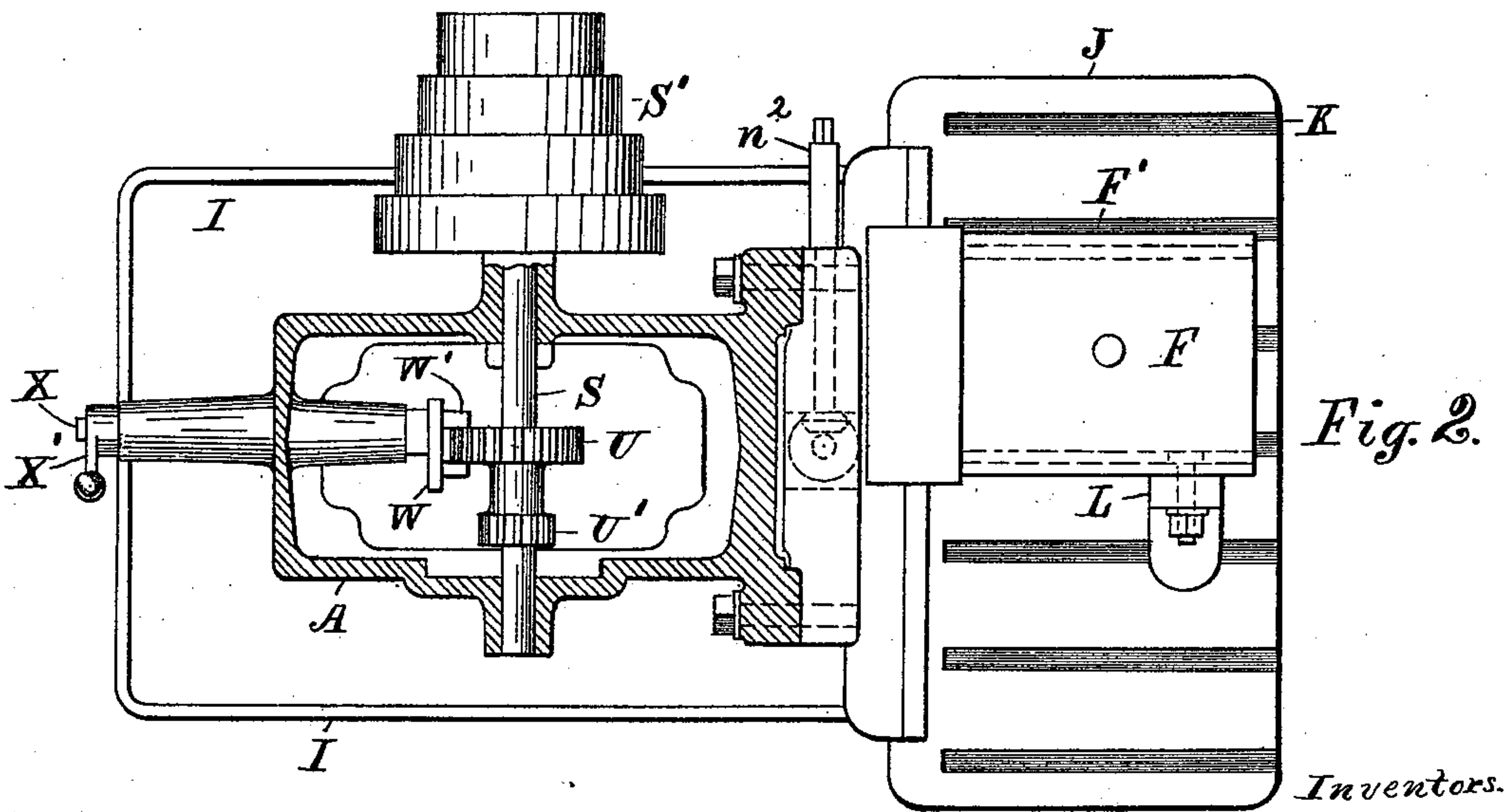
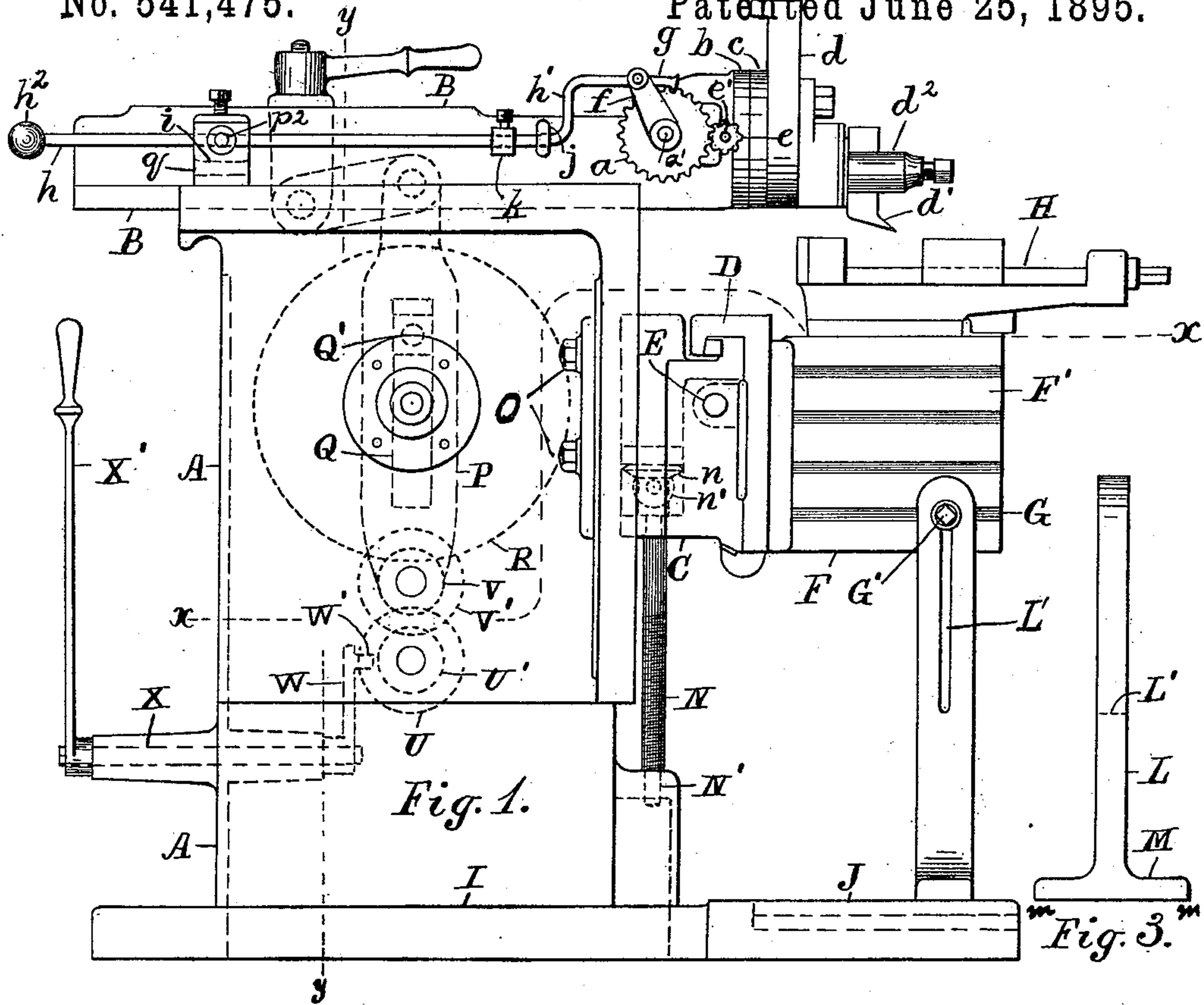


