

W. TUCKER.

Machines for Twisting Auger-Bits.

No. 150,107.

Patented April 21, 1874.

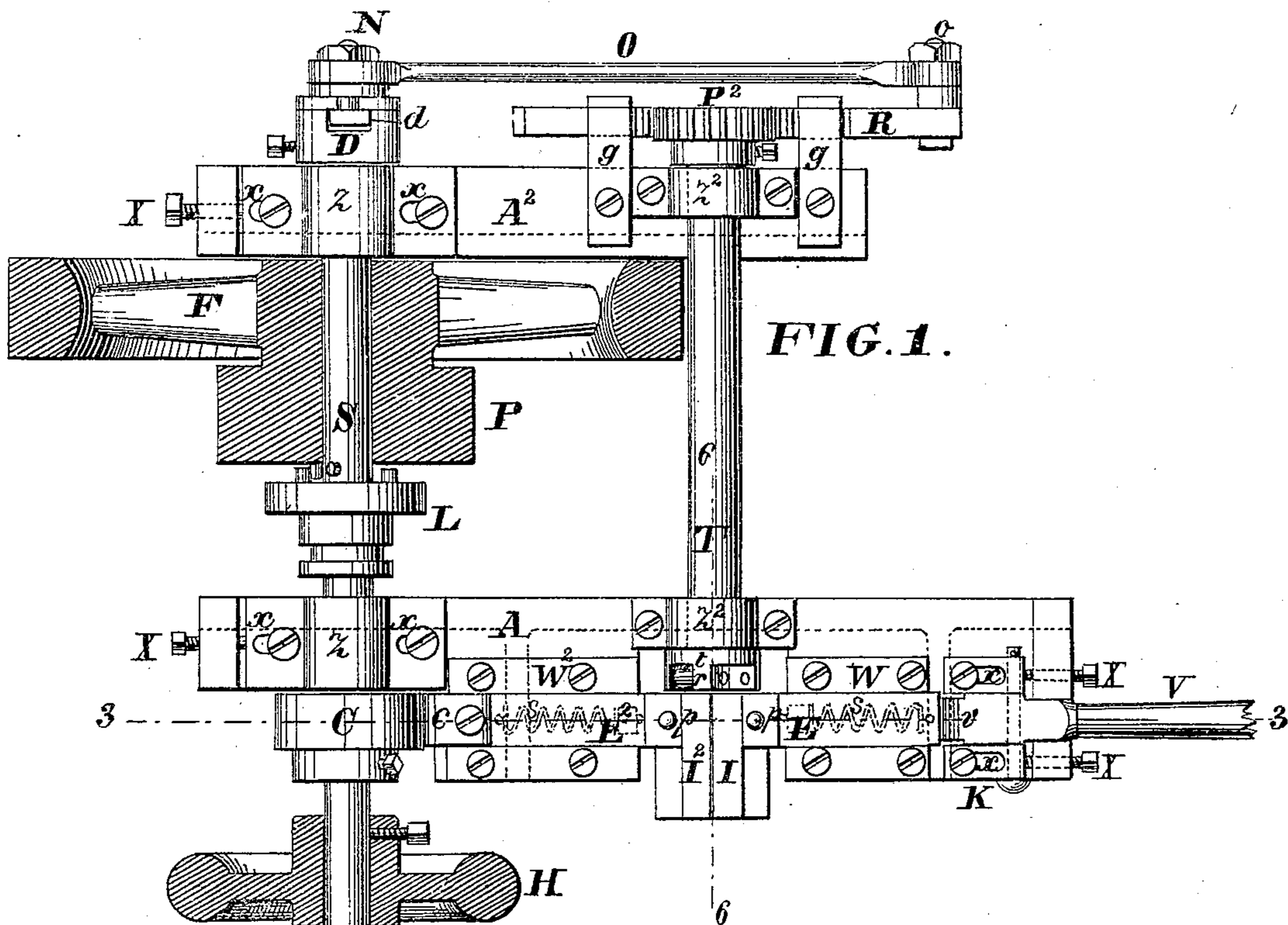


FIG. 1.

