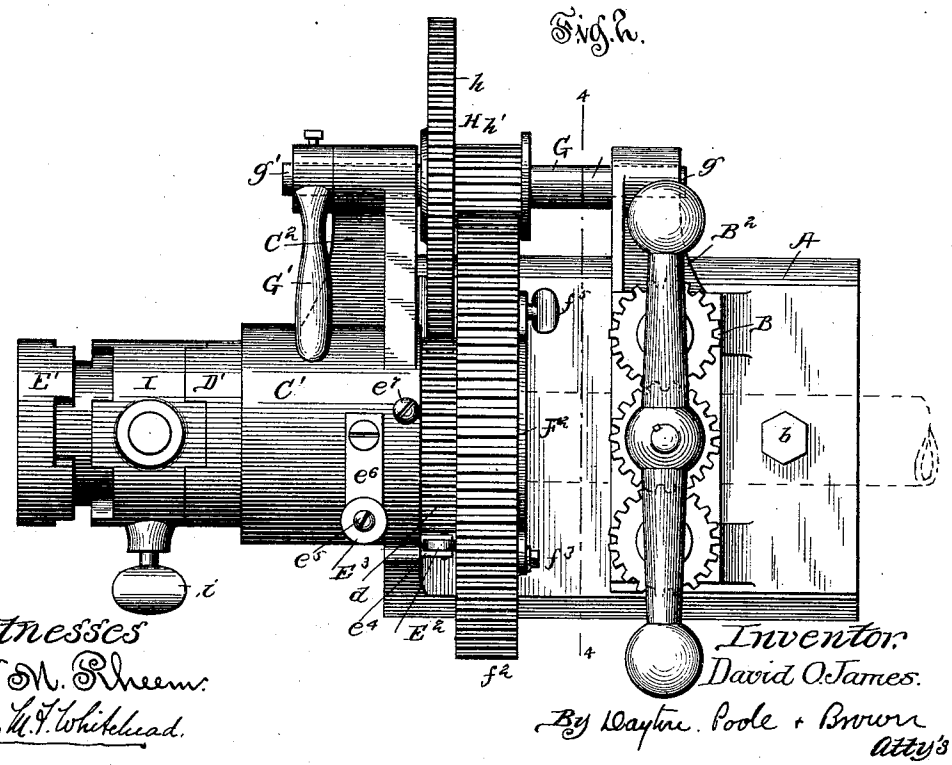


Fig. 2.



Witnesses
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Louis M. T. Whitehead.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 2.

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PIPE THREADING MACHINE.

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Fig. 3.

