(No Model.) 2 Sheets—Sheet 1.

M. C. HENLEY & P. SHELLENBACK.

PULLEY LATHE.

No. 446,448. Patented Feb. 17, 1891.

Fig. 1.

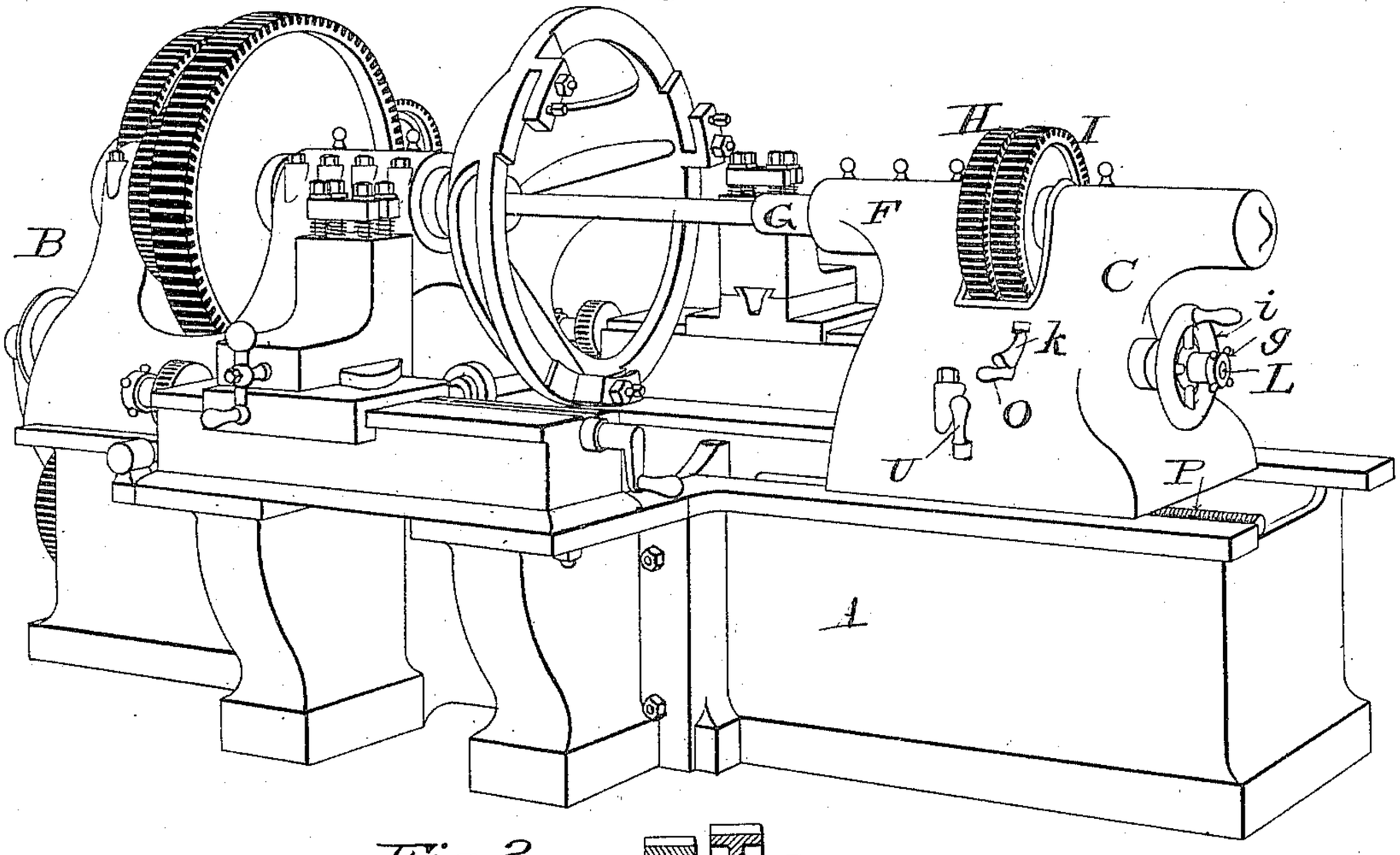