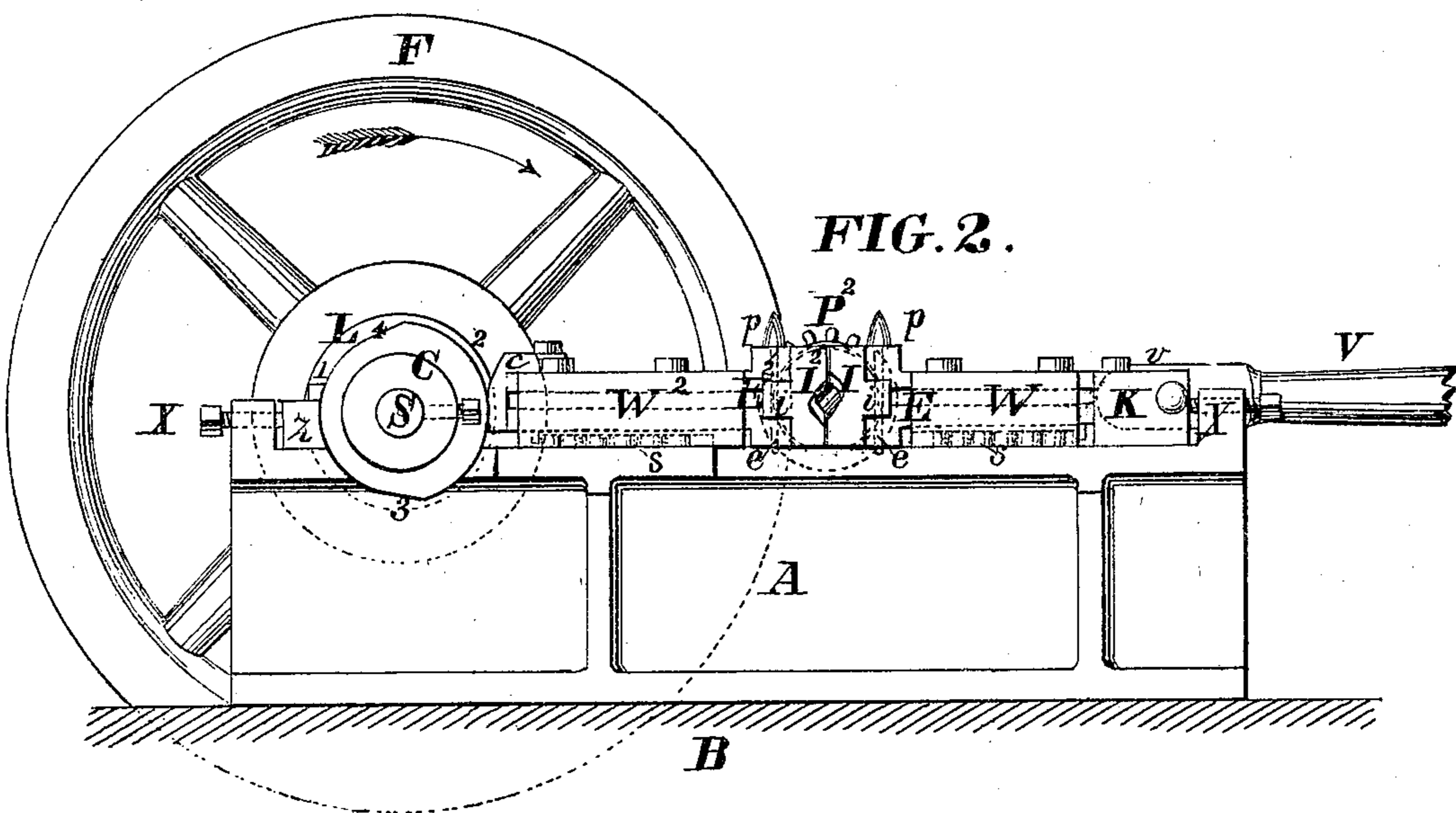


FIG. 2.

WITNESSES

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FIG. 3.