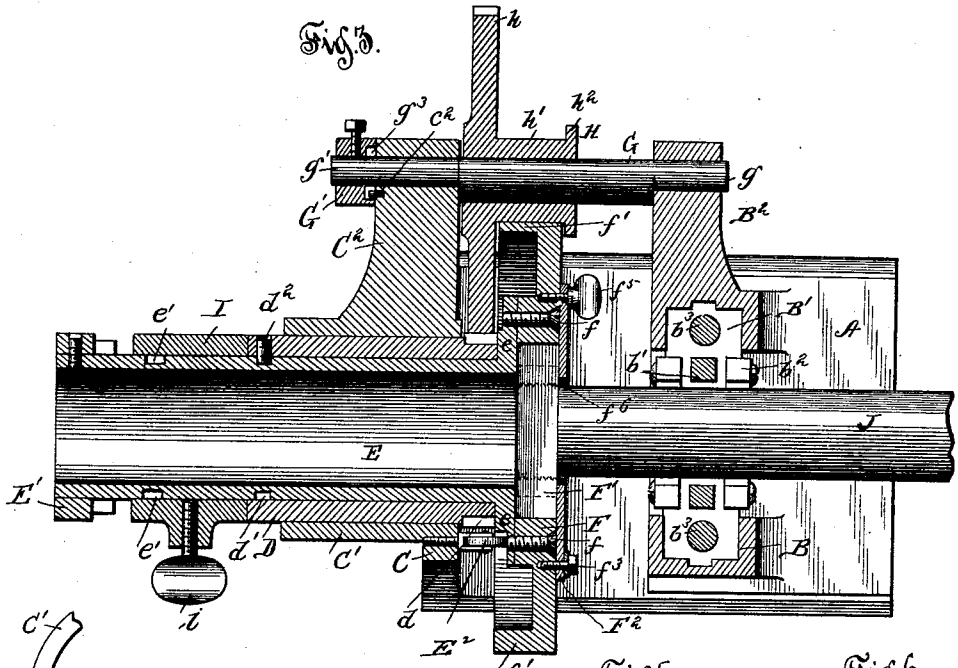


Fig. 8.

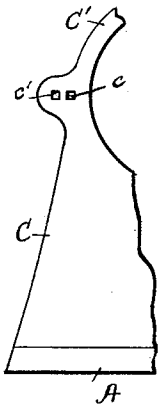


Fig. 4.

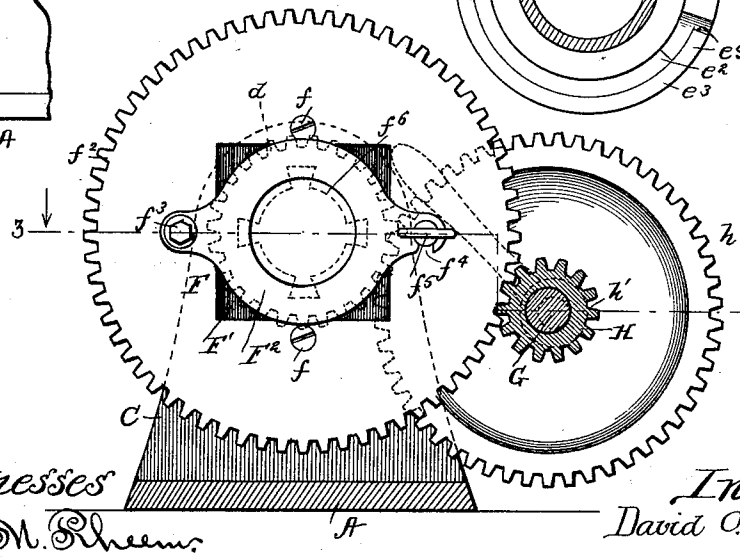


Fig. 5

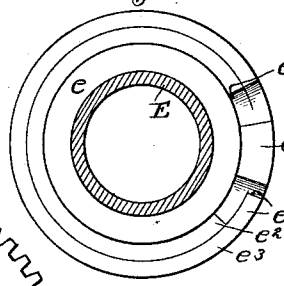


Fig. 6.

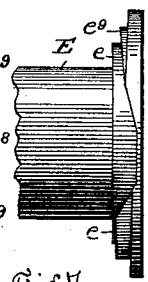
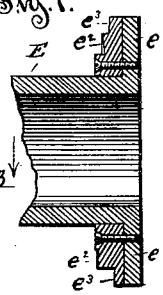


Fig. 7.



Witnesses

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(No Model.)

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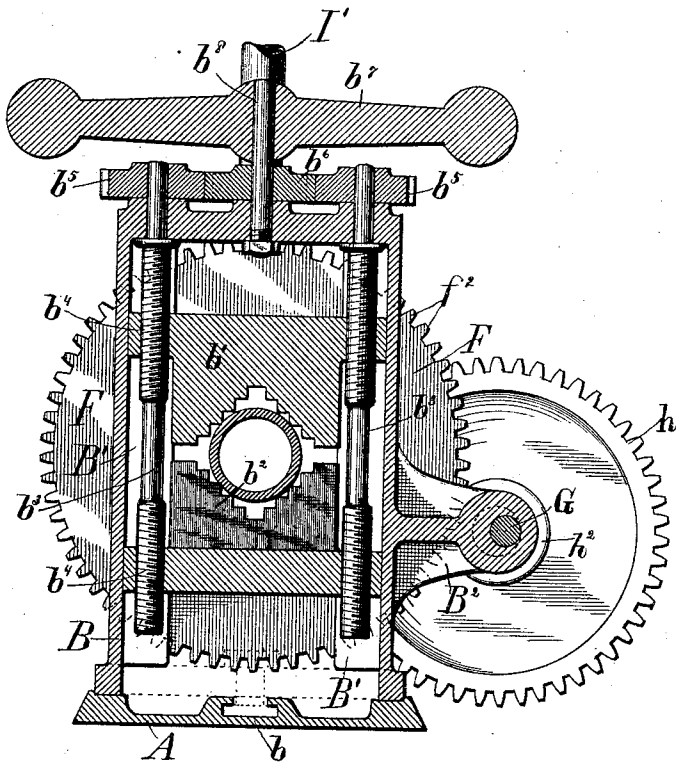
Fig. 9.