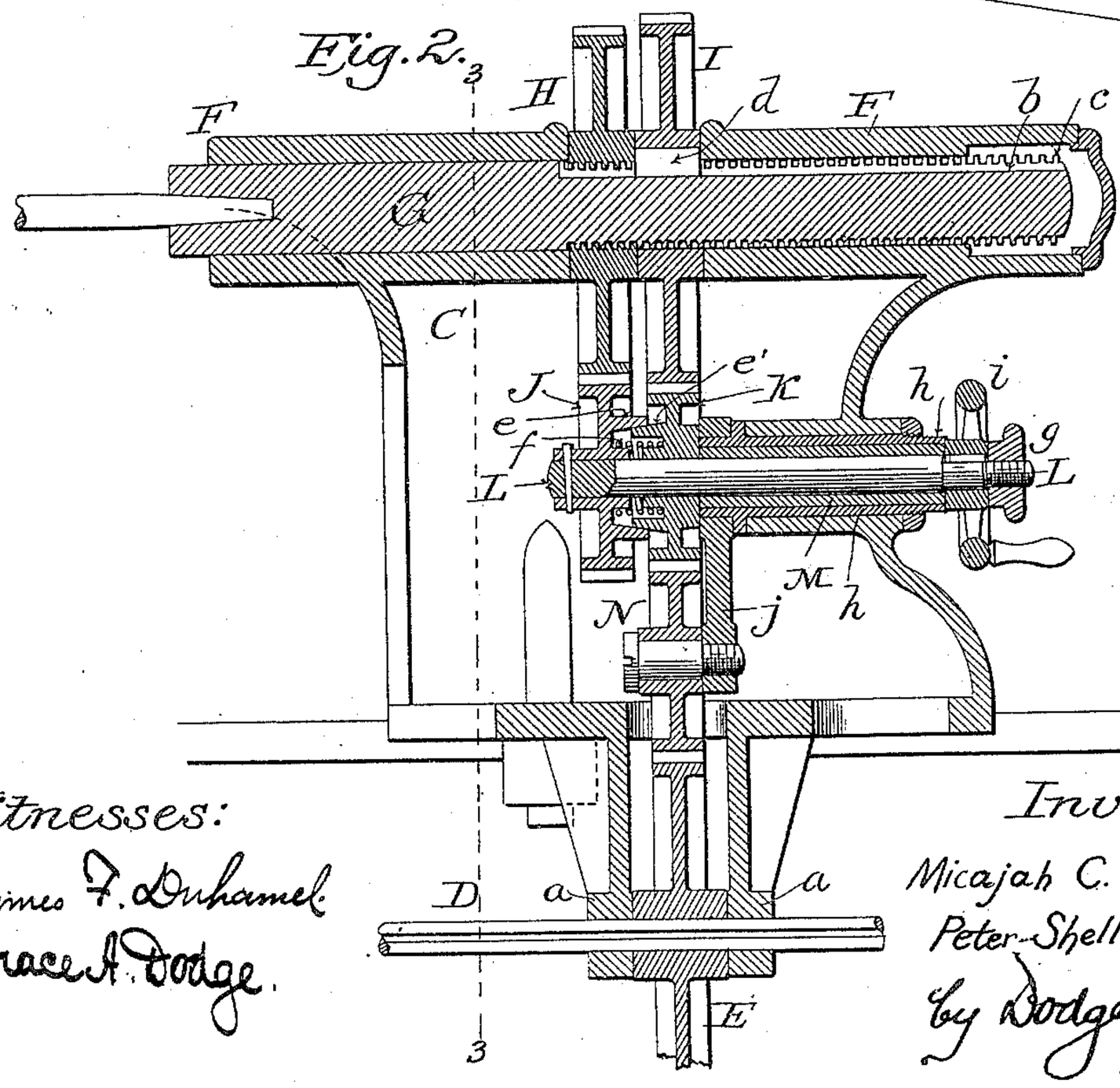


Fig. 2.



Witnesses:
James F. Duhamel.
Horace A. Dodge.

Inventors:
Micajah C. Henley,
Peter Shellenback,
by Dodger & Sons,
Attys.