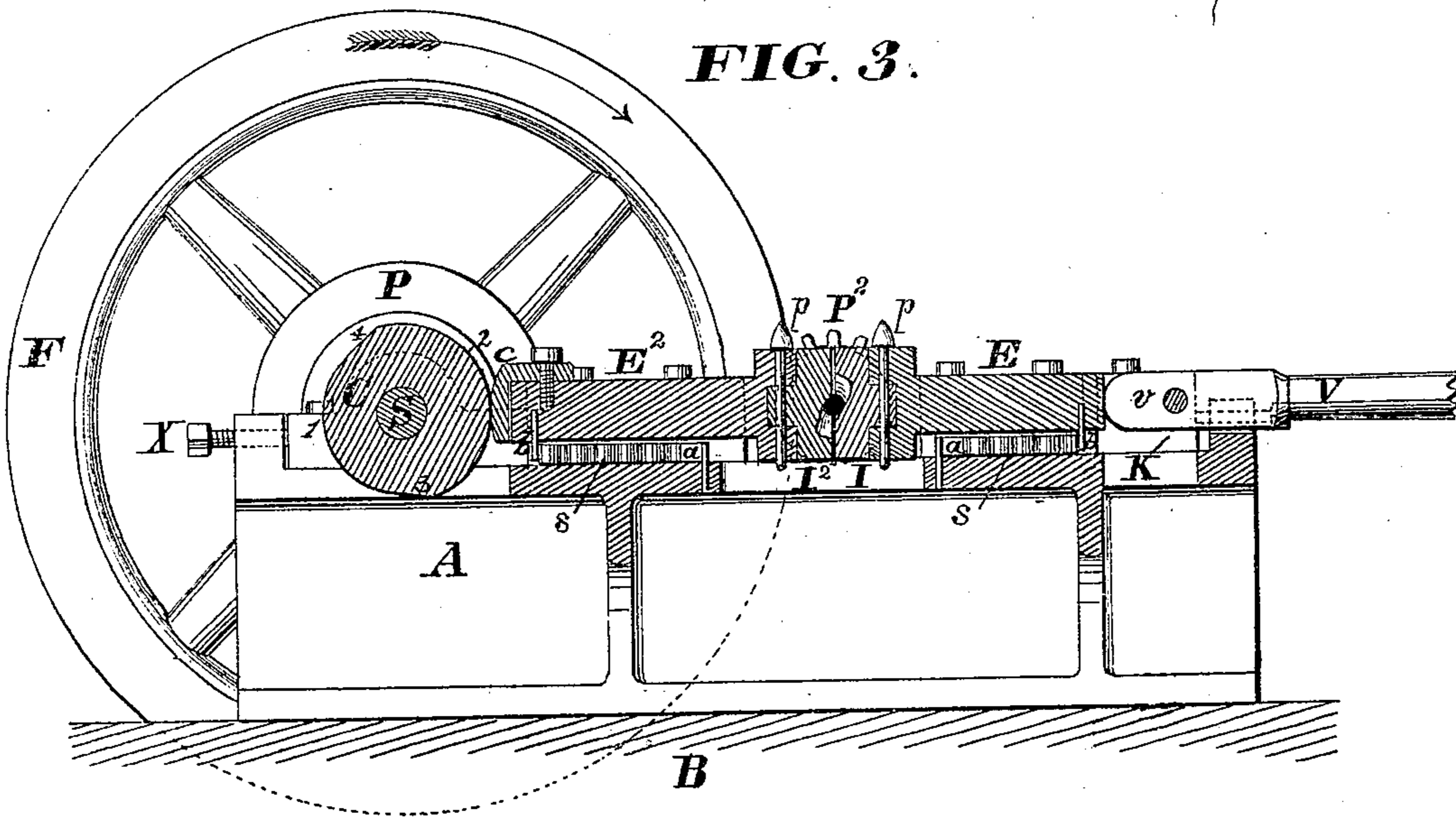
