(No Model.)

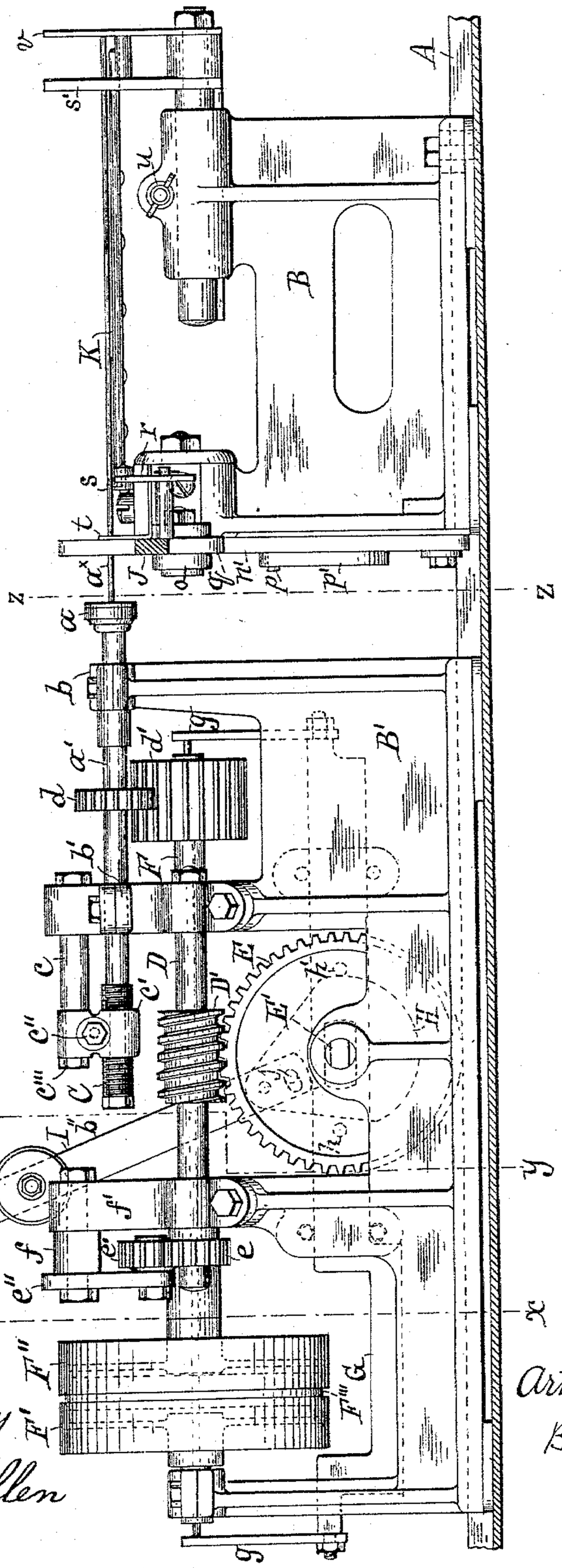
4 Sheets—Sheet 1.

A. J. MORSE.

THREADING MACHINE.

No. 597,732. Patented Jan. 25, 1898.

Fig. 1.



Witnesses.

Mark W. Dewey

Alvin D. Allen

Inventor.

Arthur J. Morse

By C. H. Duell

his Attorney.

(No Model.)

4 Sheets—Sheet 2.

A. J. MORSE.

THREADING MACHINE.

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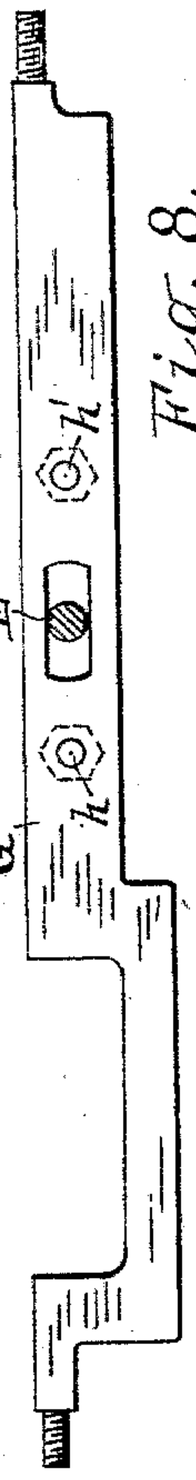

Fig. 8.

