E. J. HANNUM.

ROTARY PLANING MACHINE.

APPLICATION FILED MAR. 27, 1907.

914,948.

Patented Mar. 9, 1909.

4 SHEETS—SHEET 1.

Fig. 1.

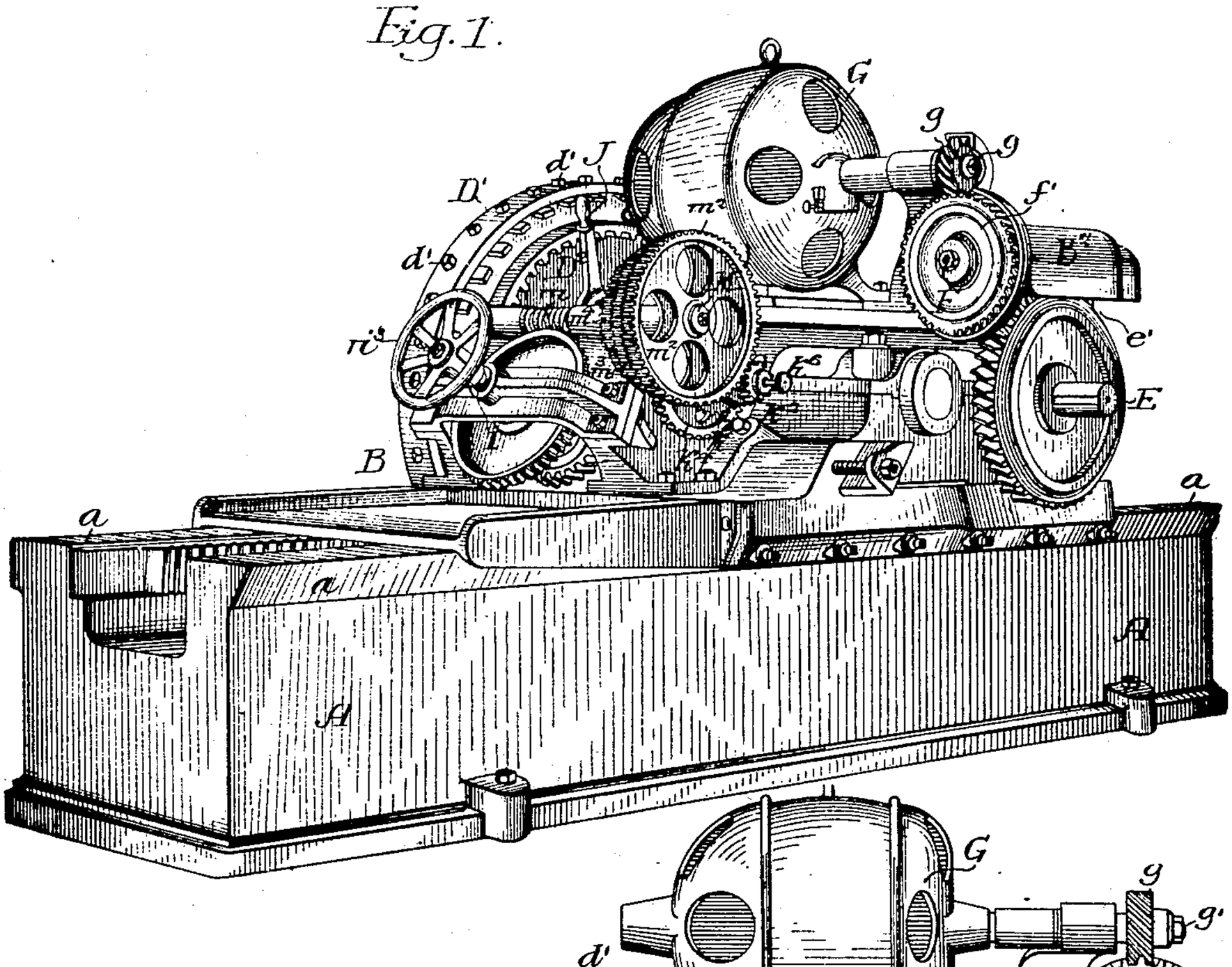
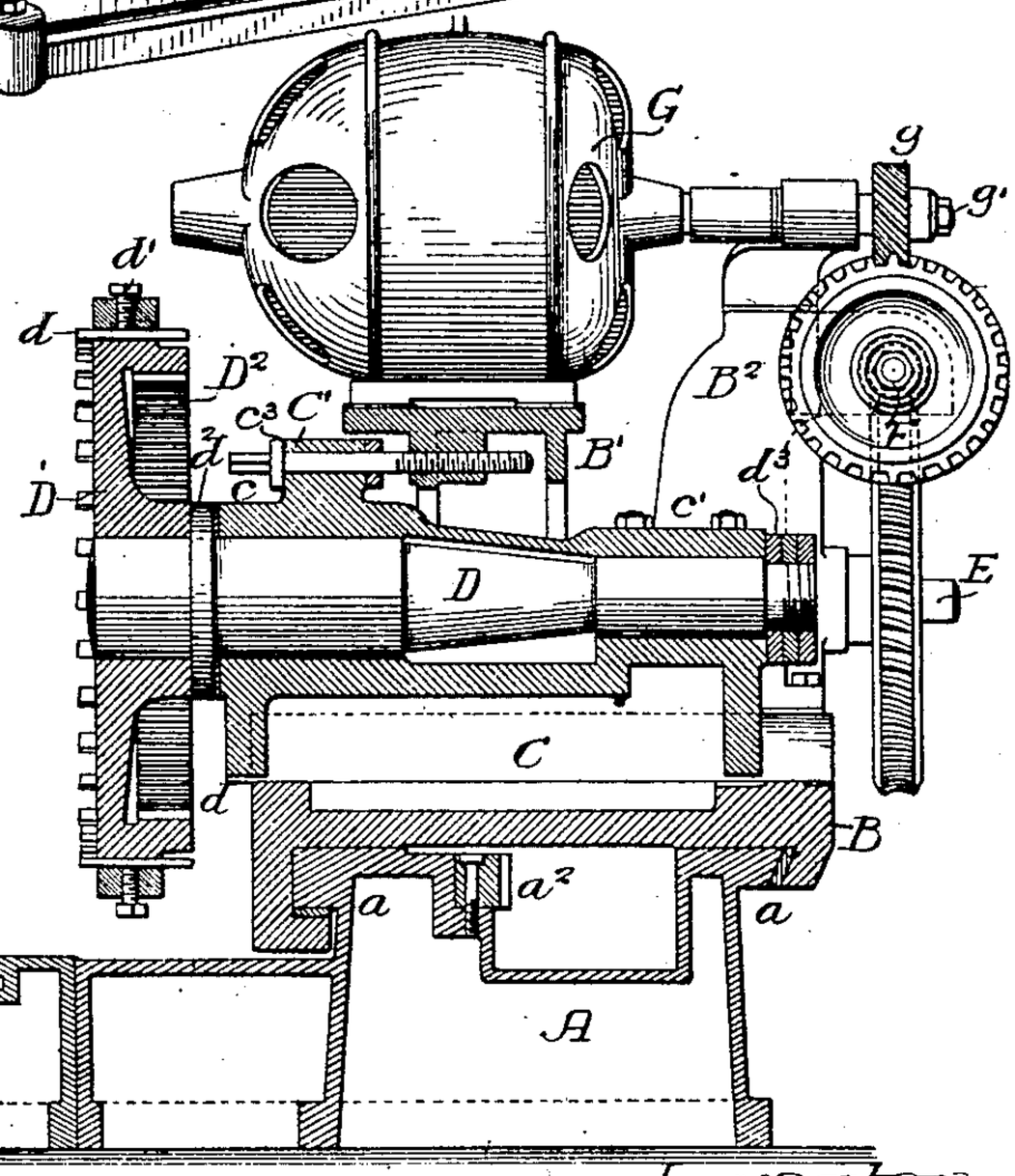