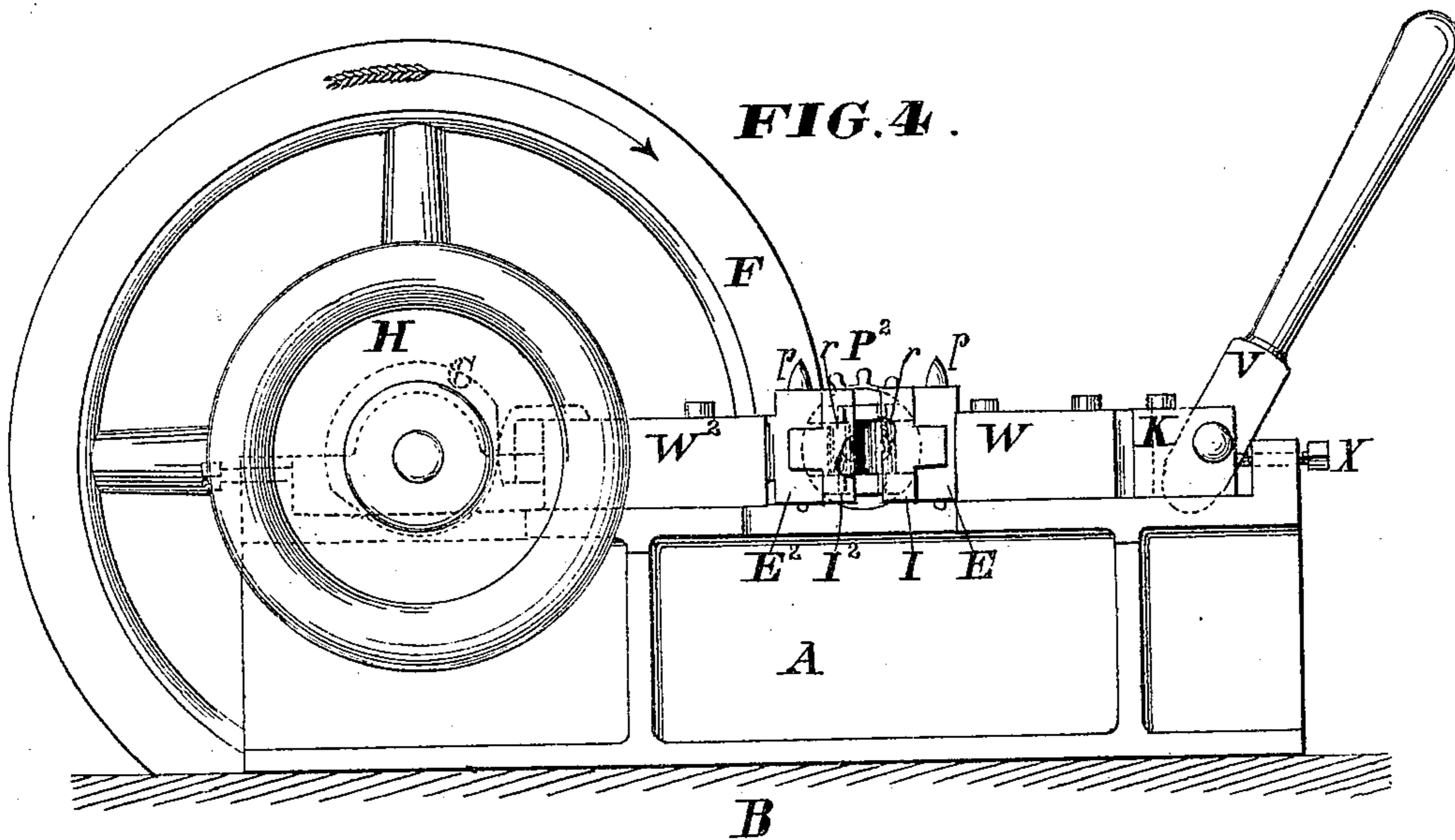


FIG. 4.