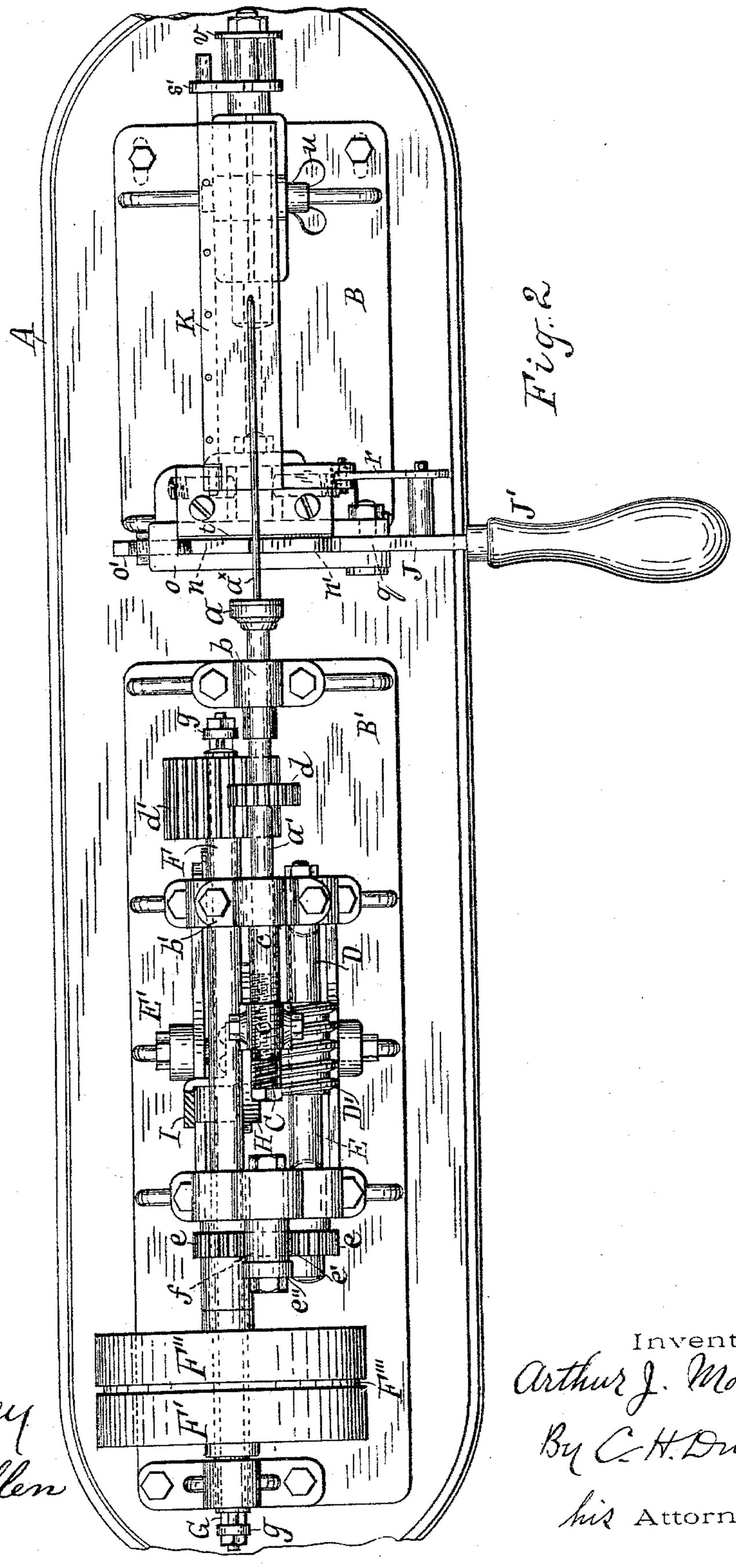

Fig. 2.

Witnesses.

Mark W. Dewey

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(No Model.) 4 Sheets—Sheet 3.

A. J. MORSE.

THREADING MACHINE.

No. 597,732. Patented Jan. 25, 1898.

Fig. 3.

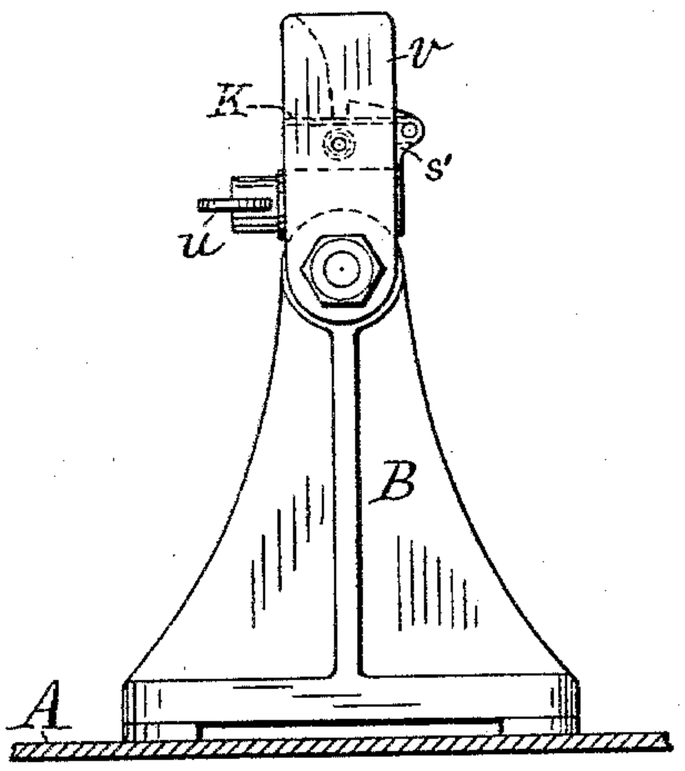


Fig. 4.