Fig. 6.



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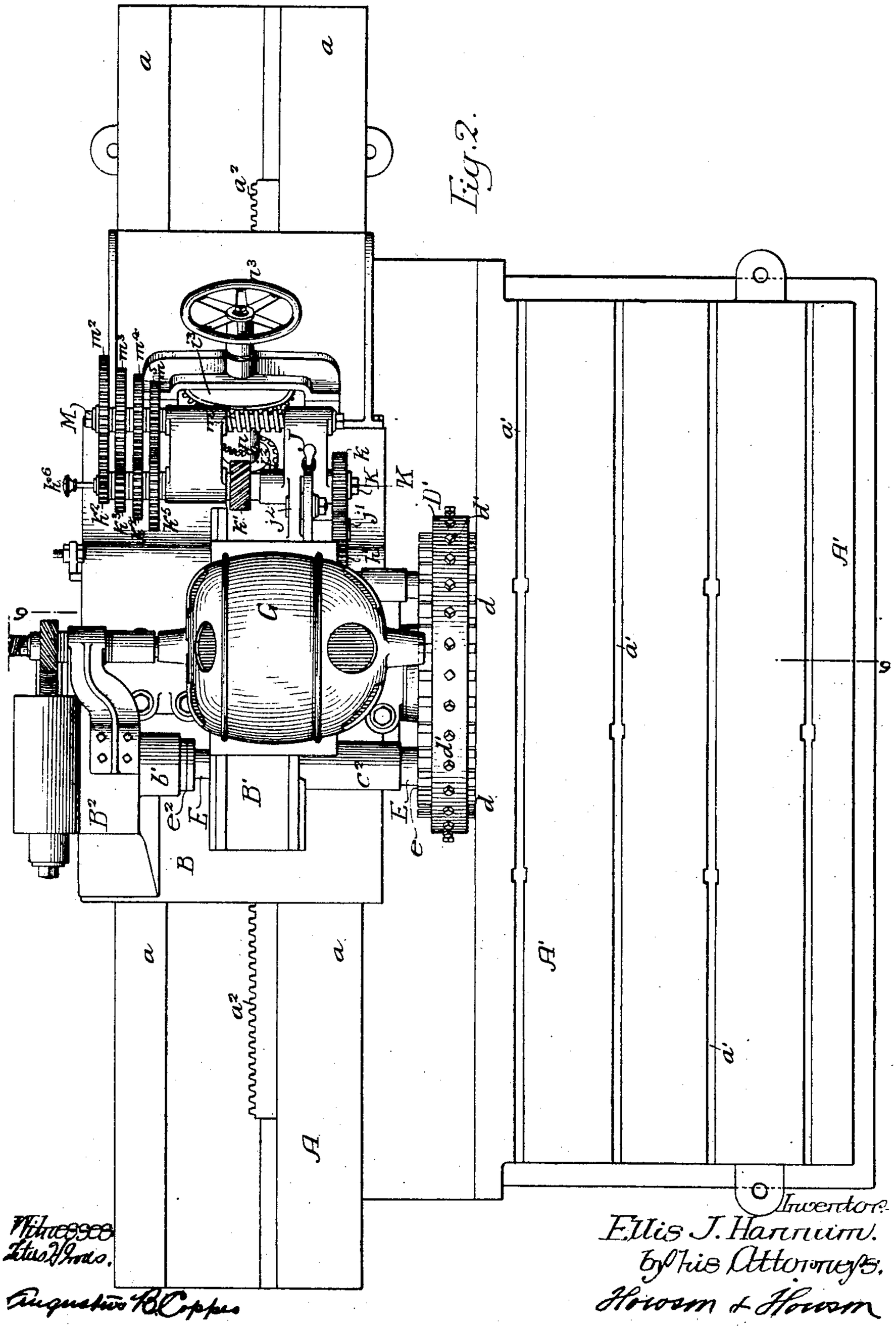
4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

Fig. 3.