WITNESSES

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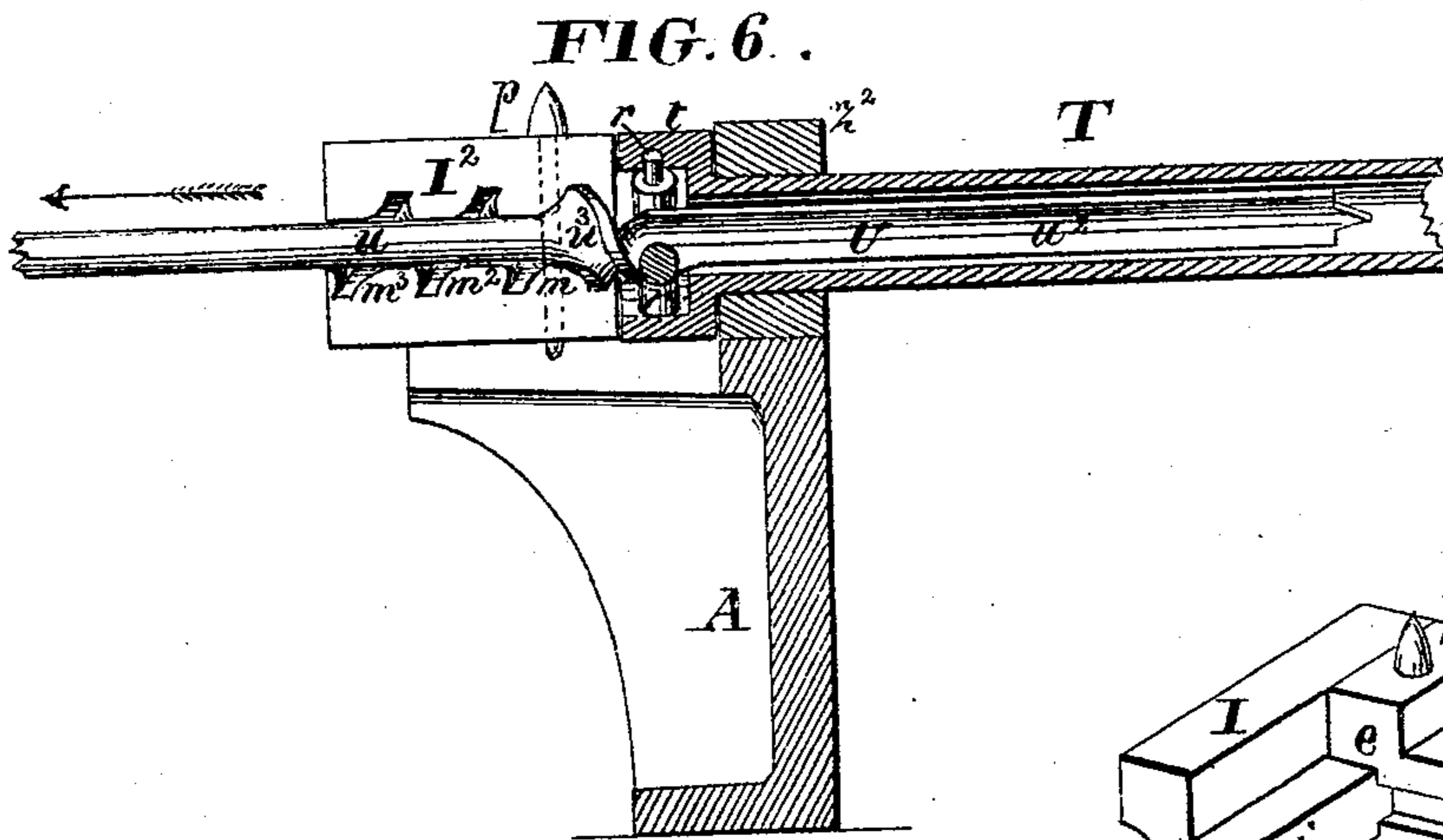
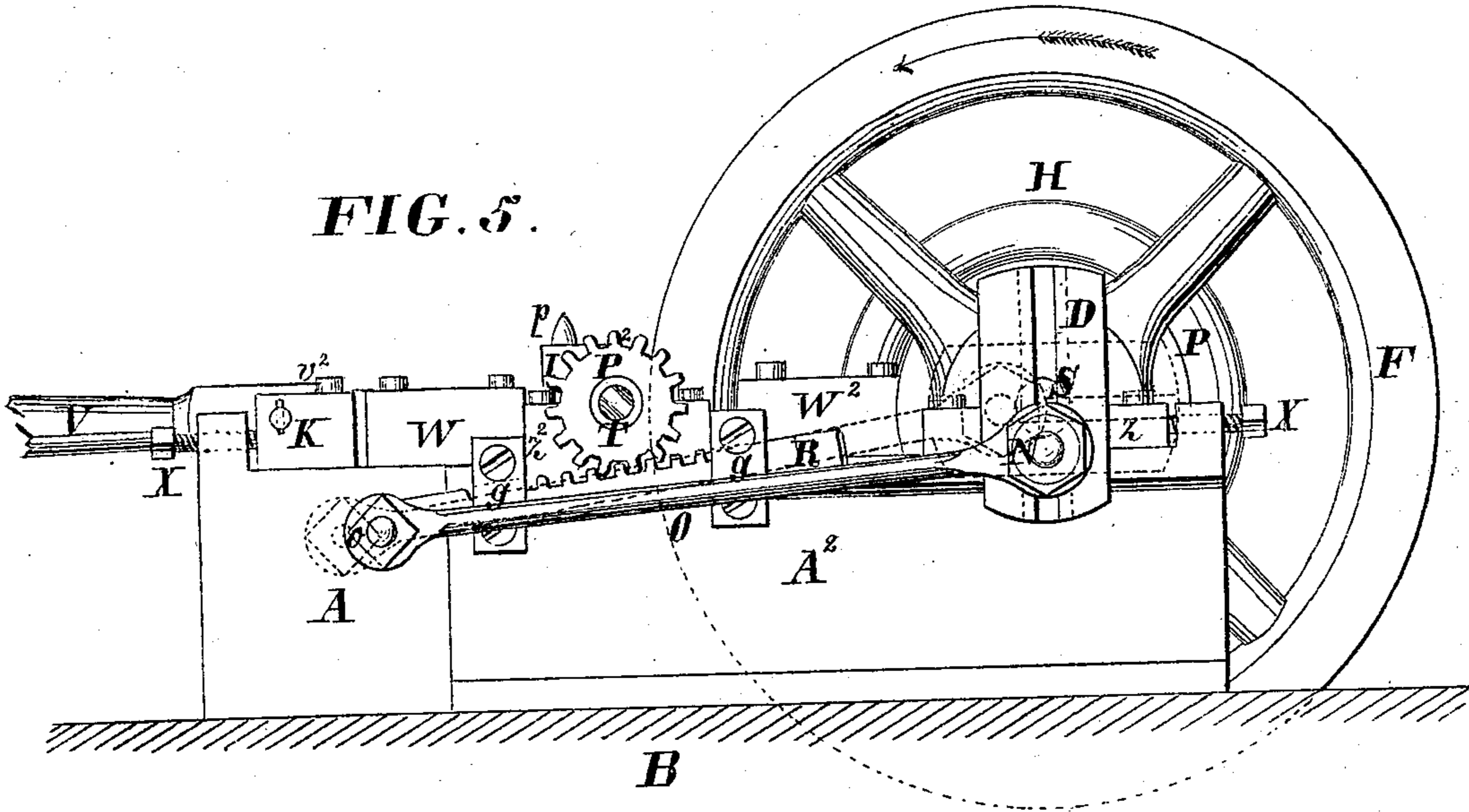