U., H. E. & F. L. EBERHARDT.  
CRANK PLANER.

No. 541,475.

Patented June 25, 1895.



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per Thomas S. Crane, Atty.

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Fig. 5.

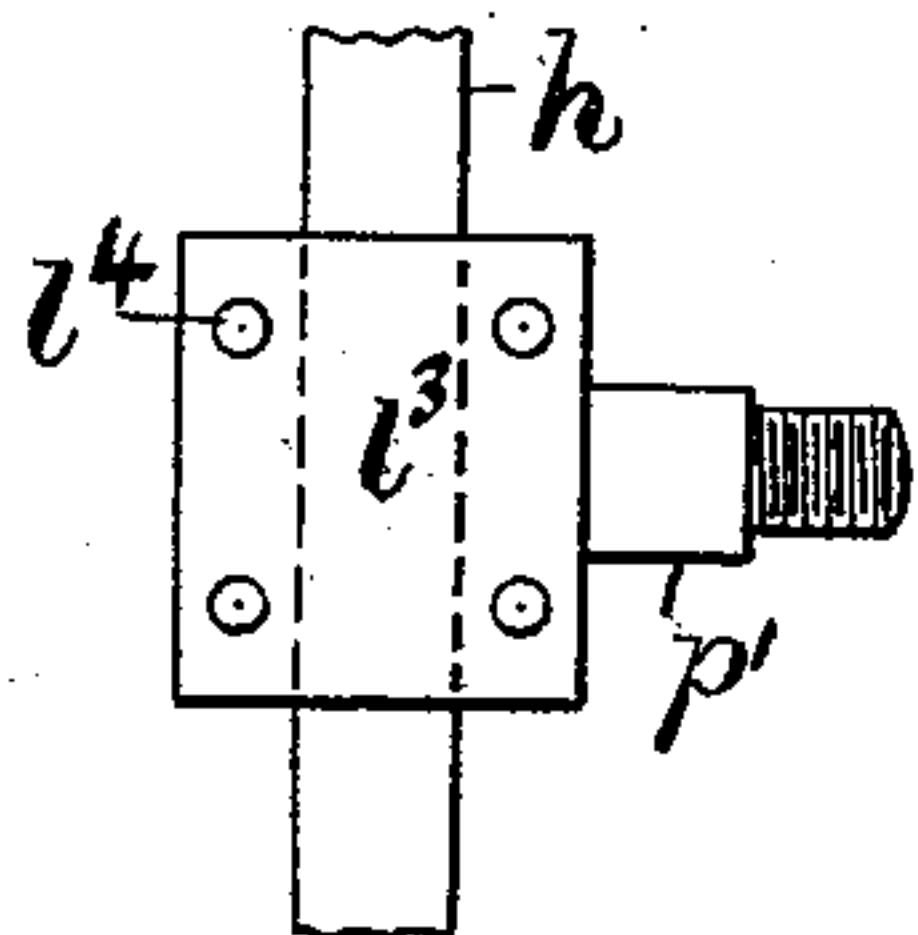
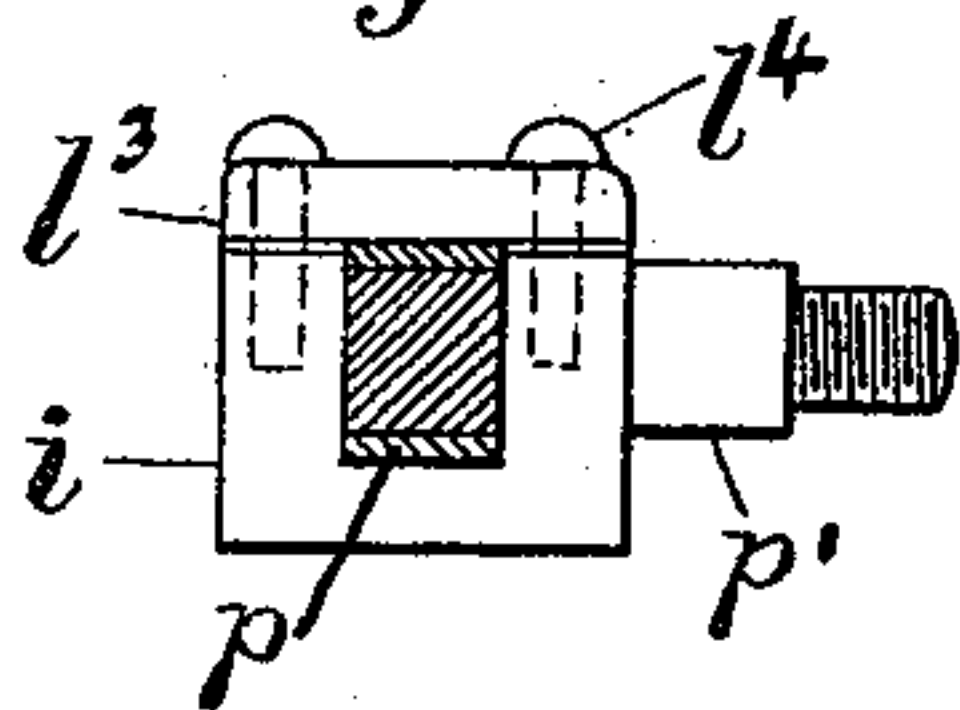


Fig. 6.