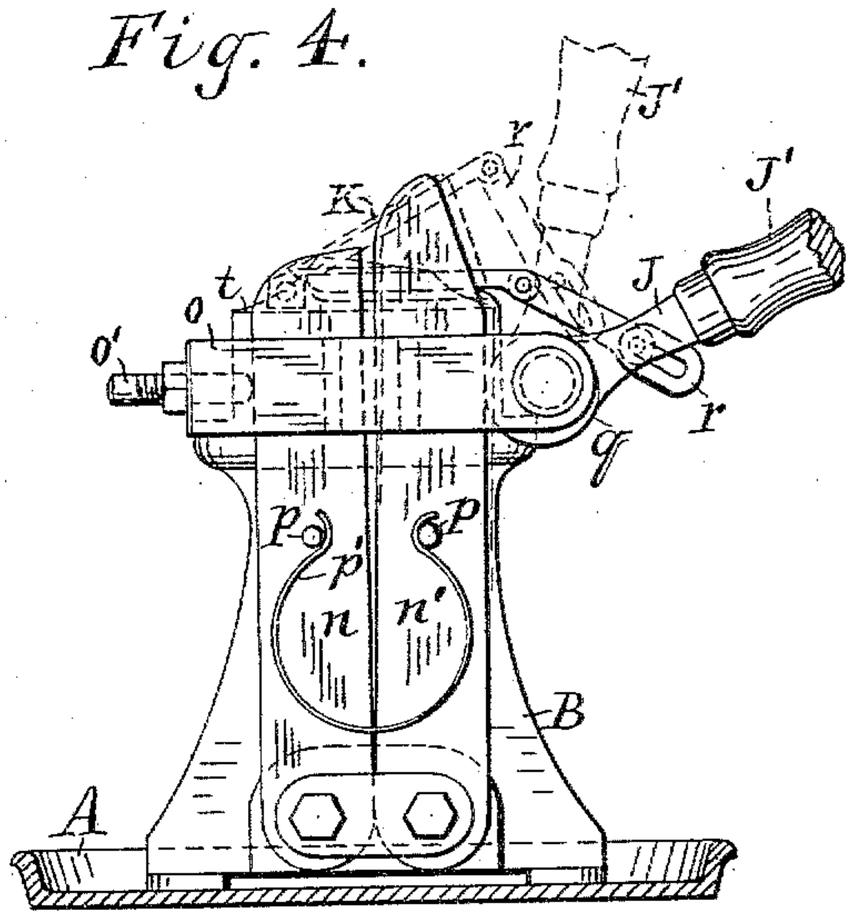


Fig. 5.

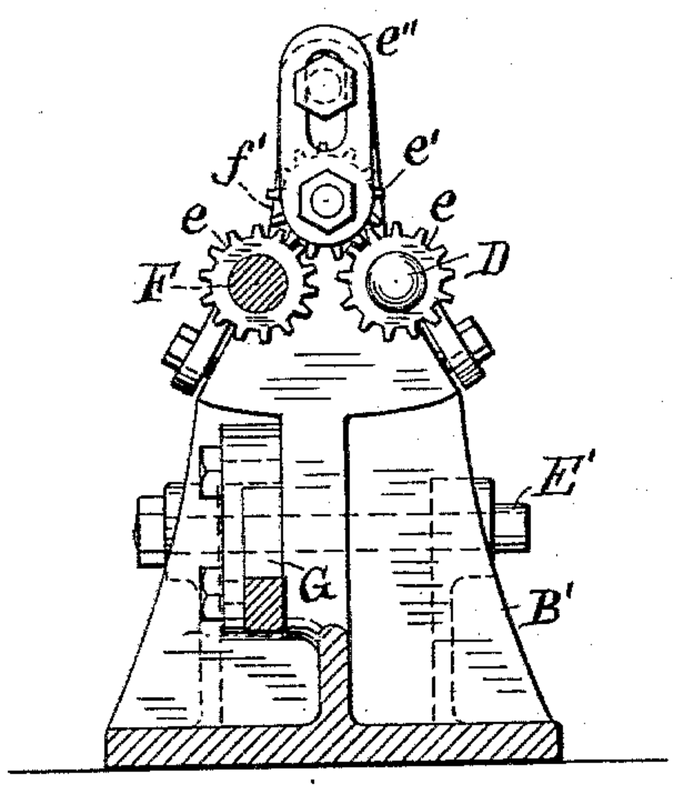
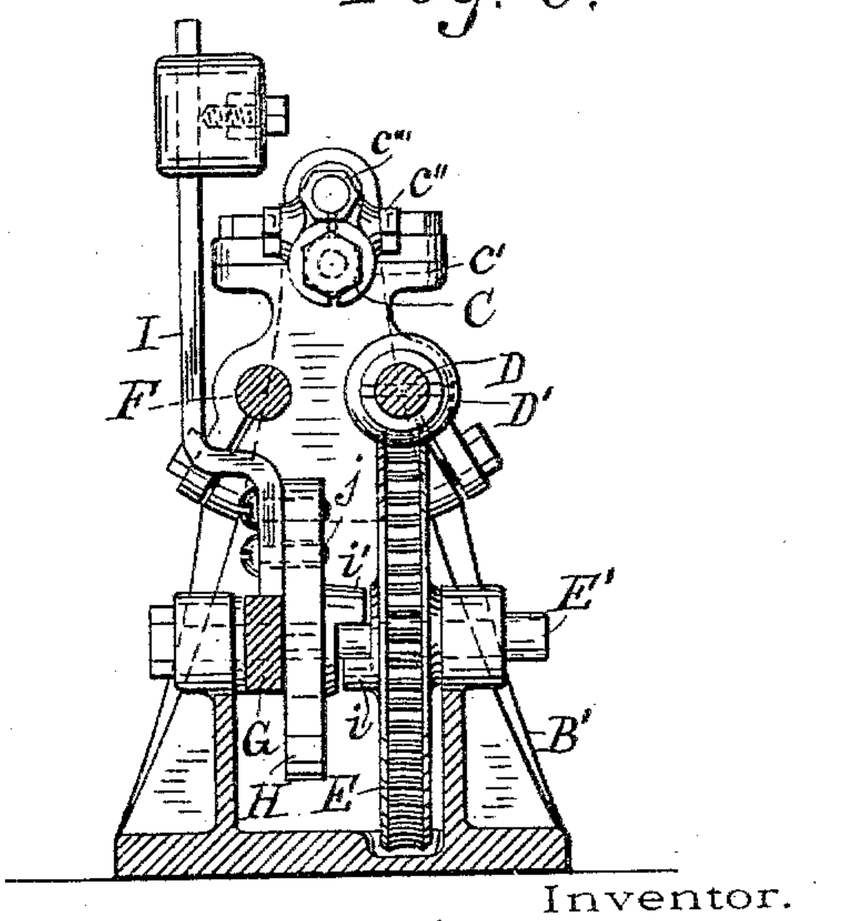