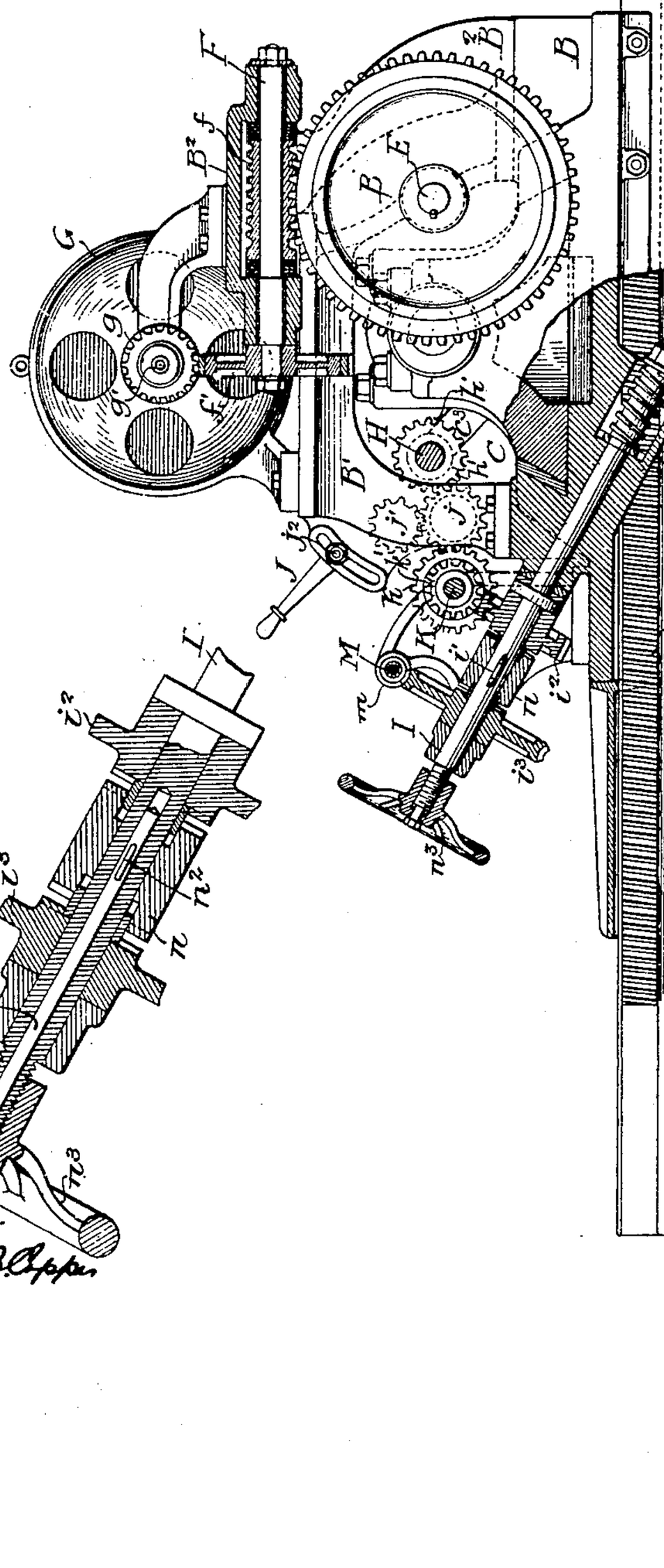
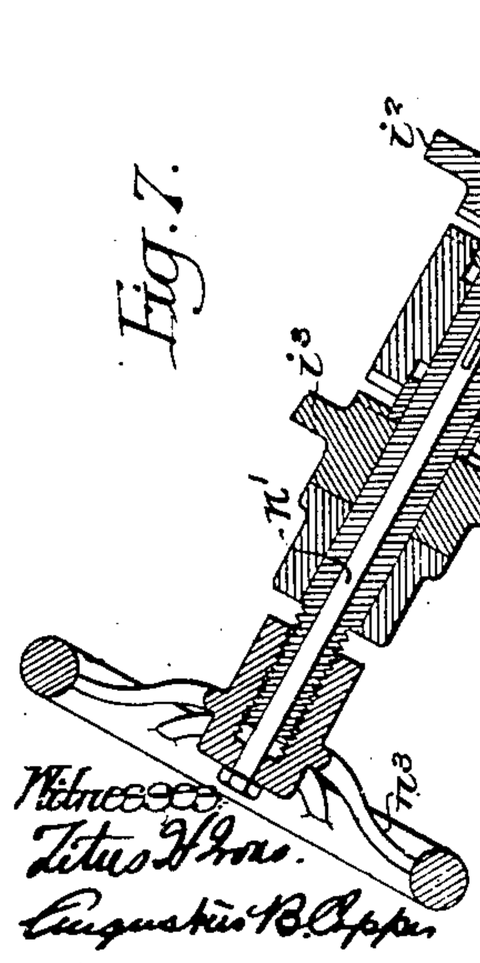


Fig. 7.



