(No Model.) 2 Sheets—Sheet 1.

A. WOEBER.

HUB BORING MACHINE.

No. 387,550. Patented Aug. 7, 1888.

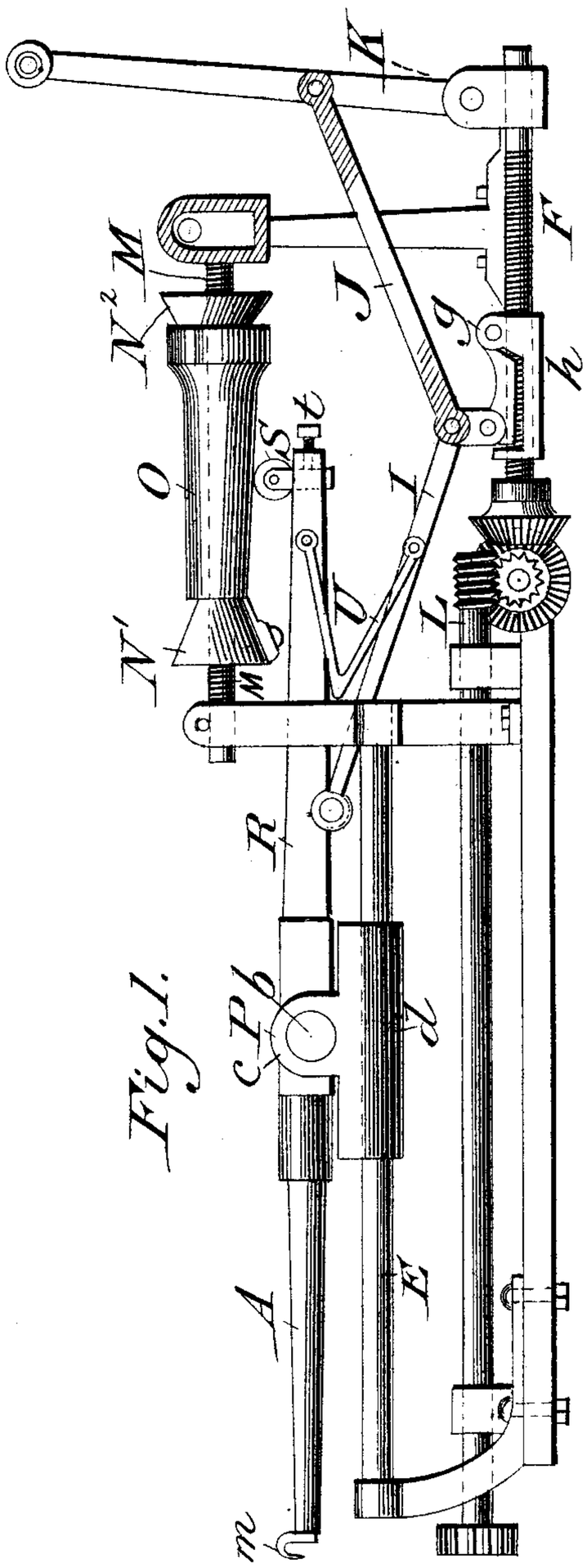

Fig. 1.