Fig. 6.



Witnesses.

Mark W. Dewey

Alvin D. Allen

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Arthur J. Morse

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his Attorney.

(No Model.)

4 Sheets—Sheet 4.

A. J. MORSE.

THREADING MACHINE.

No. 597,732. Patented Jan. 25, 1898.

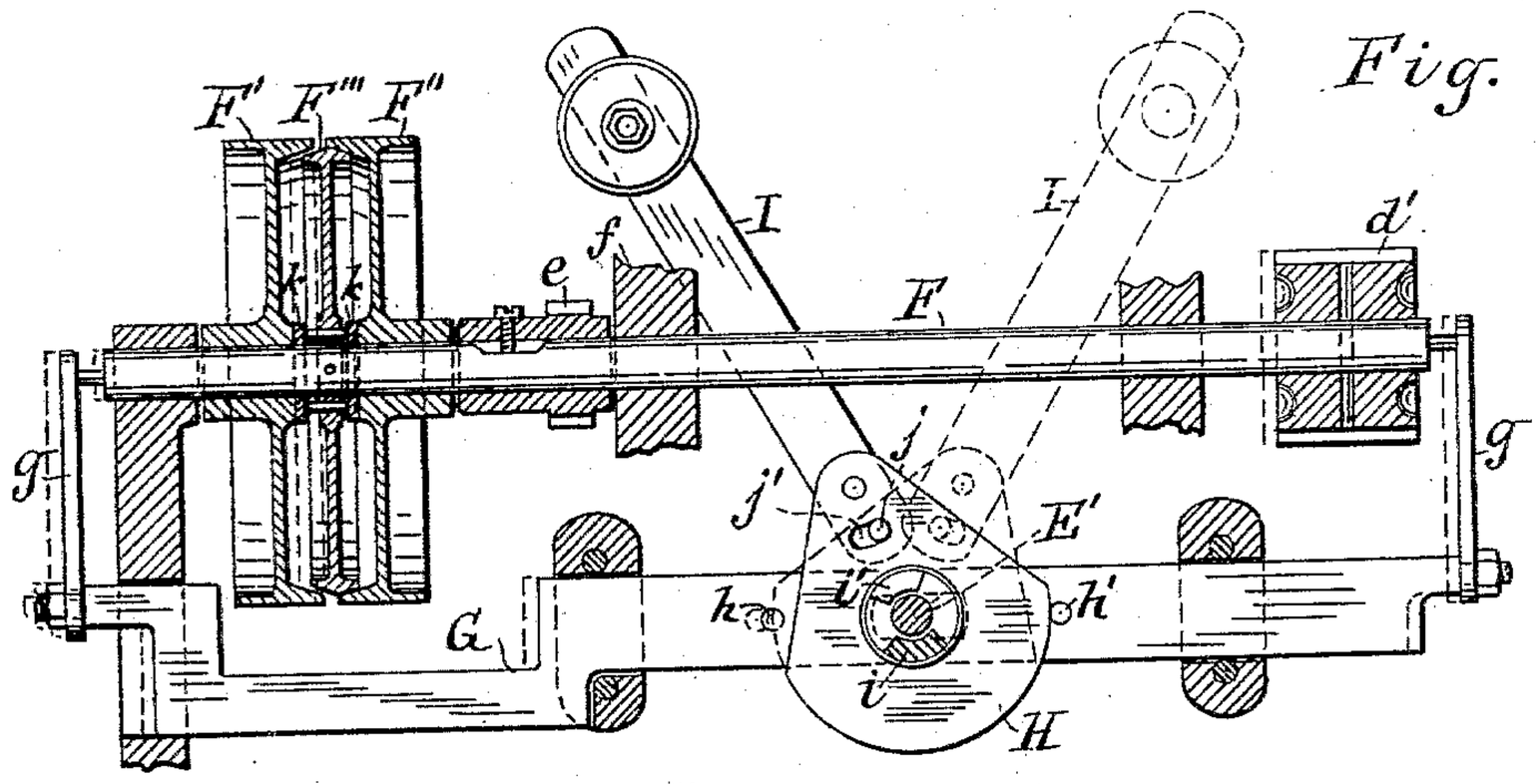

Fig. 7.

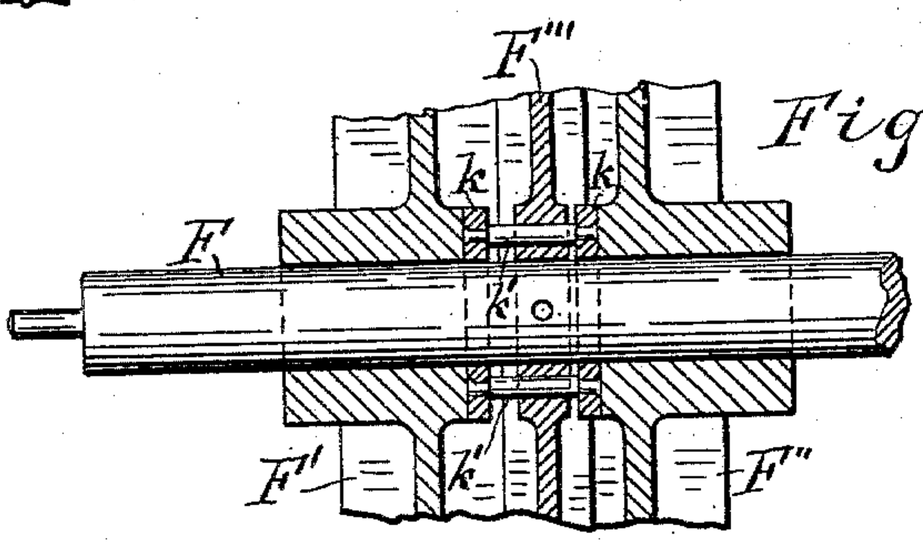

Fig. 9.

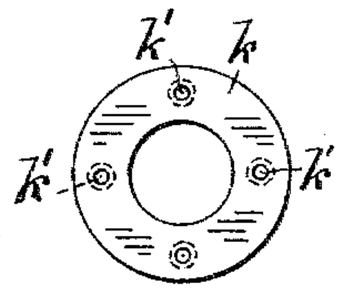

Fig. 10.

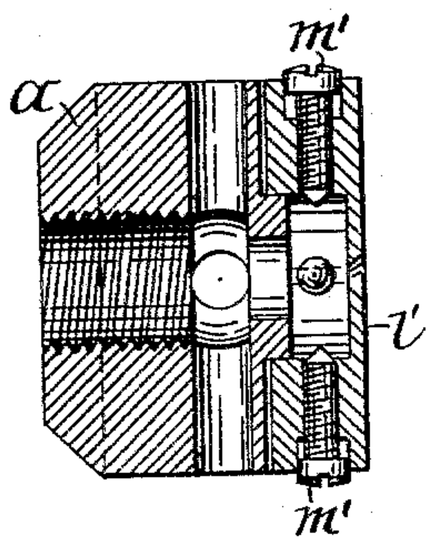

Fig. 11.

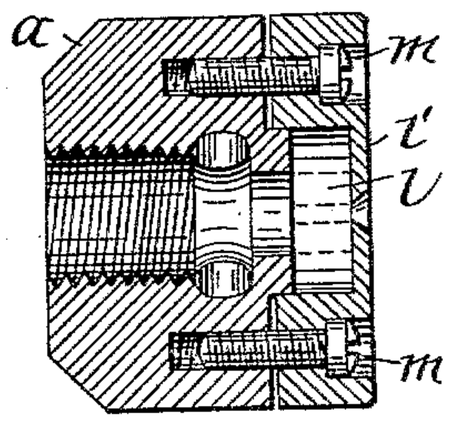

Fig. 12.