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4 SHEETS—SHEET 4.

Fig. 4.

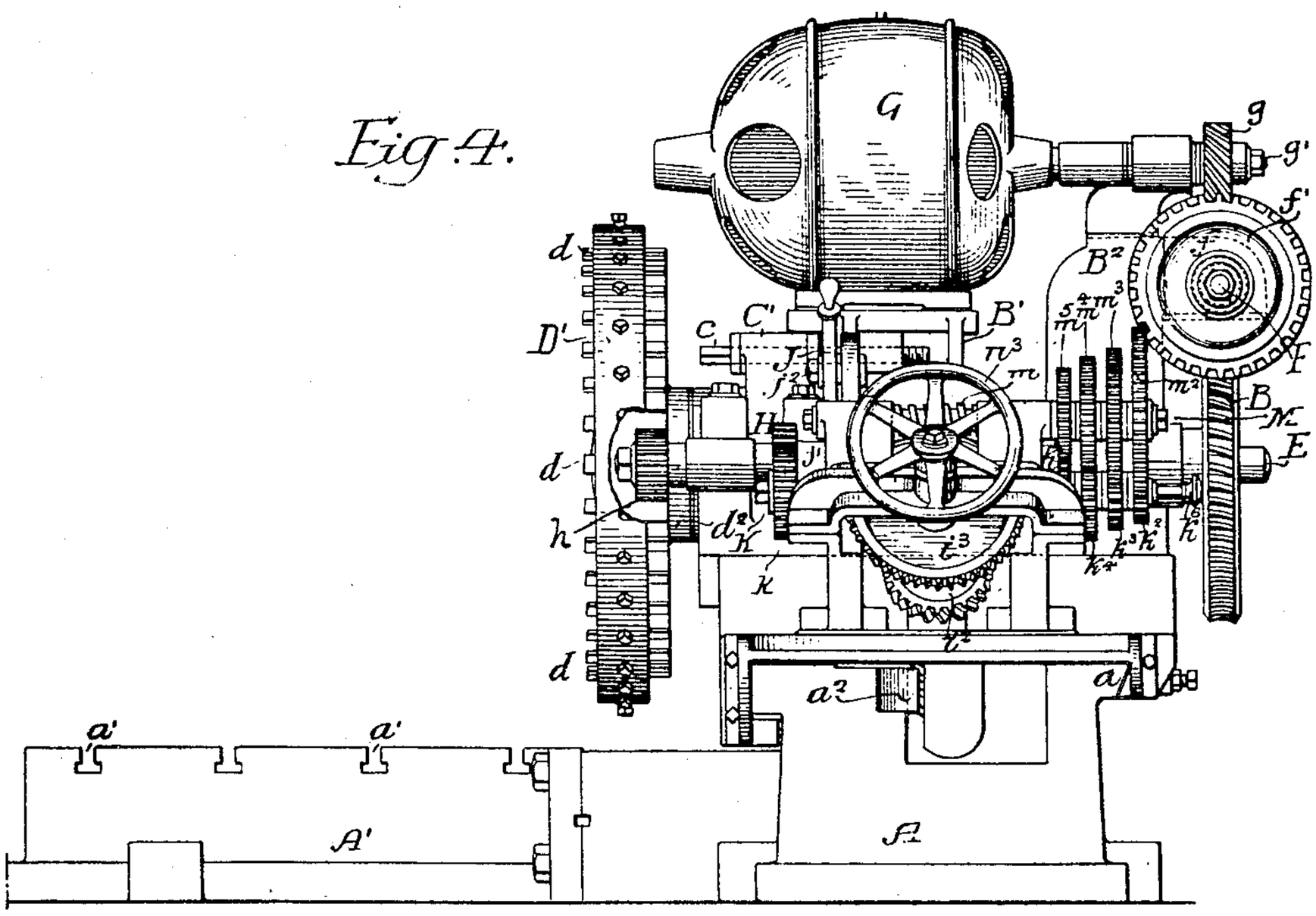
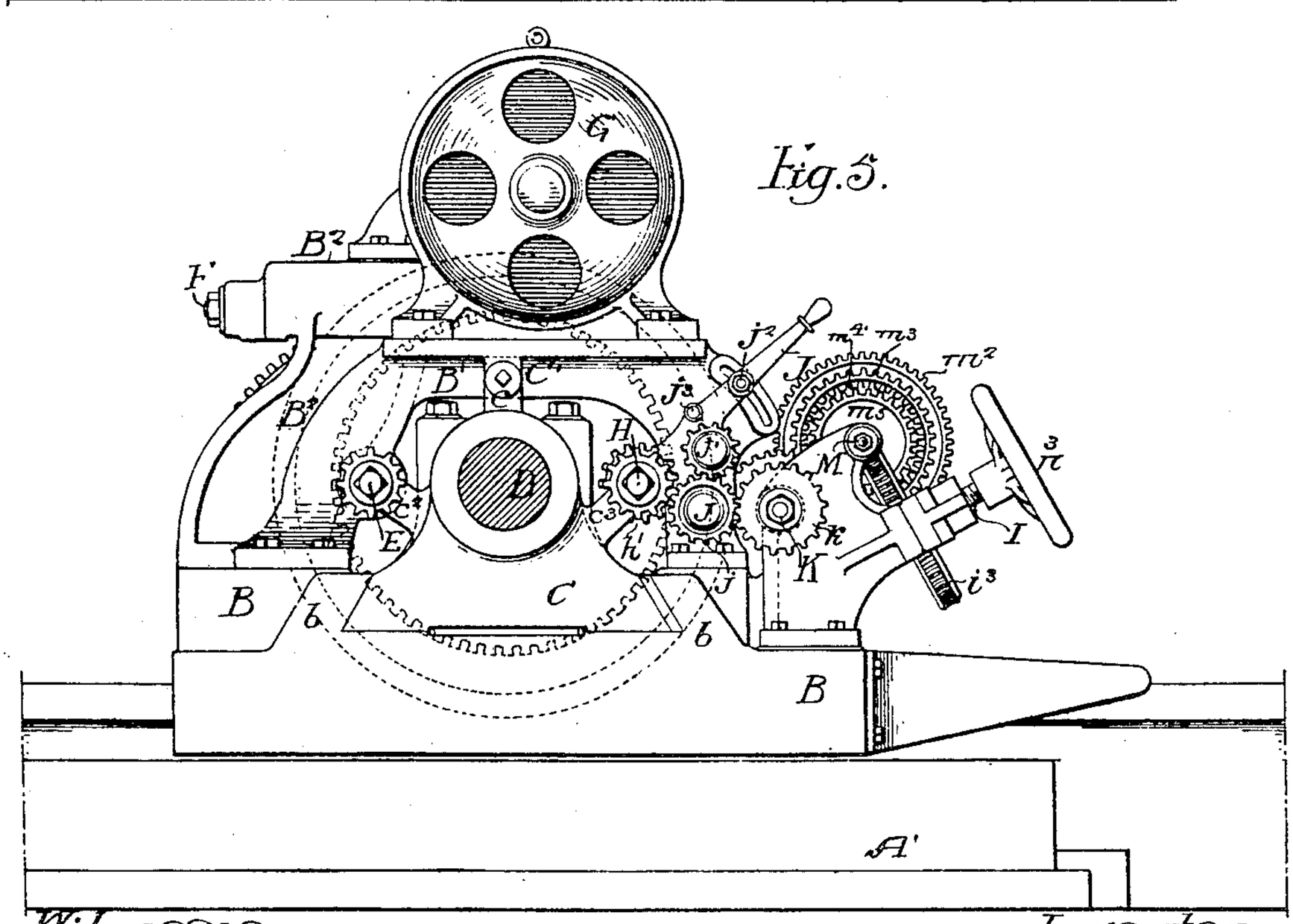