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his Attys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

DAVID O. JAMES, OF CHICAGO, ILLINOIS, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO HIMSELF AND JOHN GRANT, OF SAME PLACE.

PIPE-THREADING MACHINE.

SPECIFICATION forming part of Letters Patent No. 480,871, dated August 16, 1892.

Application filed November 10, 1891. Serial No. 411,499. (No model.)

To all whom it may concern:

Be it known that I, DAVID O. JAMES, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Pipe-Threading Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to devices for threading pipes, and has for its object to provide a portable mechanism adapted to operate on pipes of different sizes.

The invention consists in the matters to be described in the following specification, and pointed out in the appended claims.

In the accompanying drawings, Figure 1 is side elevation of a pipe-threading machine embodying my improvements. Fig. 2 is a plan view of the same. Fig. 3 is a longitudinal horizontal section of the same on the line 3 3 of Fig. 4. Fig. 4 is a vertical transverse section on line 4 4 of Fig. 2. Fig. 5 is a detail section showing the rear face of the die-stock holder. Fig. 6 is a side elevation thereof. Fig. 7 is a detail of a removable cam-track. Fig. 8 is a detail illustrating a modification of one of the parts. Fig. 9 is a vertical transverse section through the pipe-clamp standard.

The operative parts of the machine are supported in a frame comprising a base A, adapted to be secured to a bench or table, and two standards B and C, one of which C is preferably cast integral with the base A, while the other standard B is cast separately from said base and secured thereon opposite the standard C by a screw bolt or bolts b. This removable standard B is provided with a vertical recess B′, in which is arranged any usual or preferred form of pipe clamp or vise—as, for instance, that indicated in the drawings, consisting of upper and lower jaws b' and b^2, adapted to move in guides formed by the sides of the said recess B′, and operated by vertical shafts b^3 b^3, each provided with a right and a left hand thread to engage correspondingly-tapped lugs b^4, projecting from the opposite sides of each jaw b' b^2. These screw-shafts b^3 b^3 are journaled in the closed top of the standard B and are fitted at their upper ends with pinions b^5 b^5, which mesh with an intermediate pinion b^6, rigidly secured to a handle or lever b^7, journaled on a stout post b^8, which projects from the top of the standard B midway between the upwardly-projecting ends of the screw-shafts b^3 b^3. From this construction it will be seen that the movement of the handle b^7 and rotation of its pinion b^6 will cause the simultaneous rotation of the pinions b^5 b^5 and their shafts b^3 b^3, thus moving the upper and lower jaws b' and b^2 an equal distance in opposite directions.

The fixed standard C is provided at its upper end with a hollow boss C′, forming a horizontal bearing, in which is journaled a sleeve D, provided at its inner end or that adjacent to the pipe-clamp with a gear-wheel d, which may consist of teeth formed in the periphery of said sleeve.

Within the sleeve D is journaled a second sleeve E, the inner end of which is provided with a flange e, and to the face of this flange e a die-stock F is secured by bolts f, passing through said die-stock and into said flange. The die-stock F is in the form of a disk, having a peripheral flange f', which overhangs the flange e of the sleeve E, and is provided exteriorly with gear-teeth f^2. These sleeves, with their accompanying parts, are designed to be bodily moved or advanced toward the pipe-clamp in the operation of cutting a thread.