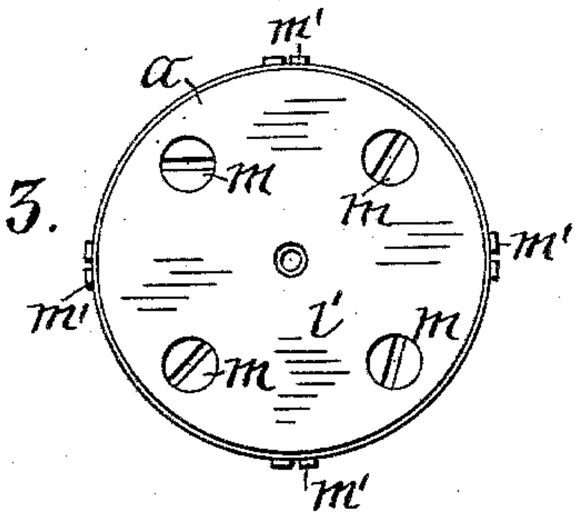

Fig. 13.

Fig. 14.

Witnesses.

Mark W. Dewey

Alvin D. Allen

Inventor.

Arthur J. Morse

By C. H. Duell

his Attorney.

UNITED STATES PATENT OFFICE.

ARTHUR J. MORSE, OF SALISBURY, CONNECTICUT, ASSIGNOR TO THE MORSE-KEEFER CYCLE SUPPLY COMPANY, OF SAME PLACE.

THREADING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 597,732, dated January 25, 1898.

Application filed August 10, 1897. Serial No. 647,748. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR J. MORSE, of Salisbury, in the county of Litchfield, in the State of Connecticut, have invented new and useful Improvements in Threading-Machines, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to threading-machines for use in threading the ends of bicycle-spokes or other rods or bolts, and the object is to provide means for rapidly and accurately forming the thread so that it will correspond with the thread on the nipple or nut which it engages and not become injured by such engagement.

To this end my invention consists in the combination, with means for holding the work, the threading-die, and its carrying-spindle, of means for rotating the spindle and suitable means for advancing said spindle upon the work corresponding to the thread, but independent of the threading-die; and my invention consists in certain other combinations of parts hereinafter described, and specifically set forth in the claims.

In the drawings hereto annexed and forming a part of this specification, Figure 1 is a side elevation of my improved machine, the pan or base being shown in section. Fig. 2 is a top plan view of the same. Fig. 3 is an end view of the right-hand end of the machine. Fig. 4 is a transverse vertical sectional view taken on line $z\ z$ of Fig. 1 and looking to the right. Fig. 5 is a transverse sectional view taken on line $x\ x$ of Fig. 1. Fig. 6 is also a transverse vertical section taken on line $y\ y$ of Fig. 1, the weighted arm being in its vertical position. Fig. 7 is a longitudinal vertical sectional view taken on the line of the driving-shaft. Fig. 8 is a detached view of the slide. Fig. 9 is an enlarged sectional view of the driving-pulleys. Fig. 10 is an end view of the frame which holds the loose pulleys apart, and Figs. 11 to 13, inclusive, illustrate the threading-chuck and die.

Referring specifically to the drawings, A is an oblong base or pan on which the sections of the machine are mounted. The right-hand section constitutes the work-holding means, and the left-hand section constitutes the threading means. The frame B′ of the threading means is secured stationary to the base, but the frame of the holding means B is adjustable on the base toward and from the other frame.

The threading-chuck a is located between the two frames, facing the work-holding frame, and is carried on the end of the spindle a', extending centrally and longitudinally in bearings b and b', extending upwardly from the frame B′.

The upper part of the bearing b' is provided with a vertical projection from which extends a short arm c parallel with and directly above the spindle a'. The end of the arm c is provided with a depending split bearing c', which is internally threaded and clasps an externally-threaded tube C, secured on one end of the chuck-spindle. The thread on the tube C is the same as the thread formed by the die held in the chuck a, and this tube causes the die to form the thread accurately, for it compels the proper advancement of the chuck-spindle during its rotation, as the bearing for the tube C is stationary. If a die having other thread is inserted in the chuck, another threaded tube and bearing corresponding to the die must be placed on the spindle. The tube and bearing therefor may be removed by simply loosening the screw c'', passing through the split bearing c', and taking off the nut b'' on the end of the spindle a' and the nut c''' on the end of the arm c.

The spindle a' is rotated by means of a cog-wheel d thereon meshing with a cog-wheel d' on the driving-shaft F, which is parallel with but below and back of the said spindle. The direction of rotation of the spindle a' is automatically reversed after the thread has been formed on the spoke, so that it is carried back to its starting-point ready to form another thread, when it is reversed again and forms the thread on the second spoke. This is effected by a worm-shaft D turning in bearings in the frame B′ and extending parallel with the driving-shaft and in the same horizontal plane. The screw-shaft is provided with a worm D′ intermediate its length which engages a worm-wheel E, hav-

ing its shaft E′ turning in bearings in the frame and extending transversely below the other shafts.