FIG. 7.

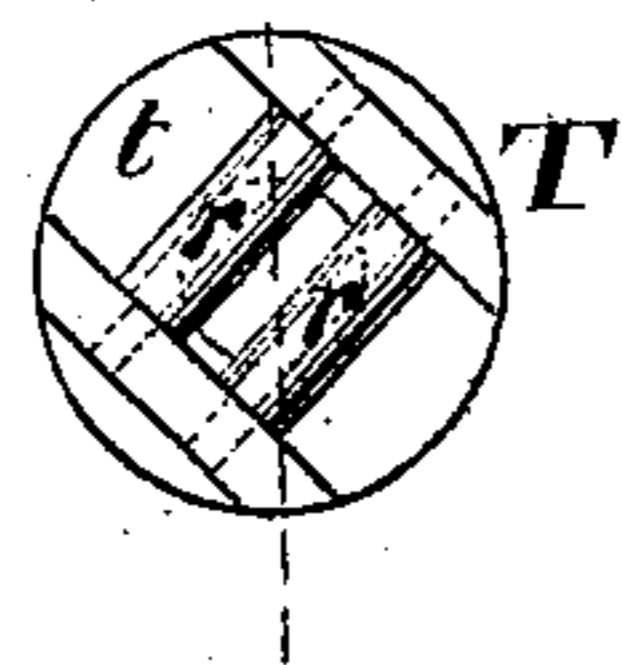
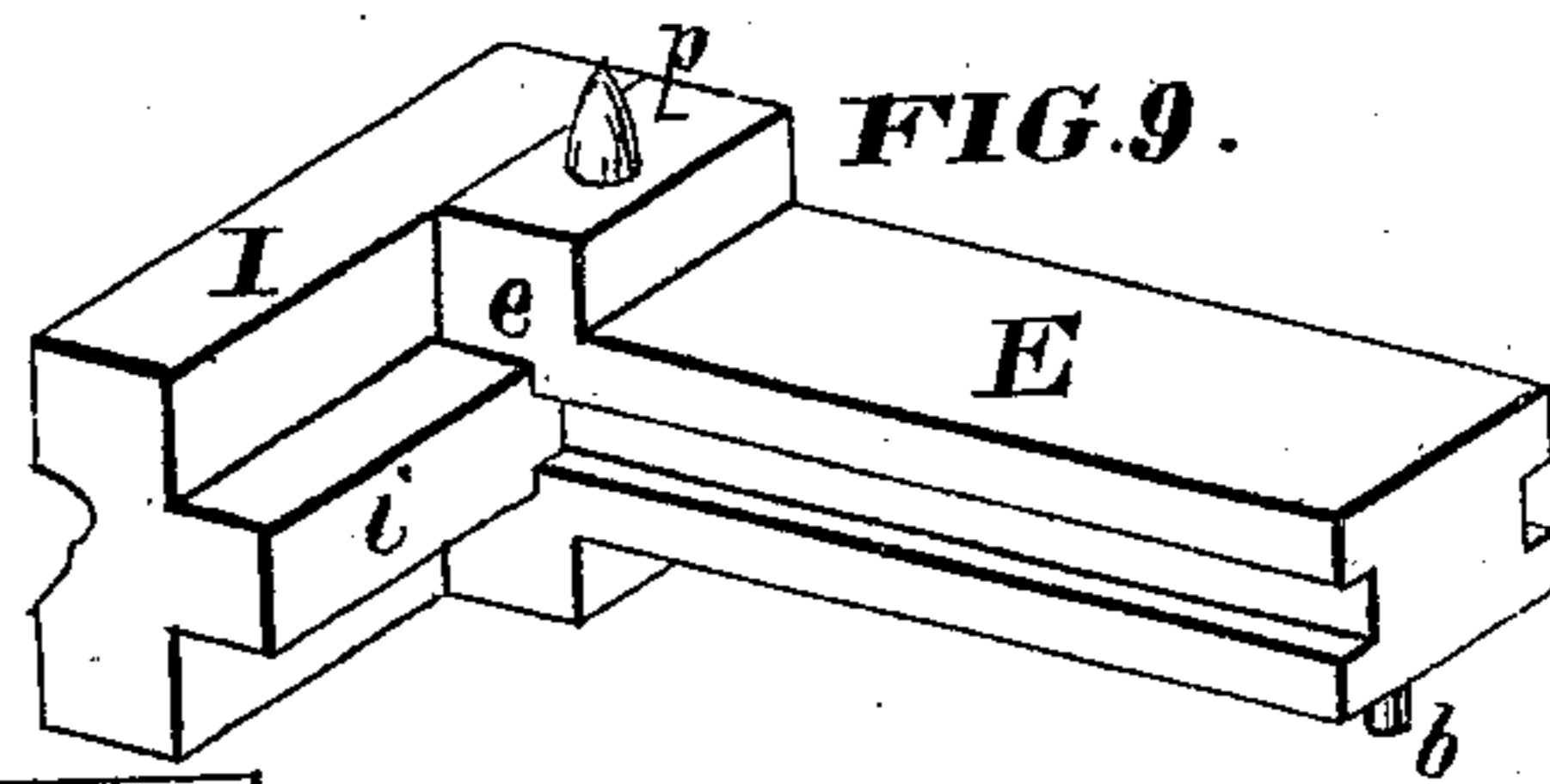
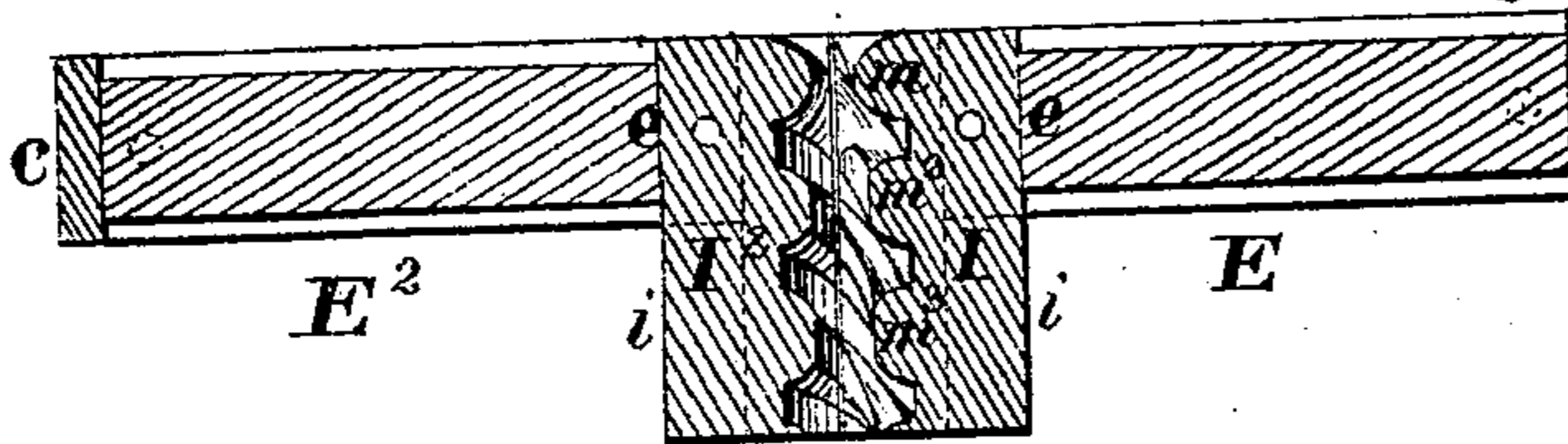


FIG. 8.