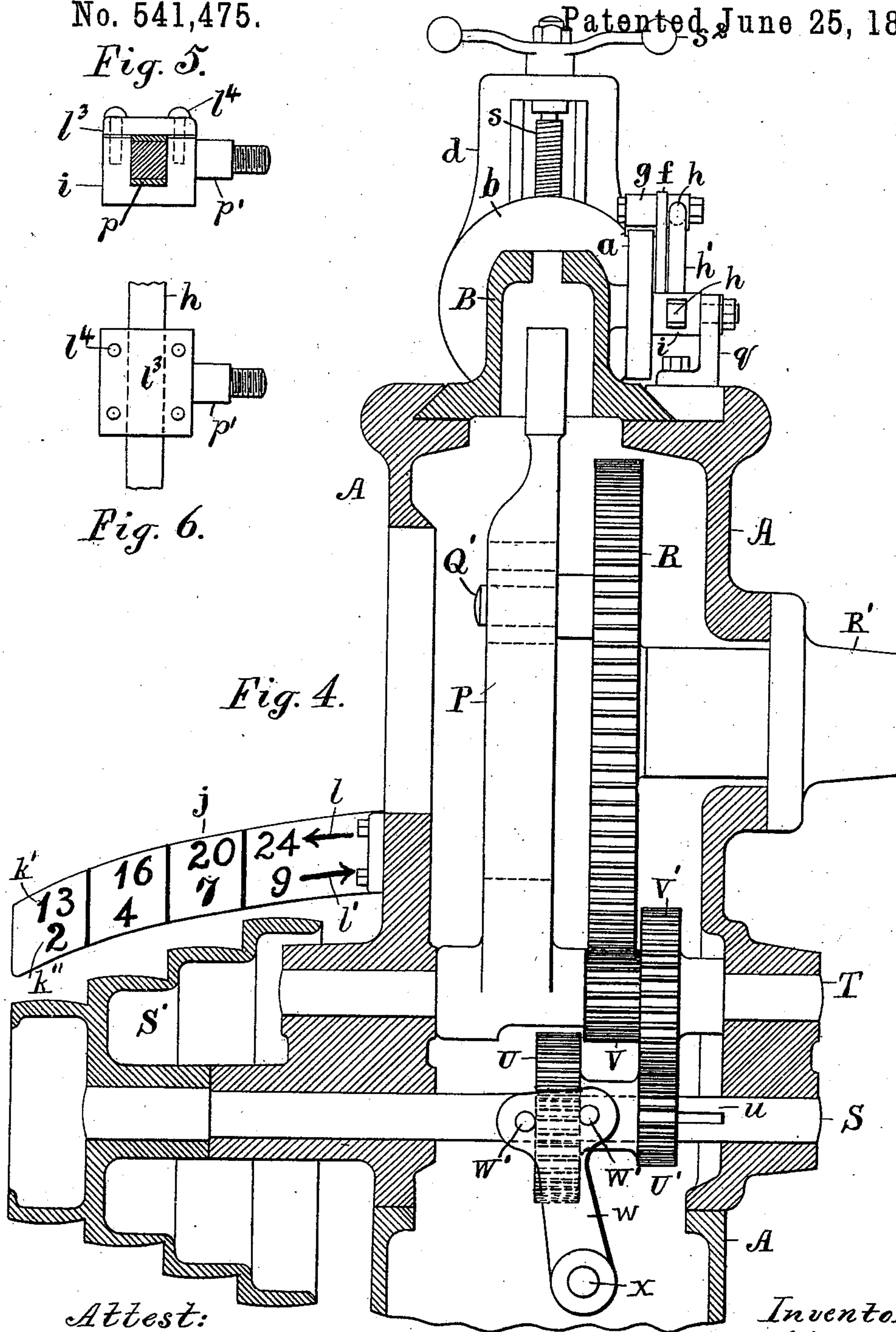


Fig. 4.