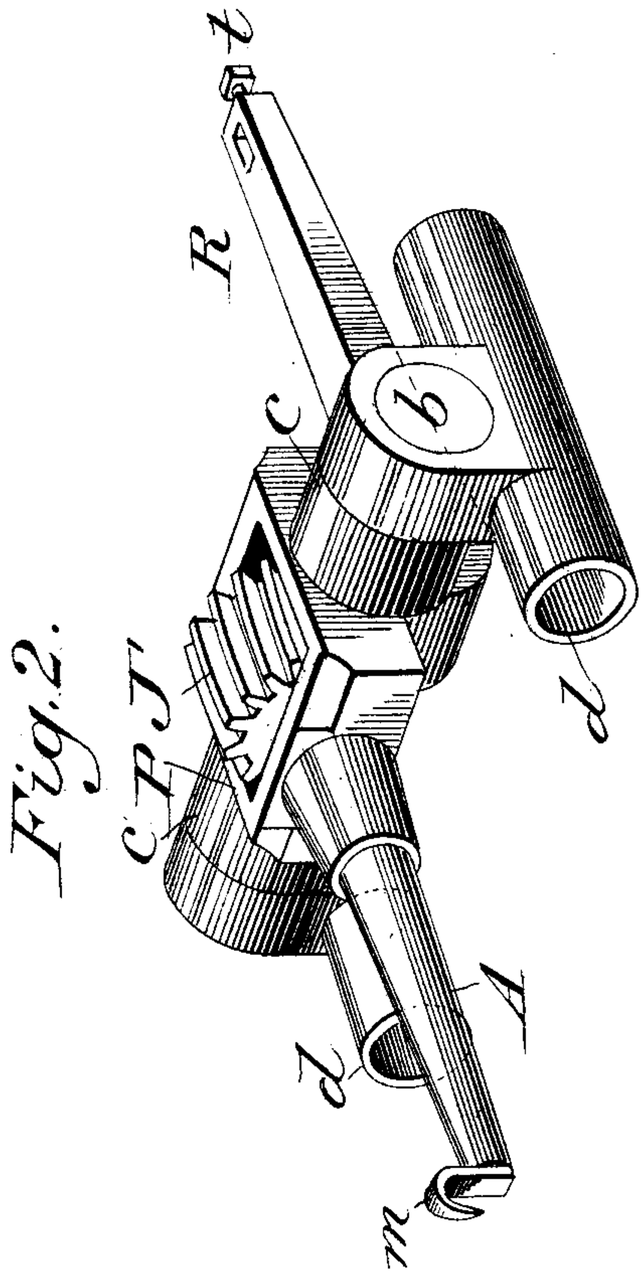

Fig. 2.

Witnesses.

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Fig. 5.