The worm-shaft D is driven in unison with the driving-shaft F by means of a small cog-wheel *e* on each shaft and a third cog-wheel *e′* above and between them, the latter being mounted on the lower end of a slotted plate *e″*, depending from an arm *f*, projecting horizontally from a vertical extension *f′* of one of the risers forming the bearings for the shafts.

The driving-shaft is movable slightly longitudinally, the driving-pulleys F′ F″ being loose on the shaft and continuously driven in opposite directions by belts. (Not shown in the drawings.)

The driving-shaft F is provided with a friction disk or wheel F‴, which is fast upon the shaft and between the loose pulleys, so that when the shaft is moved to one end or the other the disk F‴ will engage either of the loose pulleys and hold it to the shaft. The friction-wheel F‴ has its periphery slightly beveled from the center, and the loose pulleys have the inner sides of their rims beveled, so that only a slight movement of the driving-shaft is necessary to cause the friction-disk to engage and hold either of the pulleys.

Extending parallel with the driving-shaft F and directly below it is a bar G, which slides longitudinally in bearings in the frame. Projecting upwardly from the ends of the bar G are fingers *g g*, which bear upon the reduced ends of the shaft and cause it to move with the bar. The bar G is slotted to allow the shaft of the worm-wheel to pass through it. Extending from one side of the bar G on opposite sides of the slot are a pair of pins *h* and *h′*, which are engaged alternately by a triangular-shaped cam-plate H, mounted loosely on the shaft E′. The hubs of the worm-wheel and the cam-plate are provided with lugs *i* and *i′*, as shown in Figs. 6 and 7, which engage each other when the worm-wheel is rotated and cause the cam-plate H to oscillate and through the pins *h* and *h′* slide the bar G and shaft F longitudinally to reverse its direction of rotation.

In order to give a quick movement to the cam H, I extend upwardly from it a weighted arm I. The arm is pivoted to one side of the cam-plate and is provided with a pin *j* near its lower end, which enters a short slot *j′* in the cam, so that when the cam is rotated sufficiently to move the weighted arm beyond its vertical position or center it will fall over because of its weight and quickly effect the longitudinal movement of the bar G, and thus reverse the rotation of the driving-shaft and chuck-spindle.

The friction-disk F‴ is secured rigidly to the driving-shaft by a pin, and the loose driving-pulleys are held apart on the shaft by a small frame formed by joining together two rings *k k*, which bear against the ends of the hubs of the pulleys by four pins *k′ k′*, which are provided with shoulders bearing on the inner sides of the rings. The said pins pass through holes in the hub of the friction-disk, so that the hub can move upon them, the frame being rotated with the disk and driving-shaft.

The chuck *a* is provided with internal thread for securing it upon the end of the spindle *a′*.

The die *l* (shown in Fig. 14 of the drawings) consists of a disk with the usual cutting-aperture in the center and separation extending to the periphery. Said die is held in a recess of the face-plate *l′* of the chuck and is clamped between said face-plate and the head *a* by four screws *m*. The die *l* is centered by means of four screws *m′*, extending from the periphery of the chuck to the die.

The holding means for the spoke $a^{\times}$ or other work consists of a clamp formed of a pair of plates *n n′*, extending vertically and pivoted at their lower ends to the inner end of the frame B, as shown in Figs. 1 and 4 of the drawings. The plates *n* and *n′* are confined near their upper ends by a horizontal recessed bar *o*, secured to the frame. The rear plate or jaw of the clamp is adjusted by means of a screw *o′*, passing through the heel of the bar *o*. The plates or jaws of the clamps *n n′* are forced apart by means of a curved spring placed between and bearing with its ends against pins *p p*, extending from the plates. The clamping-plate *n′* is moved toward the other plate by means of a small cam *q*, pivoted in the recess in the end of the bar *o*. This cam *q* is provided with an arm J and a handle J′, by which it is operated. The arm has a horizontal extension which enters a slot in a link *r*. The said link is hinged to an arm secured to the lower side of a horizontal plate K, which in turn supports the spoke $a^{\times}$ while it is being threaded, the spoke being then in line with the center of the die. The plate K is secured to a bar which is pivoted at its ends in the uprights *s* and *s′*. After the thread has been turned on the end of the spoke $a^{\times}$ and the chuck has moved back, releasing the spoke, the handle J′ is raised quickly, which raises the plate K to the inclined position shown in Fig. 4, throwing the spoke back out of the way of the next spoke, which is placed in position by the other hand of the operator, the machine being in operation continuously and threading a spoke every time the chuck *a* advances toward the clamping device.

t is an angular plate which serves as a guide for the lower side of the spoke between the jaws of the clamp. The edge of the plate *t* is inclined, so that when moved back it will lower the spoke, which is necessary when spokes of larger diameter are threaded.

By loosening the thumb-nut *u* the guide-plate *v*, against which the end of the spoke bears, may be adjusted to accommodate longer or shorter spokes.

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

1. In a threading-machine, the combination with means for holding the work, comprising a clamp and a support for the work pivoted horizontally to one side and adapted to be raised to an inclined position, and the threading-die and its carrying-spindle, of means for rotating the spindle, and suitable means for advancing said spindle upon the work corresponding to the thread but independent of the threading-die, as set forth.