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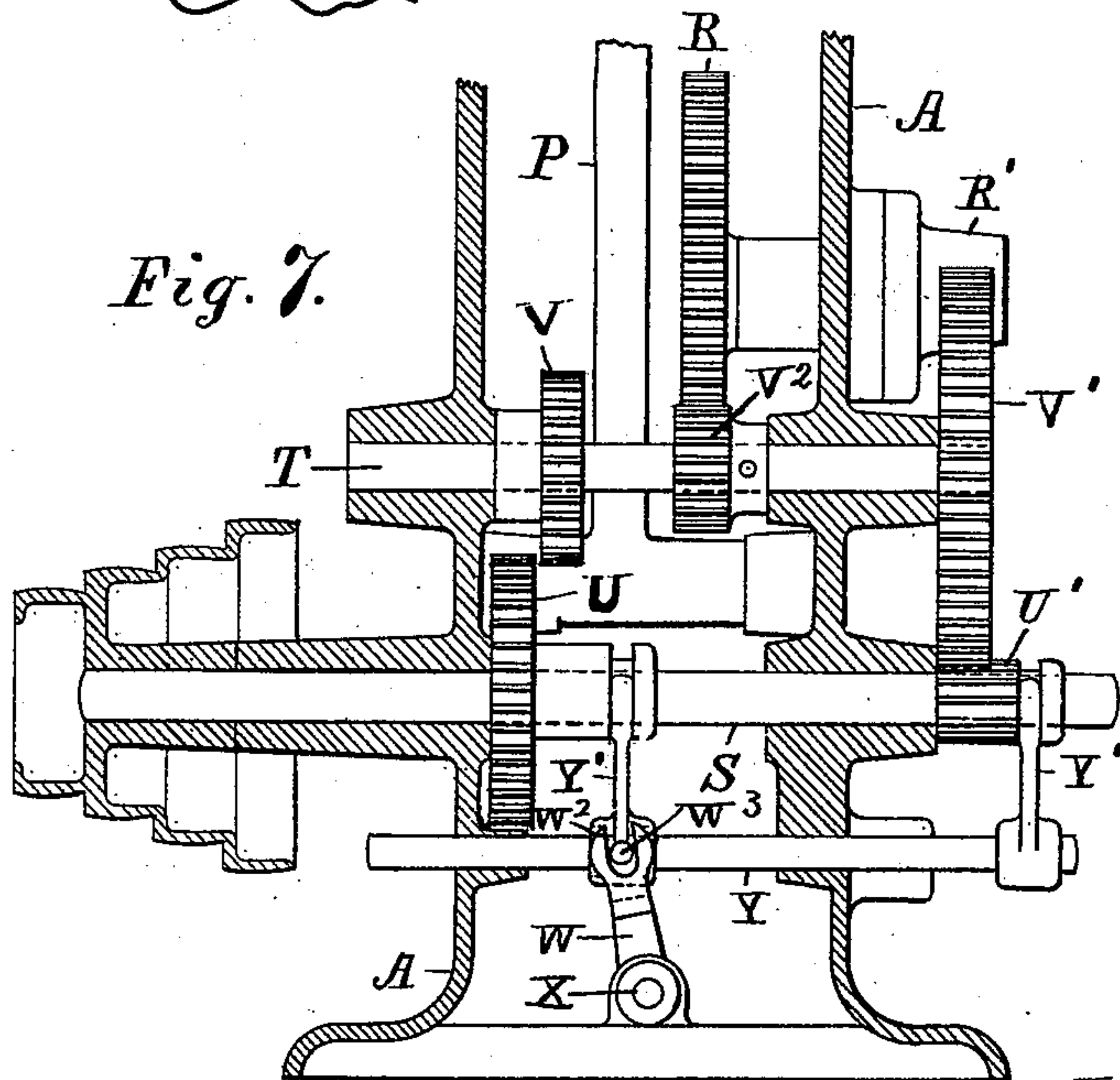
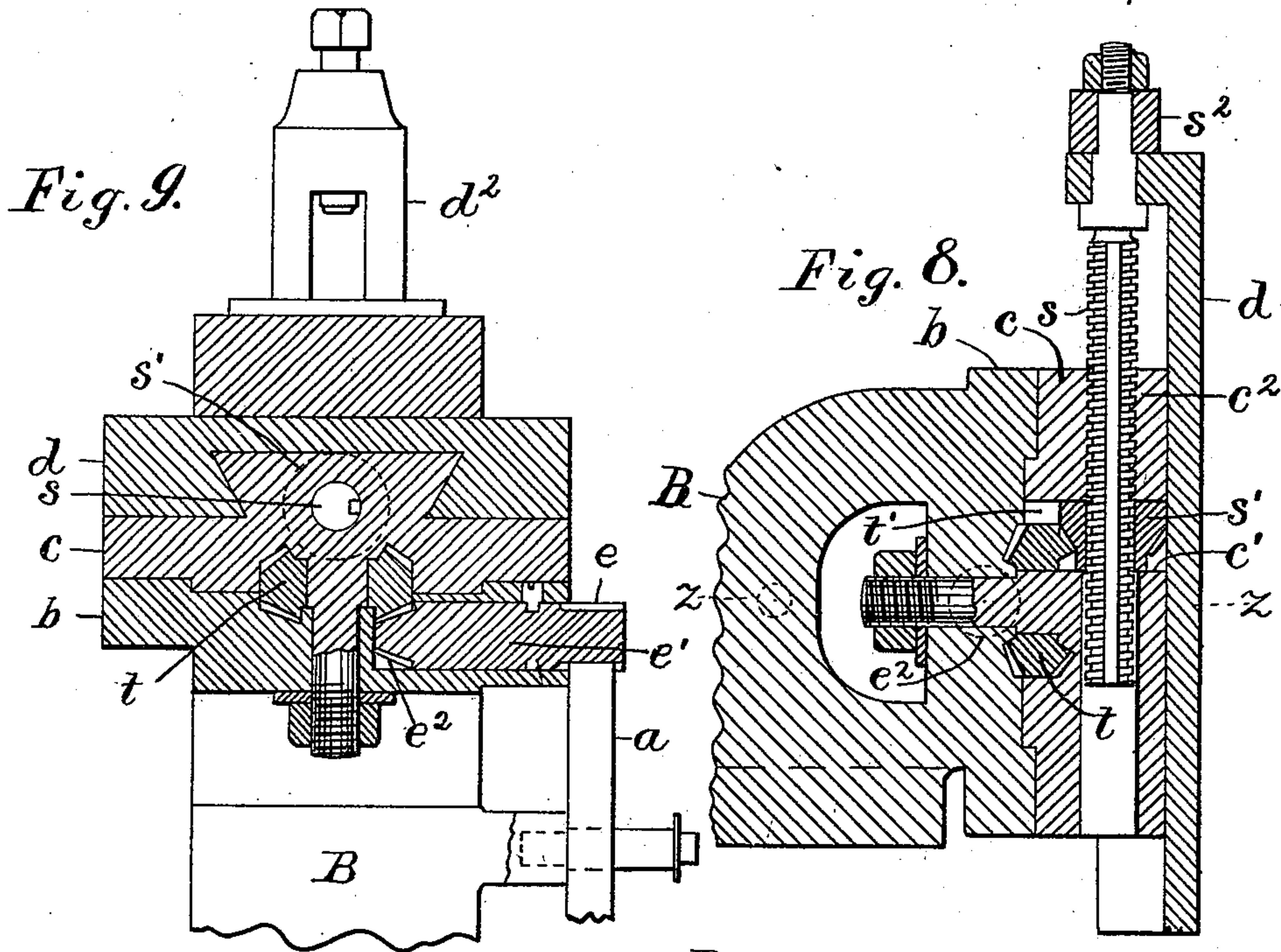
(No Model.)

3 Sheets—Sheet 3.

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# UNITED STATES PATENT OFFICE.

ULRICH EBERHARDT, HENRY E. EBERHARDT, AND FRED L. EBERHARDT, OF  
NEWARK, NEW JERSEY.

## CRANK-PLANER.

SPECIFICATION forming part of Letters Patent No. 541,475, dated June 25, 1895.

Application filed April 20, 1894. Serial No. 508,261. (No model.)