Fig. 5.



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UNITED STATES PATENT OFFICE.

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ROTARY PLANING-MACHINE.

No. 914,948. Specification of Letters Patent. Patented March 9, 1909.

Application filed March 27, 1907. Serial No. 364,846.

To all whom it may concern:

Be it known that I, ELLIS J. HANNUM, a citizen of the United States, residing at Philadelphia, Pennsylvania, have invented certain Improvements in Rotary Planing-Machines, of which the following is a specification.

The object of my invention is to construct a rotary metal planing machine in which the work is secured to a fixed table and the planing mechanism is carried on a reciprocating slide.

My invention also relates to further details whereby the mechanism is so arranged that it can be driven from an electric motor carried by the slide.

In the accompanying drawings:—Figure 1, is a perspective view of my improved rotary planing machine; Fig. 2, is a plan view; Fig. 3, is a side elevation partly in section; Fig. 4, is an end view; Fig. 5, is a side elevation of a portion of the machine showing the carriage in full lines, with the cutter head removed, looking in the opposite direction from that illustrated in Fig. 3, Fig. 6, is a transverse sectional view on the line 6—6, Fig. 2, and Fig. 7, is an enlarged sectional view of part of Fig. 3.

A is the bed plate of the machine, having slideways *a*—*a* for the carriage B upon which the mechanism is mounted. The slideways are designed somewhat similar to those of an ordinary planing machine. At one side of the bed plate is a work table A′ having undercut longitudinal grooves *a*′, in the present instance, to which the work to be planed is clamped. The table can be of any design without departing from the essential features of the invention.

On the carriage B are transverse undercut slideways *b*—*b* and C is a slide mounted on the carriage and arranged to be moved transversely in respect to the movement of the carriage. Adapted to bearings *c*′—*c*′ on the slide C is a shaft D on which is mounted the cutter head D′, having adjustable cutters *d* held in the present instance to the cutter head by confining screws *d*′. The shaft D has a collar d^2 back of the cutter head D′, which prevents it from moving longitudinally in one direction and a washer and nuts d^3 screwed on to the opposite end of the shaft to hold it from moving in the opposite direction, see Fig. 6.

The slide C is adjusted by means of a screw C′ adapted to a lug c^3 on the bearing *c* and is adapted to a screw threaded opening in the frame B′, which bridges over the slide C and is secured to the carriage B. The end of this screw is shaped so that a handle can be applied to turn the screw to move the carriage to any position desired.

The cutter head has an annular internal rack D^2 at the back, as illustrated in Figs. 1 and 6, and engaging this rack is a pinion *e* secured to a shaft E. This shaft is adapted to a bearing c^2 projecting from the carriage C and passes through the elongated hub of a worm wheel *e*′ mounted in a bearing *b*′ on a bracket B^2. The hub e^2 of this wheel is confined to this bearing preventing it from moving longitudinally and the shaft is splined to the hub so that it can move longitudinally with the carriage in the worm wheel. The worm wheel *e*′ meshes with a worm *f* in a shaft F, having its bearings in a projection on the bracket B^2 and on the end of this shaft F is a right angled gear wheel *f*′, which meshes with a pinion *g* on the armature shaft *g*′ of the electric motor G.

B′ is a frame secured to the carriage B and bridges over the slide C. The motor G is mounted upon the frame B′ and is secured thereto in any suitable manner. Thus motion is imparted from the motor directly to the cutter head and its slide can be moved transversely without throwing the driving mechanism out of gear. Motion is imparted to the carriage B through a train of gears from the cutter head D′.

On the side of the slide C, opposite to that of the shaft E, is a shaft H having a pinion *h* which meshes with the internal rack on the cutter head D′. This shaft is mounted in bearings c^3 projecting from the slide C so that the pinion *h* will always be in engagement with the annular rack on the cutter head D′ no matter in what position the cutter head is in.

I is an inclined shaft adapted to bearings on the carriage B and having at its end a worm *i* which meshes with the rack a^2 secured to the bed A of the machine.

J is an arm pivoted to the shaft H and carried by this arm are two wheels *j* and *j*′. The wheel *j* is arranged at all times to mesh with a gear wheel *h*′ on the shaft H and with the wheel *j*′. On a shaft K is a gear *k* with which

either the wheel j or j' can mesh according to the position of the lever J. By this means the movement of the shaft K can be reversed.

The lever J can be locked in either of its two extreme positions, or in an intermediate position, by means of a bolt j^2, which passes through a slot in the frame B′ and in order to set the lever in any of its three positions a spring bolt j^3 is used which is carried by the lever and is adapted to three recesses in the frame B′, but this construction is not absolutely essential.

On the shaft K is a right angled gear wheel k', which meshes with a right angled gear i^2 on the shaft I, Fig. 3, and this gear is arranged to return the carriage quickly after a cut has been made.