(No Model.) 2 Sheets—Sheet 2.

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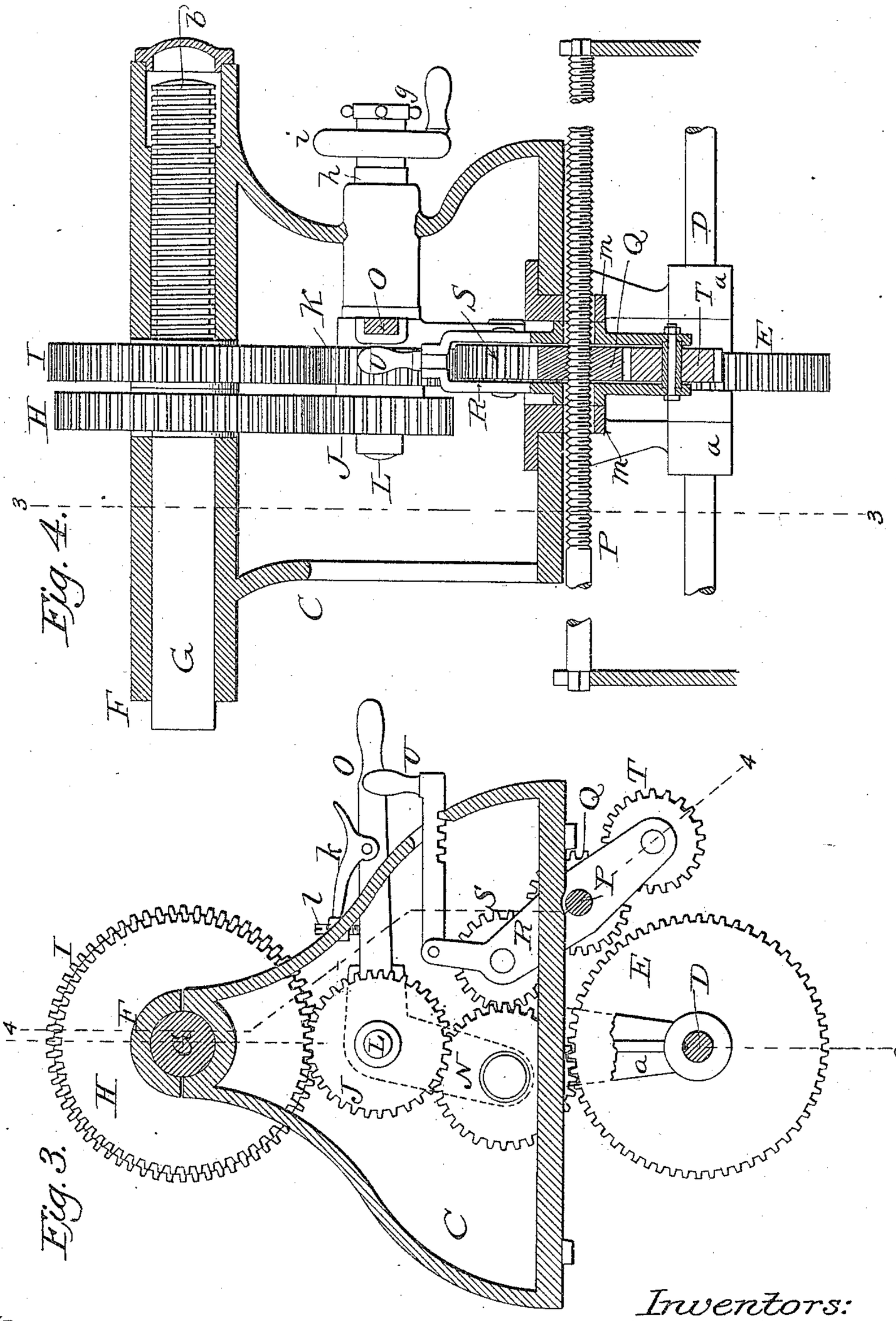

Fig. 4.

Fig. 3.

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UNITED STATES PATENT OFFICE.