Arms B^2 and C^2 project horizontally from one side of the standards B and C, and are provided at their outer ends with bearings, in which the ends g g' of an eccentric-shaft G are seated. The eccentric of this shaft G is of a length to extend from the arm B^2 of the standard B to the arm C^2 of standard C, and upon this eccentric is journaled a hub H, adapted to slide horizontally on the eccentric and provided with a gear-wheel h, adapted to mesh with the pinion d, formed at the end of the sleeve D, and provided, also, with a pinion h', adapted to mesh with the gear f^2, formed in the flange f' of the die-stock F. The forward end of the gear h' terminates in

a flange h^2 to engage the ends of the teeth of gear f^2, whereby the hub and its gears are caused to move horizontally on the eccentric as the sleeve E moves backward or forward. A rotary movement may, owing to this arrangement, be transmitted from the outer sleeve D to the inner sleeve E and in the same direction, but at less speed, by shifting the eccentric-shaft G to throw its gears h and h' into mesh with the gear d of sleeve D, and with the gear f^2 of die-stock F, which is carried by and moves with sleeve E. The opposite movement of the eccentric-shaft G disconnects the train of gearing between the sleeves D and E, so that each of said sleeves may be rotated independently of the other. The shaft G is extended at one end g' to project beyond its bearing in the arm C^2, and to said projecting end of the shaft a handle G' is secured, by means of which the shaft may be rocked in its bearings to shift the eccentric, whereby the gear-wheel h and pinion h' of the hub H are thrown into or out of mesh with the pinion d and gear-wheel f^2. The inner end of the handle G' is provided with a curved recess g^3 to receive a stop-pin c^2, projecting from the sides of arm C^2, the handle being so adjusted upon the end of shaft G that the ends of the recess will abut against the pin c^2 at the opposite extremes of the throw of the eccentric, thus affording a stop to prevent the rocking of the eccentric-shaft past the points where the gears h and h', carried thereby, are in mesh or out of mesh with the gears of the sleeves D and E. The inner revoluble sleeve E is of greater length than the outer revoluble sleeve D, within which it is journaled, and the outer end of said sleeve E projects a considerable distance beyond the outer end of the sleeve D and has rigidly secured upon its extreme end a removable clutch-faced or notched ring E', adapted to engage one side of a notched clutch-collar I, loosely mounted on said sleeve E. Said clutch-collar is provided with a set-screw i, by means of which it may be locked upon said sleeve E in engagement with said clutch-ring E', the sleeve E being to this end provided with an annular groove e' to receive the end of said set-screw i. A clutch face or member D' is also formed in the outer end of the sleeve D by notching the same or otherwise to engage the opposite or inner side of the clutch-collar I, whereby either one of the sleeves D or E may be rotated by said clutch-sleeve in either direction by application of power to the hand-levers I' thereof when the sleeve is shifted to engage one or the other of the clutch members E' or D'. To prevent longitudinal movement of the sleeves D and E with respect to each other, the inner sleeve E is provided with a peripheral groove d', which engages the inner end of a screw d^2, seated in a tapped hole in the outer sleeve D.

The die-stock F is provided centrally with a rectangular recess F' to receive a correspondingly-shaped screw-cutting die, (indicated by dotted lines in Figs. 3 and 4,) and a keeper-plate F^2 is pivoted at one of its sides on a stud f^3, projecting from the face of the die-stock adjacent to the recess F', and provided at its opposite side with a hook or notch f^4 to engage a thumb-screw f^5, entering the die-stock at the opposite side of the recess from stud f^3, said thumb-screw serving to clamp the keeper-plate F^2 securely in place over the recess F' and against the face of a die seated therein. The keeper-plate F^2 is provided with a central opening f^6 of sufficient diameter to admit of the free passage of the pipe J to be threaded.