2. In a threading-machine, the combination with means for holding the work, comprising a clamp and a support for the work pivoted horizontally to one side and adapted to be raised to an inclined position, and the threading-die and its carrying-spindle, of means for rotating the spindle, a threaded part on the spindle corresponding to the thread formed by the die, and a stationary threaded bearing for said part, as and for the purpose set forth.

3. In a threading-machine, the combination with means for holding the work, comprising vertical jaws, a pivoted support, and means for operating both simultaneously, and the threading-die and its carrying-spindle, of means for rotating the spindle, suitable means for advancing said spindle upon the work corresponding to the thread but independent of the threading-die, and means also to automatically reverse the movement of the spindle, as set forth.

4. In a threading-machine, the combination with means for holding the work, the threading-die and its carrying-spindle, of a driving-shaft geared to the spindle, loose pulleys on the driving-shaft, a friction-disk fast on the shaft between the pulleys to engage either of them, a sliding bar engaging the ends of the shaft to move the shaft longitudinally, a threaded part on the spindle corresponding to the thread formed by the die, and a stationary threaded bearing for said part, as and for the purpose set forth.

5. In a threading-machine, the combination with means for holding the work, the threading-die and its carrying-spindle, of a driving-shaft geared to the spindle, loose pulleys on the driving-shaft, means to hold them apart, a friction-disk fast on the shaft between the pulleys to engage either of them, a sliding bar engaging the ends of the shaft, means operated by the carrying-spindle and connected to the bar to move the shaft longitudinally alternately in opposite directions, a threaded part on the spindle corresponding to the thread formed by the die, and a stationary threaded bearing for said part, as and for the purpose set forth.

6. In a threading-machine, the combination with means for holding the work, the threading-die and its carrying-spindle, of a driving-shaft geared to the spindle, loose pulleys on the driving-shaft, a friction-disk fast on the shaft between the pulleys to engage either of them, said shaft being movable longitudinally, a sliding bar below the driving-shaft connected at its ends with the shaft, a cam adapted to engage pins on said bar to move the latter longitudinally in opposite directions, a threaded part on the spindle corresponding to the thread formed by the die, and a stationary threaded bearing for said part, as and for the purpose set forth.

7. In a threading-machine, the combination with means for holding the work, the threading-die and its carrying-spindle, of a driving-shaft geared to the spindle, loose pulleys on the driving-shaft, a friction-disk fast on the shaft between the pulleys to engage either of them, said shaft being movable longitudinally, a sliding bar below the driving-shaft connected to its ends with the shaft, a cam adapted to engage pins on said bar to move the latter longitudinally in opposite directions, a worm-shaft geared to the driving-shaft, a wheel engaging the worm, projections on the cam and worm-wheel adapted to engage each other, a threaded part on the carrying-spindle corresponding to the thread formed by the die, and a stationary threaded bearing for said part to turn in, substantially as described and shown.

8. In a threading-machine, the combination with means for holding the work, the threading-die and its carrying-spindle, of a driving-shaft geared to the spindle, loose pulleys on the driving-shaft, a friction-disk fast on the shaft between the pulleys to engage either of them, said shaft being movable longitudinally, a sliding bar below the driving-shaft connected at its ends with the shaft, a cam adapted to engage pins on said bar to move the latter longitudinally in opposite directions, a worm-shaft geared to the driving-shaft, a wheel engaging the worm, projections on the cam and worm-wheel adapted to engage each other, a weighted arm secured to the cam, a removable threaded tube on the carrying-spindle, and a stationary threaded bearing for said tube to turn in, substantially as described.

9. In a threading-machine, the combination with the threading-die and its carrying-spindle, of a pivoted supporting-plate for the work, clamping-jaws, adjustable guides, a driving-shaft geared to the spindle, loose pulleys on the driving-shaft, a friction-disk fast on the shaft between the pulleys to engage either of them, said shaft being movable longitudinally, a sliding bar below the driving-shaft connected at its ends with the shaft, a cam adapted to engage pins on said bar to move the latter longitudinally in opposite directions, a threaded part on the spindle corresponding to the thread formed by the die, and a stationary threaded bearing for said part, as and for the purpose set forth.

10. In a threading-machine, the combination of a pivoted supporting-plate for the work, clamping-jaws, a cam to operate the

jaws, a handle to turn the cam and raise the plate, guides, a driving-shaft geared to the spindle, loose pulleys on the driving-shaft, a friction-disk fast on the shaft between the pulleys to engage either of them, said shaft being movable longitudinally, a sliding bar below the driving-shaft connected at its ends with the shaft, a cam adapted to engage pins on said bar to move the latter longitudinally in opposite directions, a threaded part on the spindle corresponding to the thread formed by the die, and a stationary threaded bearing for said part, as and for the purpose set forth.

In testimony whereof I have hereunto signed my name.

ARTHUR J. MORSE. [L. S.]

Witnesses:
WM. S. BOSTWICK,
THOS. L. NORTON.