MICAJAH C. HENLEY AND PETER SHELLENBACK, OF RICHMOND, INDIANA.

PULLEY-LATHE.

SPECIFICATION forming part of Letters Patent No. 446,448, dated February 17, 1891.

Application filed September 20, 1890. Serial No. 365,664. (No model.)

To all whom it may concern:

Be it known that we, MICAJAH C. HENLEY and PETER SHELLENBACK, citizens of the United States, residing at Richmond, in the county of Wayne and State of Indiana, have invented certain new and useful Improvements in Pulley-Lathes, of which the following is a specification.

Our invention relates to an improved feed mechanism for boring and drilling machinery; and it consists in various features and details, hereinafter set forth and claimed.

The invention has reference more particularly to pulley-lathes in which the boring-arbor is mounted in the tail-stock, and the improvements relate to a novel means for revolving and feeding the boring-arbor, and to a novel means for moving the said tail-stock back and forth.

In the drawings, Figure 1 is a perspective view of our improved machine; Fig. 2, a longitudinal vertical sectional view through the tail-stock on the line 2 2 of Fig. 3; Fig. 3, a transverse vertical sectional view of the same on the line 3 3 of Figs. 2 and 4, and Fig. 4 a longitudinal vertical sectional view on the line 4 4 of Fig. 3.

Referring again to the drawings, A indicates the bed or frame of the machine; B, the head-stock; C, the tail-stock, and D a shaft extending from the head-stock, where it receives motion from any suitable source of power to the tail-stock, where it is provided with a gear-wheel E, which latter is held between two arms *a*, projecting downward from the tail-stock.

It will be noticed upon reference to Figs. 2 and 3 that the shaft is grooved longitudinally to receive a spline, feather, or key carried by the wheel, thereby permitting the latter to move lengthwise upon the shaft with the tail-stock, but at the same time turn with the shaft when it turns.

The tail-stock has at its upper end a tubular housing F, into which snugly fits the boring-arbor G. This arbor G is provided with a longitudinal key seat or groove *b*, and is also provided with an external square screw-thread, as at *c*, both of which extend from the outer end of the arbor inward for about two-thirds (more or less) of its length.

The housing F is cut away at its middle by a transverse opening, in which are mounted the gear-wheels H and I, the gear H having its hub bored out and threaded to screw upon the threaded arbor, while the gear I, which is larger than gear H, is provided with a key or feather *d* to enter the groove *b*, formed in the arbor.

Gears H and I engage with the wheels J and K, carried upon the inner end of a shaft L, journaled in a sleeve M, mounted in the tail-stock, the gear J being keyed rigidly to the shaft, while the gear K is designed to rotate or freely turn thereon, except when otherwise desired.

Each of the gears J and K is provided with a lateral flange or friction-cone *e e'*, held normally apart by a coiled spring *f*, as shown in Fig. 2.

The extreme outer end of the shaft L is threaded to receive a knurled nut *g*, and between this nut and the outer end of the sleeve M (journaled in a fixed bearing-sleeve *h*, secured in the tail-stock around the sleeve M) is a hand-wheel *i*, which is keyed upon the shaft L, so as to turn therewith and yet permit the shaft to move lengthwise. By turning up the knurled nut the shaft will be moved outward longitudinally and the friction-cone *e* of the gear J brought into engagement with the corresponding cone *e'* of the gear K, thereby locking the two gears together and causing them to turn in unison. The spring *f*, which is compressed when the friction-cones are in engagement, and which, when the knurled nut is unscrewed, tends to separate the friction-cones, may be omitted, if desired, though we prefer to use it.

Hung loosely upon the inner end of the larger sleeve *h* is an arm *j*, carrying at its lower end an idler N, which remains in engagement with gear K, and is designed to be thrown into or out of engagement at will with the gear-wheel E by means of a hand-lever O, provided for that purpose. This handle or hand-lever projects out through the side of the tail-stock, as shown in Figs. 1 and 3,

and is provided with a latch or dog *k*, to engage the frame of the tail-stock and prevent the arm *j* from being swung into such position as to permit the engagement of the gears N E.