WITNESSES

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WILLIAM TUCKER, OF FISKEDALE, MASSACHUSETTS.

IMPROVEMENT IN MACHINES FOR TWISTING AUGER-BITS.

Specification forming part of Letters Patent No. **150,107**, dated April 21, 1874; application filed March 7, 1874.

To all whom it may concern:

Be it known that I, WILLIAM TUCKER, of Fiskedale, in the county of Worcester and State of Massachusetts, have invented an Improved Machine for Twisting Auger-Bits and Augers, of which the following is a specification:

This invention relates to the manufacture of double-twist auger-bits and augers; and its subject-matter is an improved twisting-machine adapted to produce a superior quality of work with great rapidity. The invention consists, first, in a pair of holding and straightening dies actuated in a peculiar manner, one die being retracted mechanically at the end of each twisting stroke, while the other die is retracted by hand for introducing and removing the plate, and serves as a fixed half-nut for feeding the blank. The invention consists, secondly, in the combination of a hand-lever, a cam on the rotary driving-shaft, and a pair of retracting-springs with the said holding and straightening dies, as means for actuating the same. The invention consists, thirdly, in a peculiar combination of parts, whereby the reciprocating holding and straightening die and the oscillating twisting-shaft are adapted to be readily adjusted or set by hand preliminary to introducing the heated blank, the driving-pulley and fly-wheel being disconnected to stop the machine, and the driving-shaft serving, with a hand-wheel thereon, as means for adjusting the parts, as hereinafter more fully set forth.

Figure 1 is a plan view of this machine, partly in horizontal section. Fig. 2 is a front elevation thereof with the hand-wheel removed. Fig. 3 is a vertical longitudinal section on the line 3 3, Fig. 1. Fig. 4 is a front elevation of the machine with the parts in their primary position. Fig. 5 is a rear elevation, showing the parts in different positions. Fig. 6 is a partial transverse section at 6 6, Fig. 1, on a larger scale, showing a blank in position. Fig. 7 is an end elevation of the hollow twisting-shaft. Fig. 8 is a horizontal section of the holding and straightening dies with slides to which they are attached. Fig. 9 is a perspective view of one of the dies with its slide.

The frame of this machine consists of a parallel pair of heavy vertical plates, A A², hav-

ing lateral flanges to form extended bases and tops, and to brace the same. This frame is erected on a strong and solid horizontal base, B, and serves to support all the machinery with its other appurtenances. At one end of the frame a transverse horizontal shaft, S, is mounted in journal-boxes *z*, bolted on the tops of the respective frame-plates. This shaft carries outside of the respective frame-plates a cam, C, and a disk, D, having a central undercut groove, *d*, across its outer face. Between the frame-plates a driving-pulley, P, and a fly-wheel, F, attached to the pulley are mounted loosely on the shaft S, and a clutch-disk, L, is mounted on a splined portion thereof, to connect the pulley and fly-wheel thereto at the will of the operator. A hand-lever will be applied to this clutch-disk in customary manner for shifting it. To the outer end of the shaft, in front of the cam C, a hand-wheel, H, of convenient size is attached. Parallel to this driving-shaft S is a central hollow twisting-shaft, T, of sufficient diameter to receive within it the largest size of auger-bit or auger for which the other parts of the machine are adapted. This shaft is mounted in journal-boxes *z*², bolted to the respective frame-plates, and it has at its front end a circular head, *t*, and at its rear end a pinion, P². The head *t* has a pair of parallel ribs on its face, and a pair of rollers, *r*, are arranged between these and journaled therein, as shown most clearly in Figs. 6 and 7. For oscillating the twisting-shaft T a sliding rack, R, is mounted in guide-brackets *g*, arranged at the back of the frame-plate A² and bolted thereto, the rack being guided in a line radial to the driving-shaft S, and so as to mesh with the pinion P². A crank-pin, N, is clamped in the groove *d* of the disk D on the driving-shaft, and eyes at the respective ends of a connecting-rod, O, are applied to this crank-pin and to a pivot-bolt, *o*, at the extremity of the rack R. For holding the blank and for truing and straightening the twisted bit or auger, a pair of crimp-dies, I I², are supported in line with the twisting-tube T, and in front thereof by slides E E². These slides work in horizontal ways, W W², formed by rails bolted to the extended top of the frame-plate A. The dies are supported at the inner ends of their slides

by deep horizontal grooves, *e*, occupied by ribs *i* on the backs of the dies, and they are secured by vertical pins *p*, so as to be readily removable. Retracting-springs *s* are arranged in recesses in the bottoms of the die-slides, between pins *p* on the slides and wooden abutment-blocks *a*.