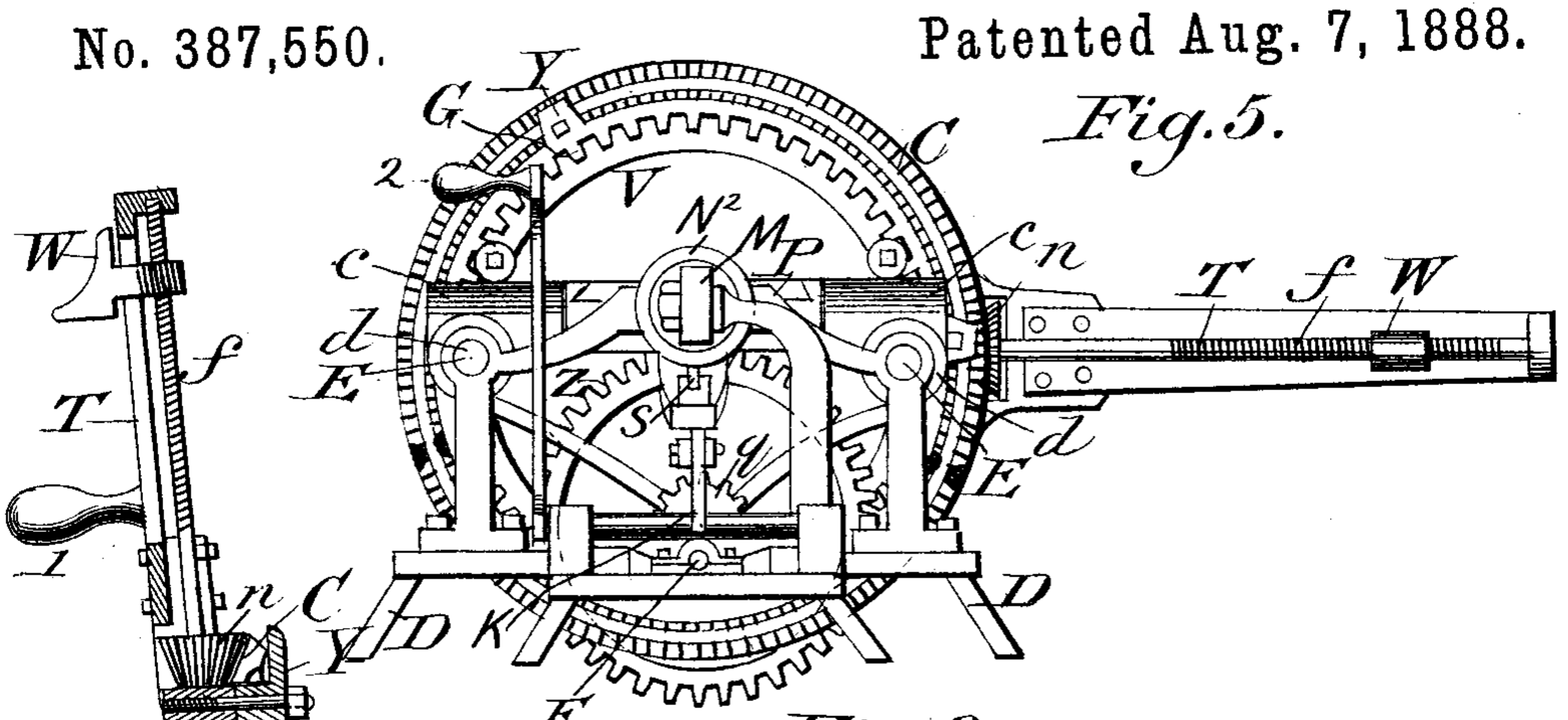


Fig. 3.