*To all whom it may concern:*

Be it known that we, ULRICH EBERHARDT, HENRY E. EBERHARDT, and FRED L. EBERHARDT, citizens of the United States, residing at Newark, Essex county, New Jersey, have invented certain new and useful Improvements in Crank-Planers, fully described and represented in the following specification and the accompanying drawings, forming a part  
10 of the same.

The present invention relates partly, to a means for actuating a vertical feed upon the ram, partly, to an improved means for indicating the adjustment of the speed gearing,  
15 and partly, to a means for bracing the work holding vise or table.

The invention will be understood by reference to the annexed drawings, in which—

Figure 1 is a side elevation of a crank-planer provided with these improvements. Fig. 2 is a plan of the same, taken in section on line  $xx$  in Fig. 1. Fig. 3 is a front view of the slotted standard. Fig. 4 is a vertical section on line  $yy$  in Fig. 1. Fig. 5 is an end view,  
25 and Fig. 6 a plan, of the friction-box for the feed-rod. Fig. 7 is a section similar to Fig. 4 with an alternative arrangement for the speed-gearing. Fig. 8 is a vertical section at the center of the ram-head, and Fig. 9 is a  
30 horizontal section through the same on line  $zz$  in Fig. 8.

The machine is shown with a box frame A, and the speed gearing is shown inclosed wholly within such box in Figs. 1, 2 and 4.  
35 B designates the ram; C, the cross head upon the front of the frame; D, the saddle moved horizontally thereon by feed screw E in the usual manner.

F designates a box table attached to the  
40 front of the saddle and formed with vertical faces  $F'$  having horizontal slots G therein.

The vise H is mounted upon the top of the table, as is common in such machines. The frame is formed with a base I, which is extended beyond the front of the frame to form  
45 a bed-plate J. The bed-plate has a plane horizontal surface, and slots K for securing large work-pieces. The strain of the tool upon any work piece fastened in the vise or  
50 upon the table, tends to thrust the table downward, and to resist such thrust a stand-

ard is affixed to the outer portion of the table and supported at its lower end upon the smooth surface of the bed plate J. Such a standard, L, provided with vertical slot  $L'$  55 and horizontally spreading foot M is shown standing upon the bed plate J with its side applied to the vertical face of the table F, and clamped thereto by bolt  $G'$  inserted through the slot  $L'$  into one of the table slots 60 G. A screw N is fitted in a nut  $N'$  upon the front of the base and is provided with gears  $n$  and  $n'$ , which are rotated by a shaft  $n^2$  to raise and lower the cross head. When adjusted, the cross head is clamped by bolts O, 65 and when thus adjusted at a suitable height, the standard L is correspondingly adjusted by slackening the bolt  $G'$ , pressing the foot of the standard upon the bed plate J, and then tightening the bolt  $G'$  to secure the 70 standard rigidly to the table. The foot of the standard is shown with sharp angles at its corners  $m$ , and is freely movable upon the bed plate J while the saddle D is fed longitudinally along the cross head C, during the 75 operation of the machine. The table and vise are thus supported against the thrust of the tool, and the cut is more perfectly parallel with the bed plate, than if the table were allowed to yield. The standard is made 80 with a vertical face where it is fitted against the table F, and such vertical face adapts it to apply adjustably to any portion of the table when the cross head is raised or lowered. The shape of the table is therefore immate- 85 rial, and a single bolt hole in the table would operate adjustably to secure the standard, in conjunction with the slot therein.

In Figs. 1 and 4, P designates the arm for vibrating the ram, formed with slot Q to receive the block of the crank pin  $Q'$ , which is fixed adjustably in the crank gear R.

S designates the pulley shaft extended transversely through the box frame, and T an intermediate shaft similarly arranged between the same and the bearing  $R'$  of the crank gear. 95

$S'$  designates a speed pulley upon the outer end of the shaft S, and U,  $U'$ , designate pinions of different sizes connected rigidly together and fitted movably over a spline  $u$  upon the shaft S. 100



V, V', designate two pinions upon the shaft T adapted to pair reversely with the pinions U, U'. A dog W is mounted upon a rock shaft X which is extended through the rear of the box frame and provided upon its outer end with a vertically projecting hand-lever X'. The dog is formed as a crank W projected at one edge of the gear U and provided with pins W' at opposite edges of the gear. The shifting of the handle X operates to slide the pinions U, U', simultaneously upon the shaft S; so as to shift either of these pinions into gear with the pinions V, V'.

The pinion U' is shown meshing with the pinion V', and being smaller than the latter is adapted to transmit a reduced speed from the shaft S to the shaft T.

The sharp corners upon the foot of the standard L are adapted, as the foot slides over the surface of the bed plate J, to push the chips and grit before it, and thus prevent the same from crowding under the standard and pressing it upward; which would affect the horizontality of the table F and vise H. The slots K are provided in the bed plate chiefly to permit the escape of the chips and grit from beneath such foot, as it is pushed along by the sharp corners *m*; as the slots in such a bed plate are seldom of use to hold a work piece by bolts fitted in such slots, as few work pieces would reach up as high as the tool *d*'.