When it is desired to throw the gear N into engagement with wheel E it is only necessary to depress the outer end of the dog and rock the latter so that its nose will be thrown out of engagement with the lug or projection of the main frame of the tail-stock, whereupon the free end of the hand-lever O will rise and the arm *j* swing into such position as to permit the desired engagement of the gears, the lever being limited in its movements by means of a set-screw *l*. (Shown in Fig. 3.)

It will of course be seen that when the idler-gear N is out of engagement with wheel E no motion will be imparted to the arbor G. When the idler is in gear with the wheels K and E and the wheels J K are drawn together, as before described, motion imparted to the wheel E will be transmitted through the idler N to the gear K; but inasmuch as the gears J K are locked together they will act as one gear of two different diameters. As these wheels gear directly into the wheels H I, it follows that the latter will have to receive different movements.

The wheel I, which serves to rotate the boring-arbor, will have a slow movement, while the wheel H, which serves to advance or recede the arbor, has a faster movement, the relation of the two movements being dependent of course upon the proportions of the gears.

When it is desired to recede or advance the arbor by hand, it is only necessary to throw the idler N out of engagement with wheel E, and then actuate the gears H I J K through the shaft and hand-wheel.

The advancement or retraction of the arbor (relatively to the tail-stock) without rotating the latter, should it ever become desirable, may be effected by throwing the idler out of action, separating the gears J K and turning the gear J through the medium of shaft L and its hand-wheel, the gear H, which will be turned by the gear J, acting as a nut upon the threaded arbor.

In order to carry the tail-stock and the parts carried thereby bodily back and forth, we adopt the construction illustrated in Figs. 3 and 4, upon reference to which it will be observed that the feed is secured by means of a screw or threaded shaft P and a gear-nut Q, the former being rigidly affixed in position in the bed or frame, while the latter is carried by the traveling tail-stock.

The tail-stock is provided on its lower face with two lugs *m m*, separated from each other, and is cut away between the lugs to receive a frame R, which latter comprises two parallel bars, separated a distance from each other, as shown in Fig. 4, to receive the intermeshing gears Q S T. The gear-wheel Q, arranged between the gears S T, is mounted upon the threaded shaft or screw P; but as the gear is embraced on its sides by the bars of frame R, which is in turn embraced by or held between the lugs *m m*, the rotation of the gear will cause the tail-stock to move in one or the other direction, according to the direction of rotation of the gear.

As shown in Fig. 4, the lugs *m m* and the side bars of the frame R are perforated so that they move freely upon the screw or threaded fixed shaft, the frame R being also capable of a rocking or oscillating movement upon and at right angles to the screw, so that the gears S and T may be thrown into or out of engagement with the gears N and E, respectively.

When the gear S is thrown into engagement with the idler N, the former will communicate motion in a certain direction to the gear Q; but when the gear S is thrown out of engagement with the idler and the gear T thrown into engagement with the gear E, a reverse motion will be imparted to the gear-nut.

The rocking of the frame is effected by means of a handle U, secured to the upper end of the frame and projecting out through an opening in the side of the tail-stock frame, as shown in Figs. 1 and 3, and the handle and frame are held in their different positions by means of the notches formed in the under side of the handle to receive a lug on the tail-stock frame.

To adjust the frame so that the tail-stock may remain fixed in position, the handle will be raised and moved until the lug engages the middle notch.

When it is desired to move the tail-stock forward, the handle will be pulled outward to bring the innermost notch over the lug, by which movement the frame R will be rocked and the gear T thrown into gear with wheel E; but when it is desired to recede the tail-stock the handle will be pushed inward until the gear S comes into engagement with the idler N.

From the foregoing it will be seen that we are enabled to move the tail-stock backward or forward, as desired, by power, thereby obviating the necessity of moving it by hand.

Instead of making the screw or shaft stationary and threading the gear Q, this arrangement may be reversed—that is to say, the shaft may be turned or rotated in one or the other direction by means of the gearing Q S T; but the gear Q in this arrangement instead of being threaded would be provided with a feather to enter a longitudinal groove in the shaft in the same manner as the gear I and shaft or arbor G in Fig. 2. Furthermore, this would necessitate the threading of the lug or lugs *m*, or of the frame R, so that when the shaft is rotated it will move the tail-stock. In view of the simplicity of this proposed modification and its illustration in principle in Fig. 2 further illustration seems unnecessary.