In order to regulate the forward speed of the carriage B, I introduce a series of change gears between the shaft K and the shaft M and this shaft M has a worm m which meshes with a worm wheel i^3 on the shaft I. On an extension of the shaft K, in the present instance, are four gears k^2, k^3, k^4, and k^5, and on an extension of the shaft M are gears m^2, m^3, m^4 and m^5. The wheels m^2 to m^5 inclusive are all secured to the shaft M, but the wheels k^2 to k^5 inclusive are loose on the shaft K and any one gear can be locked to the shaft by the sliding spline k^6 operated by a handle from the end of the shaft in the manner common to metal working machines, so that by this arrangement four different change speeds can be made by simply moving the spline k^6 longitudinally.

The two wheels i^2 and i^3 are loose on the shaft I and mounted between the two wheels is a clutch sleeve n, which has teeth at each end engaging teeth on the hubs of the two wheels i^2 and i^3 and extending through the shaft I from the outer end is a rod n', shown clearly in the detail view Fig. 7, and this rod has a key n^2 which passes through a slot i' in the shaft I and engages the clutch sleeve n. On the outer end of the rod n' is a hand wheel n^3. The hub of this hand wheel is screw threaded and adapted to the screw threaded end of the shaft I, so that on turning the hand wheel the clutch can be moved so as to be thrown into engagement with either of the wheels i^2 or i^3, or may be shifted to an intermediate position clear of both wheels when it is desired to stop the machine. Thus it will be seen that the direction of movement of the carriage B can be controlled by the operator turning the hand wheel n^3 in either direction and the forward movement of the carriage can be regulated by adjusting the spline k^6, while the direction of movement of the carriage can be controlled by the lever J.

By the above described arrangement the carriage can be moved from left to right slowly and returned quickly, or by shifting the lever J it can be moved from right to left slowly and returned quickly, thus enabling the operator to set the work in any manner desired, cutting from either the left side or the right side.

The operation of the mechanism is as follows: After the work is clamped to the table A′ then the slide C is adjusted so that the cutter head will be in position to cut one face of the work and if the cutter head is on the left side of the work then the parts are adjusted so that the machine will make a slow forward feed from the left to the right and a quick return, and at each return movement the slide can be adjusted so as to take a fresh cut if desired. Current being supplied to the motor G it drives the cutter head through the shaft F and the gearing f and e' and the shaft E. The speed of the cutter is comparatively slow, owing to the intervention of the worm gear and the speed of travel of the carriage is also comparatively slow.

By the above described arrangement, I am enabled to mount all the operative parts in a very compact manner upon the carriage and dispense entirely with any drive belts or intricate mechanism, which is necessary in the ordinary type of machine where the motor is mounted independently of the carriage.

I claim:—

1. The combination of a bed, a carriage mounted on the bed, transverse slideways on the carriage, a slide mounted on the slideways, a frame mounted on the carriage and bridging the slide, a cutter head, a shaft upon which the cutter head is mounted, said shaft being carried by the slide, a motor mounted on the frame, and gearing between the motor and the cutter head, substantially as described.

2. The combination of a base, a carriage mounted on the base, said carriage having transverse slideways, a slide mounted in the slideways, a cutter head, a shaft carrying the head, said shaft being mounted on the slide, the cutter having an internal rack, a frame mounted on the carriage and bridging over the slide, a motor mounted on the frame above the slide, a bracket on the carriage, a wheel having a hub mounted in the bracket and geared to the motor, a driving shaft mounted in bearings on the slide and adapted to an opening in the hub of the wheel, and a pinion on the end of the shaft meshing with the internal rack on the cutter head, substantially as described.

3. The combination of a base, a carriage arranged to slide on the base, a slide mounted on the carriage and arranged to be adjusted laterally in respect to the movement of the carriage, a shaft mounted on the slide, a cutter head mounted on one end of the shaft and overhanging the carriage, said cutter head having an internal rack, two shafts each

mounted in bearings on the slide and each having a pinion meshing with the teeth of the annular rack, driving mechanism geared to one of said shafts, and feed mechanism on the carriage for moving the carriage, geared to the other of said shafts, substantially as described.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

ELLIS J. HANNUM.

Witnesses:
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Wm. A. Barr.