By shifting the dog, as shown in Fig. 4, to the right, the pinion U' would slide out of gear with the pinion V', and the pinion U would mesh with the pinion V, and being larger than the latter, would transmit an increased speed from the shaft S to the shaft T. The pinions U, U', are shifted simultaneously, and a single movement of the shifting mechanism thus operates to change the adjustment of the gearing, to vary the speed of the crank wheel at pleasure.

In Fig. 7 the pinions U' and V' are shown outside of the box frame, and a sliding rod Y is shown arranged parallel with the shaft S, and provided with arms Y' adapted to shift the pinions U and U' simultaneously. The shaft X is shown arranged beneath the rod Y and transverse thereto, and the arm W is provided at the top with a notch or open slot W<sup>2</sup> fitted to a pin W<sup>3</sup> upon one of the arms Y'; by which the rod and the arms are moved by the actuation of the hand lever X'.

In Fig. 4, the vibrating arm is shown hinged upon the shaft T; but in Fig. 7, the lower end of the arm is shown in the rear of the shaft, where it would be hinged upon a suitable stud. By the simple addition of the intermediate shaft T, and the reversely arranged pinions U, U', V, V', with the means for shifting two of the pinions simultaneously, the ranges of speed afforded by the steps upon the cone S' may be doubled, and the change of speed effected by the pinions may be instantly secured by a single movement of the lever X'.

The speed pulley in Figs. 2 and 4 is shown

with four faces to produce four changes of speed, and the addition of the intermediate shaft therefore doubles the range of speed attainable upon such pulley. The variation produced in the speed of the machine by shifting the lever X', and the stroke to which each of the several speeds is adapted, are indicated to the eye by an attachment shown in Fig. 4. Such attachment consists in an index plate *j* shown mounted at one edge of the speed pulley, and provided with two scales *k*', *k*'', bearing figures opposite the belt faces upon the speed pulley, and showing respectively the proper strokes for the ram in a machine capable of twenty-four inch stroke, when actuated by placing the driving belt upon the corresponding belt face with the hand-lever X' moved in a specific direction. The proper movements for the hand-lever to correspond with the two scales are indicated by arrow heads *l*, *l*', applied respectively to such scales, and pointing respectively in the two directions in which the hand lever may be moved. The arrow head *l*' pointing to the right indicates that the shifting of the hand-lever to the right would produce an augmented speed of the ram, which with the belt applied to the several belt faces, would be suitable respectively for the strokes of two, four, seven, and nine inches. The arrow head *l* pointing in the opposite direction, indicates that the four speeds of the speed cone would be suitable respectively for strokes of thirteen, sixteen, twenty, and twenty-four inches. The various speeds would also be used, as is common in such machines, for the strokes intermediate to those upon the index. It is obvious that the scale may be fixed upon the frame adjacent to the hand-lever X' with the understanding that the arrow heads indicate corresponding movements of the hand-lever, and that the figures upon the scale relate to the several belt faces upon the speed pulley.

In Fig. 1, a feed wheel *a* is shown mounted upon a stud *a*' upon the side of the ram adjacent to the disk *b* upon which the ram head *c* is swiveled in the usual manner. Such feed wheel constitutes the main feed gear for the vertical feed of the tool. The ram head *c* is provided with vertically movable slide *d* having a feed screw *s* which is intermittently rotated by a gear *e* affixed upon a transverse shaft *e*', and meshing with the gear *a*.

*f* designates an arm pivoted upon the stud *a*' and carrying a pawl *g* to actuate the wheel *a*. A rod *h* formed with offset *h*' is jointed to the arm *f* and extended backward parallel with the side of the ram through a friction clamp *i*. The rod passes loosely by an eye forming a stop *j* upon the ram, and is provided at opposite sides of the stop with the offset bend *h*' and a set screw collar *k*. The rod *h* is formed with opposite smooth parallel surfaces so as to offer only a frictional resistance to the clamp.

The friction clamp, as shown in Figs. 5 and



6, consists in a block grooved longitudinally to admit the rod  $h$ , and having a cap  $l^3$  clamped adjustably by screws  $l^4$  to produce a regulated pressure upon the rod. The cap and block are preferably lined with leather  $p$  to increase the friction, and to compensate for the oscillation of the rod, where attached to the arm  $f$ , the block is swiveled to a stationary bearing  $q$  by a lateral stud  $p'$  and nut  $p^2$ . The bearing  $q$  is bolted upon the frame at the side of the ram. A knob  $h^2$  is provided on the rod  $h$  to shift the same by hand. Figs. 8 and 9 show the arrangement of the gearing for rotating the screw  $s$  which feeds the slide  $d$ . The head  $c$  is formed with a nut  $c^2$  in the top above an aperture  $c'$  in which is mounted a pinion  $s'$  fitted movably to a spline upon the screw  $s$ . A double bevel gear  $t$  is fitted to an aperture  $t'$  in the center of the head  $c$ , its outer face meshing with the pinion  $s'$ , and its inner face meshing with a similar pinion  $e^2$  upon the shaft  $e'$ . Only one of the pinions is shown in each of the Figs. 8 and 9, the relation of the other pinion to the wheel  $t$  being indicated merely by a dotted circle; as the section planes in these figures remove such pinions from the view. The rotation of the shaft when actuated by the wheel  $a$  and pawl  $g$ , thus rotates the feed screw  $s$  and actuates the slide as desired; while the usual handle  $s^2$  upon the top of the feed screw may be independently used to move the slide up or down. In the forward movement of the ram the friction box being stationary, pulls the rod backward until the offset  $h'$  is in contact with the stop  $j$ , thus retracting the pawl, as shown in Fig. 1. By the backward movement of the ram, the friction upon the rod pushes it forward, thus pushing the pawl and wheel  $a$  forward, and actuating the feed screw as desired. The tool  $d'$  is shown secured to the slide by the usual tool post  $d^2$ .