For releasing or projecting the die I a hand-lever, V, carrying a cam, *v*, is arranged at the outer end of the die-slide E, and fulcrumed in blocks K, bolted to the frame-plate. A shoe, *c*, applied to the outer end of the die-slide E², engages with the cam C, which has two cylindrical sections, 1 2, of different radial prominence, and projecting and releasing inclines, 3 4, connecting the concentric cylindrical sections.

To provide for setting up the dies and other parts to take up lash, and for adjusting them to work smoothly at all times, longitudinal slots *x* are provided in the bearings *z* of the driving-shaft S, and in the fulcrum-blocks K of the lever V, for the reception of their attaching-screws, and adjusting-screws X are tapped into abutment projections behind these parts and in line therewith.

The dies I I² are constructed with at least three pairs of crimps, *m m*² *m*³, so as to operate to straighten the twisted bit or auger.

To admit the shank *u* of the blank in the beginning of the operation, the middle of the dies is reamed out as far in as the first pair of crimps *m*, as illustrated in Figs. 6 and 8.

The operation of this machine is as follows: Continuous rotary motion is transmitted to the pulley P and fly-wheel F by a driving-belt applied to the former. This motion, with that of the shaft S, is represented by arrows in Figs. 2 to 5. To stop the machine the clutch L is shifted by its lever, so as to disconnect it from the pulley. In this condition the machine is under the control of the hand-wheel H, by means of which the operator sets the holding-die I² in retracted position and the twisting-rollers *r* in vertical position, and the die I is retracted by throwing up the lever V, as illustrated in Fig. 4. The flat blade *u*² of the heated blank U, Fig. 6, is now readily introduced between the dies I I² and rollers *r*, and into the hollow twisting-shaft T, and the shank *u* of the blank is introduced between the dies as far as the second crimps *m*², so that the portion *u*³ of the blade or plate immediately adjoining shall be held by the first or inner crimps *m*, which are caused to bite it by depressing the lever V, and thereby projecting the die I. The clutch L is now projected, and the shaft S is thereby connected to the driving-pulley and caused to rotate therewith.

In the primary position of the parts illustrated in Fig. 4, and in dotted lines in Fig. 5, the projecting incline 3 of the cam C is close above the shoe *c* on the die-slide E². Consequently, when the machine is started, this slide is immediately projected, and the closure of the dies is thus completed. The twisting-

shaft T at this time is rotating in the same direction as the driving-shaft—to the right—and that portion of the blank within the same is rotating therewith. At the same time those portions of the blank between the holding-dies and the twisting-rollers receive a torsional movement, but at different rates of speed, that portion nearest the rollers moving most rapidly, and that portion adjoining the dies moving most slowly.

The relative positions of the parts at the middle of this movement is illustrated in Figs. 1, 2, 3, 6, and 7, and in full lines in Fig. 5.

When the crank-pin N passes its center, opposite the starting-center at which it is shown in dotted lines in Fig. 5, the motion of the twisting-shaft T is reversed, and it turns to the left. At the instant of this reversal the outer surface 2 of the cam C passes out of contact with the shoe *c* of the die-slide E², and the die I² is permitted by the retracting-incline 4 to recede under the pressure of its spring *s*.

The entire blank now rotates with the twisting-shaft, and is screwed backward into and through the dies, as indicated by arrow in Fig. 6. The clamping and twisting actions then recur, and the newly-twisted portion is fed into the dies, and so on, in rapid succession, until the entire length of the plate has been twisted. The machine is then stopped, and the parts are returned to their first position, and the die I is retracted by throwing up the lever V. The twisted bit or auger is then withdrawn from the opened dies. A new blank is introduced, the machine is again started, and the operation thus proceeds.

Within the crimp-dies, and in passing there-through, the twist is perfectly "trued," and the bit or auger is "straightened," so as to be ready for completion by the heading and finishing operations.

By withdrawing the pins *p*, the dies may be detached, and others of a different size or pattern substituted, and, by adjusting the crank-pin N, the degree of pitch imparted by the twisting-shaft may be regulated.

Having thus described this my invention, I claim—

1. In combination with an oscillating hollow shaft, T, for twisting augers, the stationary crimp-die I and the reciprocating crimp-die I², arranged in line with the axis of the shaft, and operating together to hold and straighten the auger, said reciprocating die serving also to alternately clamp and loosen the auger, and said stationary die operating as a half-nut for feeding the loosened auger during the backward movements of the twisting-shaft, as herein set forth.

2. The combination of the holding and straightening dies I I², the hand-lever V, the cam C on the driving-shaft, and the retracting-springs *s*, substantially as shown and described.

3. The combination of the rotary driving-shaft S, carrying the crank-disk D and cam

C, and provided with hand-wheel H, the oscillating twisting-shaft T, operated by said crank-disk, and the reciprocating holding and straightening die I², projected by said cam, with the driving-pulley P and fly-wheel F, attached to the driving-shaft by clutch L, so as to be disconnected at will, substantially as

shown and described, for the purpose specified.

WILLIAM TUCKER.

Witnesses:

EMORY L. BATES,
RUFUS E. BOND.