The face of the flange e of sleeve E opposite the die-stock F is provided with two concentric cam-tracks e^2 and e^3, rising in opposite directions from a common level, which operate, in conjunction with friction-rollers E^2 and E^3, to give a lead to the die in starting the thread. The roller E^2 is carried by a fixed stud e^4, secured to the standard C, and travels on the inner cam-track e^2, which gradually increases in height from right to left, the conjoint operation of the roller and cam-track being to advance the inner sleeve E, with its die-stock and die, the distance of one thread in a complete revolution of said sleeve E when rotated from left to right in cutting a right-hand screw-thread. The roller E^3 is journaled on a stud e^5, projecting from an arm e^6, pivoted on the standard C, the arm e^6 being of such length that when moved on its pivot to a position parallel with the longitudinal axis of the revoluble sleeves the roller E^3 will project beyond the roller E^2 the distance of one thread, or, in other words, a distance equal to the height of the inner cam-track e^2. This roller E^3, when properly adjusted, travels on the outer cam-track e^3, which gradually increases in height from left to right, the conjoint operation of this roller and cam-track being to cause the positive advance of the inner sleeve E, with its die-stock and die, independently of the natural draft of the die, so that if the cam-track e^3 extends completely around the flange e the die would be advanced a distance of one thread in a complete revolution of said sleeve E when rotated from right to left in cutting a left-hand screw-thread. In the machine illustrated these cam-tracks are arranged side by side and extend completely around the flange e, less the length of the straight or flat part e^8 thereof, thus forcing the die forward positively until the cutting of one thread is nearly completed; but it will be understood that I do not confine myself to the use of cam-tracks of such length, nor to the particular arrangement thereof illustrated, as they may be of the same radius and extend but part way around the flange e, their highest points meeting opposite the straight part e^8 of the flange. This arrangement would provide for the positive advancement of the die during the cutting of a little less than half of one thread, and the adjustable roller E^3 could be dispensed with. The roller E^3 is retained in

position during this operation by contact of its arm e^6 against an abutment or stop e^7, projecting from the standard C; but upon reversing the movement of the die-stock and its accompanying parts the arm e^6 will swing on its pivot, thus moving the roller E^3 out of operative position.

As illustrated, the cam-tracks e^2 and e^3 form a part of the flange e of the sleeve E; but it will be understood that these cam-tracks may be formed on a separate ring of metal, which may be secured to said flange e in any approved manner, and in some instances such a construction is preferable, as it provides for the employment of cam-rings of different pitch, thus admitting of cutting a greater or less number of threads to the inch.

To insure the engagement of a die with the pipe to be threaded at the commencement of the operation, the cam-tracks at their lower or depressed ends join the level of the flange e at a greater or more abrupt angle, as indicated at e^9, than the angle of the thread to be cut, so that a roller E^2 or E^3, traveling upon this abrupt angle e^9, will force the die upon the end of the pipe, thus compensating for a slight degree of lost motion in the parts, which cannot well be avoided, owing to the difficulty of clamping the end of the pipe to be threaded tightly against the end of the die. In threading pipes of small diameter or of a material that is easily cut by the die the clutch-collar is adjusted to interlock with the clutch-ring E′, and the eccentric-shaft is turned to disconnect the gears h h' from the gears d and f^2, thus leaving the inner sleeve E, which carries the die-stock F, free to rotate independently of the sleeve D, within which it is journaled; but in operating on pipes of large diameter or hard meterial power is applied to the outer sleeve D by adjusting the clutch-collar I to engage with the clutch member d', formed in the end of said sleeve D, and the eccentric-shaft G is rocked to cause the engagement of the respective gears, thus causing the inner sleeve E and its die to rotate at a slower speed, but with a relative increase of power.

The machine illustrated is designed to operate upon pipes varying from one-eighth to two inches in diameter, the various dies being interchangable.

As in the operation of threading pipes the tendency of the workman is to press forward on the hand-levers of the clutch-sleeve, I therefore prefer to provide a means, as the groove and set-screw, by which the clutch-collar may be locked in engagement with the clutch-ring E′. Because of the tendency mentioned there is but little liability of the disengagement of said clutch-sleeve and the clutch member D′ during operation, and I therefore deem it unnecessary to provide a locking-groove adjacent to said clutch member D′ for the reception of the set-screw, though it may be supplied if deemed desirable.