The movement of the pawl and the rate of feed produced thereby, are governed by the adjustment of the collar  $k$  in relation to the offset  $h'$  and stop  $j$ , and when once set for a given rate of feed, are unaffected by any change of stroke or speed of the ram. The rod  $h$  may be made straight and a collar substituted for the bend or offset  $h'$ , the latter being used merely to bring the rod down close to the top of the frame.

Having thus set forth the nature of the invention, what is claimed herein is—

1. In a planer, the combination, with the main feed gear, of an oscillating arm having a pawl applied to the gear, a feed rod extended from such an arm and having opposite smooth parallel surfaces, and a friction clamp secured to the frame of the planer and clamped upon the opposite parallel surfaces of the feed rod, as herein set forth.

2. In a planer, the combination, with the adjustable ram head  $c$  provided with the tool slide and feed screw  $s$ , of gearing mounted upon the ram for rotating the screw, an os-

cillating arm having a pawl applied to the main feed gear, a feed rod extended from such arm along the side of the ram, and a friction clamp secured to the frame of the planer and clamped upon the feed rod, as herein set forth.

3. In a planer, the combination, with the adjustable ram head  $c$  provided with the tool slide  $d$  and feed screw  $s$ , of gearing mounted upon the ram for rotating the screw, an arm with pawl applied to the main feed gear, a feed rod extended from such arm along the side of the ram, a friction clamp clamped upon the feed rod, a bearing attached to the main frame and a swivel connection between such friction box and bearing, as herein set forth.

4. In a crank planer, the combination, with the ram provided with the disk  $b$ , of the transverse shaft  $e'$  inserted in the edge of such disk, the pinion  $e$  and feed gear  $a$  and pawl  $g$  for actuating the shaft, the adjustable head  $c$  provided with the double bevel gear  $t$ , the slide  $d$  carrying the tool post and the pinion  $s'$  within such head and the screw  $s$  fitted to a spline within such pinion, as herein set forth.

5. In a crank planer, the combination, with the frame having the cross head  $C$  provided with means for adjusting the same vertically upon the frame, and having a saddle movable thereon with the table  $F$ , of the base having a bed plate projected beneath the table  $F$ , and a standard bolted adjustably to the table and fitted at its lower end to slide upon the bed plate, substantially as herein set forth.

6. In a crank planer, the combination, with the frame having a base provided with the plane bed plate  $J$ , and having the cross head  $C$  with screw  $N$  for elevating and sustaining the same, of the saddle movable upon the cross head and carrying the table  $F$ , of the slotted standard  $L$  bolted adjustably to such table and having a foot adapted to slide upon the bed plate, as herein set forth.

7. In a crank planer, the combination, with the frame having a base provided with the slotted bed plate  $J$ , and having the cross head  $C$  with screw  $N$  for elevating and sustaining the same, of the saddle movable upon the cross head, the box table with vertical slotted side secured to the saddle, the slotted standard  $L$  clamped adjustably to the slotted side of the table and having a foot to slide upon the bed plate, as herein set forth.

8. A crank planer comprising a suitable frame carrying the ram  $B$ , the crank gear  $R$  with lever connection to the ram, the intermediate shaft  $T$  mounted transversely beneath the same and provided with the pinions  $V$ ,  $V'$ , the pulley shaft  $S$  provided with cone  $S'$  and the reversely arranged pinions  $U$ ,  $U'$ , the shaft  $X$  projecting from the rear of the frame and provided with the upright lever  $X'$ , and with means for simultaneously shifting the pinions  $U$ ,  $U'$ , a scale supported at the side of the speed pulley with two sets of fig-



ures upon such scale indicating respectively  
suitable strokes for the ram with the lever  
moved to the right and the left, and the re-  
versely arranged arrow heads *l, l'*, indicating  
5 the positions of the hand-lever corresponding  
to the two sets of figures, the whole arranged  
and operated as herein set forth.

In testimony whereof we have hereunto set

our hands in the presence of two subscribing  
witnesses.

ULRICH EBERHARDT.  
HENRY E. EBERHARDT.  
FRED L. EBERHARDT.

Witnesses:

JOSEPH B. PIERSON,  
THOMAS S. CRANE.