While the invention was designed primarily for use in connection with pulley-lathes and for boring we do not wish to be understood as limiting ourselves to such use, as it is obvious that various features of the present invention are capable of use elsewhere.

Having thus described our invention, what we claim is—

1. In a pulley-lathe, the combination, with the bed or frame, of the fixed head-stock, the tail-stock movable upon the bed, a power mechanism, substantially such as shown and described, receiving motion from a driven part of the lathe for moving the tail-stock backward and forward and for actuating the tool-arbor mounted in the tail-stock, and manually-operated devices, substantially such as shown and described, for throwing either the tail-stock feed mechanism or the tool-arbor mechanism, or both, into or out of action, as desired.

2. In a pulley-lathe, the combination, with the bed or frame, of the fixed head-stock, the movable tail-stock carrying the tool-arbor, and a power-feed mechanism for the tail-stock independent of the arbor-actuating mechanism.

3. In a pulley-lathe, the combination, with the movable tail-stock carrying the tool-arbor, of a single driven shaft, such as D, and intermediate connections between the rotatable shaft and the tail-stock and arbor for communicating motion thereto.

4. In a pulley-lathe, the combination, with the tail-stock, of a rotatable tool-arbor journaled therein, and means, substantially such as shown, for rotating said arbor and for moving it longitudinally.

5. In a pulley-lathe, the combination, with the tail-stock, of a rotatable and longitudinally-movable tool-arbor, a driving-shaft D, provided with a gear-wheel E, and intermediate connections, substantially such as shown, between the arbor and gear-wheel for imparting both a longitudinal and rotary motion to the arbor.

6. In combination with the tail-stock and the tool-arbor, a gear-wheel H for moving the arbor longitudinally, a gear-wheel I for rotating the arbor, gears J K, engaging the gears H I, and means for locking the gears J K together and imparting motion thereto.

7. In combination with the tail-stock and the tool-arbor, gear-wheels H and I, adapted to rotate and to advance and recede the arbor, gears J K, engaging the wheels H I, a driven shaft D, provided with a gear-wheel E, an idler N, and means for throwing the idler into and out of operative position between the gears E and K.

8. In combination with the tail-stock, the tool-arbor, threaded and slotted as shown, gear-wheels H and I, provided, respectively, with a threaded hub and a key, gears J K, mounted upon a shaft L and engaging the wheels H I, means for moving the shaft lengthwise and locking the wheels J K together, an arm swinging concentrically about shaft L and provided with an idler-pinion to mesh with the gear K, a handle secured to the pivoted arm, and a latch or dog for holding the handle in position.

9. In combination with the tail-stock, tool-arbor, and gears H I, the sleeves M and *h*, mounted in the tail-stock, a shaft L, mounted within the sleeve N and carrying at its outer end a thumb-nut, a hand-wheel between the nut and the outer end of the sleeve, having a sliding connection with the shaft, a gear-wheel K, mounted loosely upon the shaft and having a friction-face, and a gear J, rigidly secured upon the shaft and provided with a friction-face to engage the corresponding face of wheel K.

10. In combination with the tail-stock having the perforated lugs, the fixed screw-shaft, the frame R, hung upon the shaft and provided with a handle and with gears S and T, a gear-nut Q, engaging the gears S T, and means for imparting motion to either of the gears S T at will.

11. In combination with the tail-stock provided with perforated lugs, the threaded shaft passing freely through the lugs, a frame R, hung loosely upon the shaft and provided with gears S T and gear-nut Q, a driven shaft D, provided with a gear E, a gear-wheel N, meshing with gear E, and means for rocking the frame R so as to throw the gears S T into and out of gear alternately with the gears N and E.

In witness whereof we hereunto set our hands in the presence of two witnesses.

MICAJAH C. HENLEY.
PETER SHELLENBACK.

Witnesses:
WEB PARRY,
WILLIAM E. BELL.