In Figs. 1 and 2 of the drawings I have showed two separate rollers E^2 and E^3, each designed to be used in conjunction with but one of the concentric cam-tracks e^2 and e^3; but it will be understood that the same end may be attained by the use of a single roll, as E^2, adapted to be adjusted opposite either one of said concentric cam-tracks in any one of many ways—as, for instance, referring to Fig. 8, one side of the tubular boss C′ of the standard C may be provided with two sockets c and c', arranged at different distances from the center of said boss and each designed to receive the stem of the stud e^4, in which the roller E^2 is journaled.

What I claim is—

1. A pipe-threading machine comprising a pipe-clamp, a revoluble sleeve supported opposite said clamp and carrying a die-stock, a cam-track secured to said sleeve, and a roller arranged to travel upon said cam-track, substantially as described.

2. A pipe-threading machine comprising a pipe-clamp, a revoluble sleeve supported opposite said clamp and carrying a die-stock, two oppositely-arranged cam-tracks secured to said sleeve, and a roller arranged to travel upon each of said cam-tracks, substantially as described.

3. A pipe-threading machine comprising a pipe-clamp, a revoluble sleeve supported opposite said clamp and carrying a die-stock, two oppositely-arranged cam-tracks secured to said sleeve, a fixed roll arranged to travel upon one of said cam-tracks, and an adjustable roll adapted to be projected beyond the fixed roll and travel upon the other cam-track, substantially as described.

4. A pipe-threading machine comprising a pipe-clamp, two revoluble sleeves supported one within the other opposite said clamp and each provided at its inner end with a gear, a shaft arranged parallel with said sleeves and having thereon a hub provided with gears adapted to mesh with the gears of said sleeves, and a die-stock secured to the inner sleeve opposite the pipe-clamp, substantially as described.

5. A pipe-threading machine comprising a pipe-clamp, two revoluble sleeves supported one within the other opposite said clamp and each provided at its inner end with a gear, a laterally-movable shaft arranged parallel with said sleeves and having thereon a hub provided with gears adapted to mesh with the gears of said sleeves, and a die-stock secured to the inner sleeve opposite the pipe-clamp, substantially as described.

6. A pipe-threading machine comprising a pipe-clamp, two revoluble sleeves supported one within the other opposite said clamp and each provided at its inner end with a gear, a laterally-movable shaft arranged parallel with said sleeves and having thereon a hub provided with gears adapted to mesh with the gears of the said sleeves, an adjustable clutch-collar mounted on the inner sleeve, clutch

members carried by each of said sleeves, a die-stock secured to the inner sleeve opposite the pipe-clamp, and means for adjusting the shaft, substantially as described.

7. A pipe-threading machine embodying two standards, one of which is provided with a pipe-clamp, a sleeve journaled in the other standard and provided at its inner and outer ends with a gear and clutch member, respectively, another sleeve of greater length journaled within the first-named sleeve and provided at its inner end with a die-stock having a peripheral gear and at its outer end with a clutch member, a clutch-collar mounted on the outer end of the inner sleeve, a laterally-adjustable shaft journaled in arms projecting from the standards, a hub on said shaft provided with gears adapted to mesh with the gears of the sleeves, and a means for adjusting the shaft, substantially as described.

8. A pipe-threading machine comprising a pipe-clamp, two revoluble sleeves supported one within the other opposite said clamp and each provided at its inner end with a gear, a laterally-adjustable shaft arranged parallel with said sleeves and having thereon a hub provided with gears adapted to mesh with the gears of the sleeves, clutch members carried by each of said sleeves, a clutch-collar mounted on the inner sleeve between the clutch members, a die-stock secured to the inner sleeve opposite the pipe-clamp, and means for advancing the inner sleeve toward the pipe-clamp as said sleeve is rotated, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

DAVID O. JAMES.

Witnesses:
IRVINE MILLER,
C. A. NEALE.