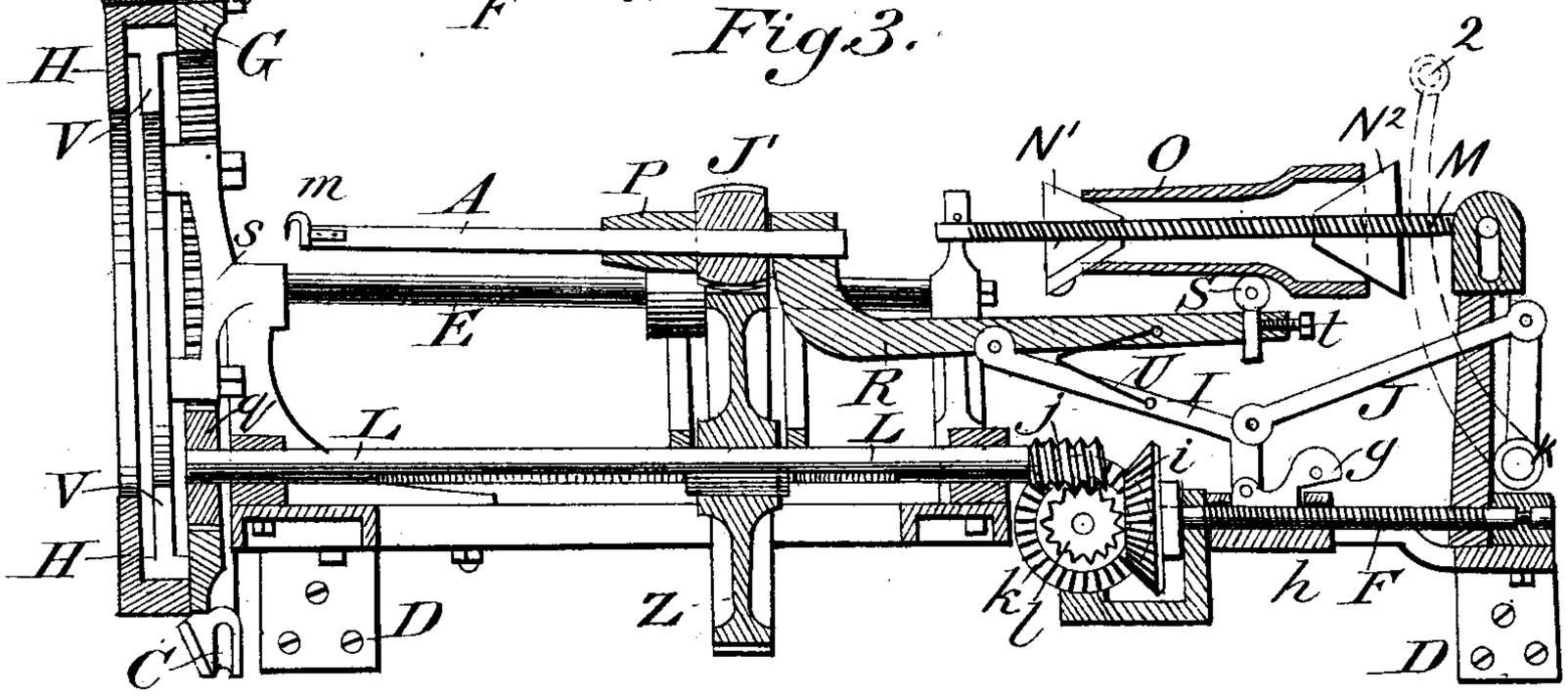
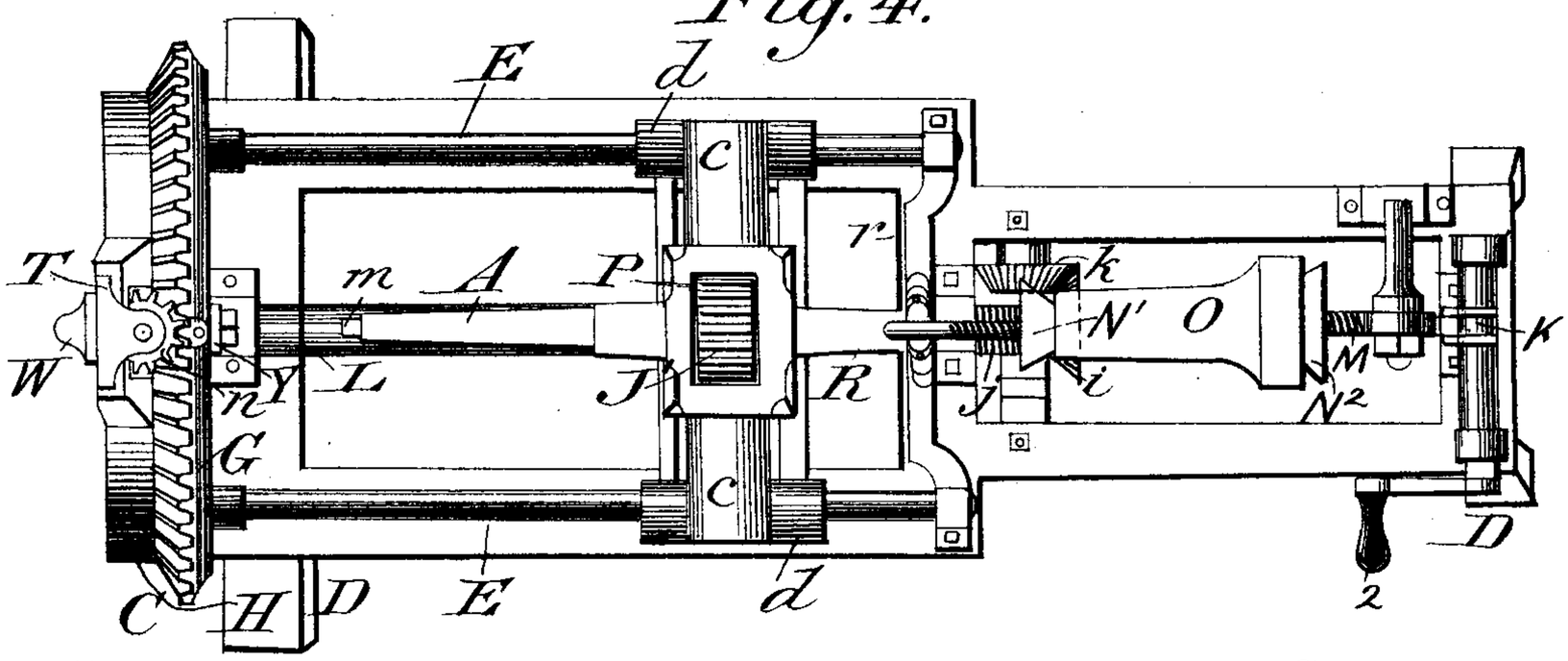


Fig. 4.



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UNITED STATES PATENT OFFICE.

AMOS WOEBER, OF DAVENPORT, IOWA.

HUB-BORING MACHINE.

SPECIFICATION forming part of Letters Patent No. 387,550, dated August 7, 1888.

Application filed July 29, 1886. Renewed June 1, 1888. Serial No. 275,691. (No model.)

To all whom it may concern:

Be it known that I, AMOS WOEBER, a citizen of the United States, residing at the city of Davenport, in the county of Scott and State of Iowa, have invented a new and useful Improvement in Hub-Boring Machines, of which the following is a specification.

My invention relates to improvements in hub-boring machines, in which the axle-box or a former having the exterior form of an axle-box forms a guide to control the cutter in cutting the aperture through the hub, so that such aperture will be substantially of the same size and form as the axle-box to be inserted therein.

In the accompanying drawings, Figure 1 is a sectional side view showing devices for feeding and guiding the knife or cutter, the devices for clutching, centering, and rotating the wheel and hub being omitted. Fig. 2 is a perspective view of cross-head and other details. Fig. 3 is a vertical longitudinal section of the machine. Fig. 4 is a plan or top view of the same. Fig. 5 is a rear end view of the machine, except that only one of the arms T from the clutch is shown.

The rocking cross-head P, with its knife-arbor A and knife *m*, is supported by its cross-arms *b b*, inserted in the cylindrical boxes *c c*. At right angles to and underneath each cylindrical box *c* is a sleeve, *d*, which is fitted over and slides upon slide-rod E. There are two slide-rods, E E, parallel to each other and supported by standards from the bed-plate of the machine. The cross-head P is thus suspended between slide-rods E E, and through sleeves *d d* may slide forward and backward thereon, so that knife *m* may be forced to cut into the hub or be withdrawn therefrom. The rocking movement of cross-head P on its arms *b b* in cylindrical boxes *c c* raises or lowers the knife *m*, controlling the area of its cut into the hub.

The combination of the parts above described, together with arm R and traveler S, hereinafter described, I term a centrally-pivoted and longitudinally-sliding cutter-bar.

F is a screw-shaft having proper screw-threads cut therein, and properly supported at its extremities in boxes or journals, so as to revolve and resting upon standards from the bed-plate of the machine.

Fitted upon screw-shaft F is a half-nut, *g*, with a proper screw-thread cut therein, and shell *h*, which are hinged at one end. An arm, I, is pivoted to half-nut *g* and cross-head P, through the medium of its arm R.

The revolution of screw-shaft F causes half-nut *g* to move lengthwise upon it forward or backward, at the same time causing a corresponding movement through the medium of arm I to cross-head P on slide-rods E E. Lever J, attached to the standard on rock-shaft K, provides the means for sliding half-nut *g* and cross-head P backward when half-nut *g* is raised upon its hinge and disengaged from the threads of screw-shaft F by means of the handle 2.

Power may be applied to rotate worm-shaft L and the miter cog-wheels geared to screw-shaft F.

M is a horizontal bar having screw-threads cut thereon, and supported at each end by standards from the bed-plate of the machine. The rear standard has a vertical slot with thumb-screw or other equivalent for raising or lowering bar M. Nuts N′ and N², made in the form of a cone, are screwed upon bar M. Axle-box O is passed over or onto bar M between nuts N′ and N², which are used to adjust and hold in place said axle-box. Arm R is attached to and extends from cross-head P, so that its traveler S rests against axle-box O. Traveler S may be adjusted on arm R by the thumb-screw *t*. I adjust a V-shaped spring, U, between arms R and I.

It will be observed that upon adjusting the axle-box O in position, as cross-head P and knife *m* are fed or moved forward, so that the knife cuts into the hub, traveler S likewise moves lengthwise upon the axle-box O, following its projections and depressions, causing a like elevation or depression in knife *m*, so that the aperture cut in the hub will be of the same form and size of the axle-box O, which is thus used as a guide.

If desired, that part of nut N′ outside of the axle-box O, as shown in drawings, may be so formed and shaped that, as traveler S moves upon it, it will guide the knife *m* so that it will cut an aperture in the front end of the hub, of suitable size and form to receive the axle-nut.

To the front end of the machine I attach to

the standards from the bed-plate or frame a chuck for gripping, centering, and rotating the wheel and hub.

A description of the chuck is as follows: A flat stationary ring, V, is bolted to the front of said standards. I encircle ring V with two other rings, H and G, bolted together, each having an inwardly-projecting lip, between which is rim of ring V, permitting rings H and G together to rotate around and on its rim. The lower surface of lip on ring G is supplied with cogs. From the outer or top surface of ring H project three arms, T, equidistant apart. Each of the arms T has a longitudinal slot or aperture, into which is inserted longitudinally a screw-shaft, *f*, having bearings at each end, so that it may rotate, and at its lower end is a pinion, *n*. Upon each screw-shaft *f* is a nut, *w*, having a projection or foot extending in front and through the slot in arm T. On one of the arms T is a handle, 1, for the purpose of rotating the clutch by manual power. On the rim and encircling ring G, and in the rear of pinion *n*, is a ring, C, the front side of which is provided with cogs which engage with pinion *n*. Projections Y on ring G and pinions *n* in each of the three arms T retain ring C in position and permit it to rotate around and upon rim of ring G. In the outer surface of ring C are holes in which a pin may be inserted.

The wheel and hub to be operated upon is placed within the projections of nuts *w* of each of the three arms T. The operator inserts the pin in one of the holes in ring C and holds the pin, and with the other hand takes hold of one of the arms T, then rotates ring C, which in turn rotates each of the pinions *n* and screw-shafts *f*, causing nuts *w* to move inwardly and lengthwise upon screw-shafts *f*, and the projections of nuts *w* come in contact with the rim or felly of the wheel and hold the same and hub in position to be operated upon. By rotating ring C in the opposite direction the wheel is disengaged.

A shaft, L, supported in bearings upon standards from the bed plate or frame of the machine, extends lengthwise, its front end being provided with a cog-wheel, *q*, which engages with the cogs in ring G, and its rear end terminating in a worm or screw, *j*. The front end of screw-shaft F has a beveled or mitered cog-wheel, *i*, which engages with a similar beveled or mitered cog-wheel, *k*, upon a shaft running crosswise and supported by standards or bearings upon the bed plate or frame of the machine, and also upon this shaft is a worm or screw geared cog-wheel, *l*, which engages with the worm or screw *j* on shaft L.

By revolving the chuck by manual power applied to the handle 1 after the wheel and hub has been centered and gripped, as herein described, the hub is rotated, as also shaft L, through cogs on ring G and cog-wheel *q*, and such rotation thereby causes worm or screw *j* on shaft L to rotate the worm or screw geared cog-wheel *l* and beveled or mitered cog-wheels *i* and *k*, thus causing rotation of screw-shaft F. I have already described the effect and operation produced by the rotation of screw-shaft F.

In addition to the mechanism explained, when desiring to use power other than manual to operate my machine, I add these parts: I cut a vertical slot or aperture in cross-head P. I fit the rear end of knife-arbor A in cross-head P so that it may revolve, and upon said knife-arbor A in the slot or aperture I secure a small cog-wheel, J′, its outer surface being oval, and beneath, on shaft L, I secure a wide cog-wheel, Z, so as to engage with cog-wheel J′. I also secure a pulley on shaft L, to which the power is applied by means of a belt in the usual way. When power is thus applied as here shown, the machine works as heretofore described, and, in addition, the knife-arbor A and knife *m* rotate.

The devices and mechanism herein described for feeding the cutter *m*, and also the devices for clutching and rotating the wheel and hub, are merely presented for the purpose of illustrating a mode of feeding the cutter and a mode of rotating the hub in the operation of my device, and no claim is made herein to such feeding and hub-rotating devices, or either of them, as a part of my invention, which is not limited to the use of any particular form of mechanism for either of such purposes.

What I claim, and desire to secure by Letters Patent, is—

1. In a hub-boring machine, the combination of a former having the shape of the exterior surface of an axle-box, a cutter-bar provided at one end with a cutter adapted to cut the bore in a hub and having the other end adapted to bear upon and be reciprocated over the former, the said cutter-bar being attached to a rocking cross-head mounted in reciprocating bearings, means to reciprocate the cutter-bar, and means to hold in place and revolve a hub in contact with the cutter, all of the said devices being constructed and arranged to cause the bore in the hub to be cut the size and shape of the axle-box, substantially as and for the purposes described.

2. In a hub-boring machine, the bar A, provided with a cutter, *m*, and rigidly attached to the cross-head P, pivotally mounted in movable bearings placed on fixed supports, guide-arm R, provided with friction-roller *s*, former O, adjustably secured on the shaft M, in combination with mechanism for holding and rotating the hub of a wheel in position to be bored by the cutter, and mechanism for reciprocating longitudinally the cross-head carrying the cutter-bar and guide arm, substantially as set forth and described.

AMOS WOEBER.

Witnesses:
E. M. PHELAN,
J. W. STEWART.