(No Model.) 3 Sheets—Sheet 1.

W. C. HOGG.

COMBINED METAL ROLLING AND PUNCHING MACHINE.

No. 355,693. Patented Jan. 11, 1887.

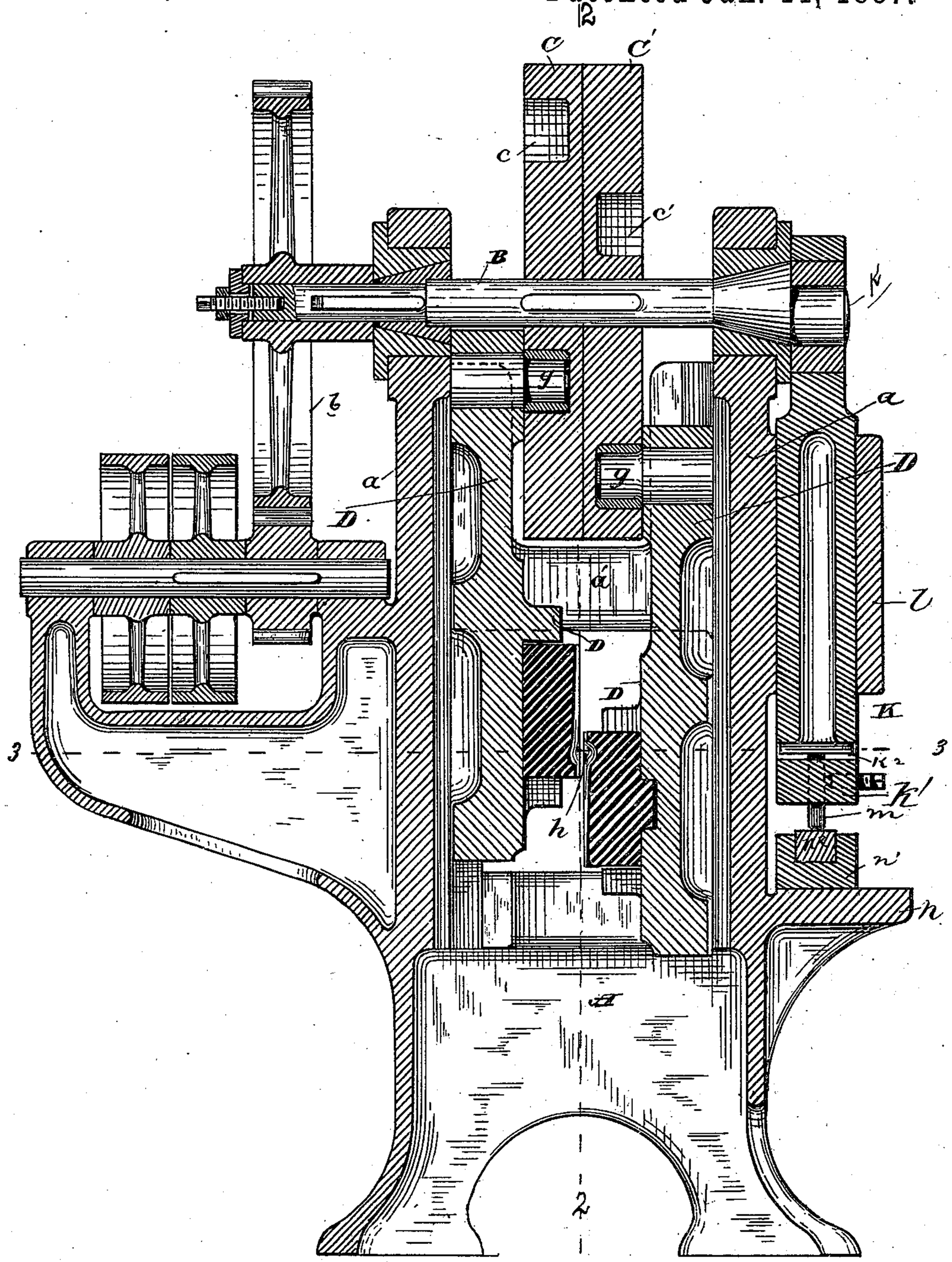

FIG. 1

WITNESSES:

B. F. Eibler

Jno. W. Monroe

INVENTOR

William C. Hogg

BY

H. L. Fisher

ATTORNEY

(No Model.) 3 Sheets—Sheet 2.

W. C. HOGG.

COMBINED METAL ROLLING AND PUNCHING MACHINE.

No. 355,693. Patented Jan. 11, 1887.

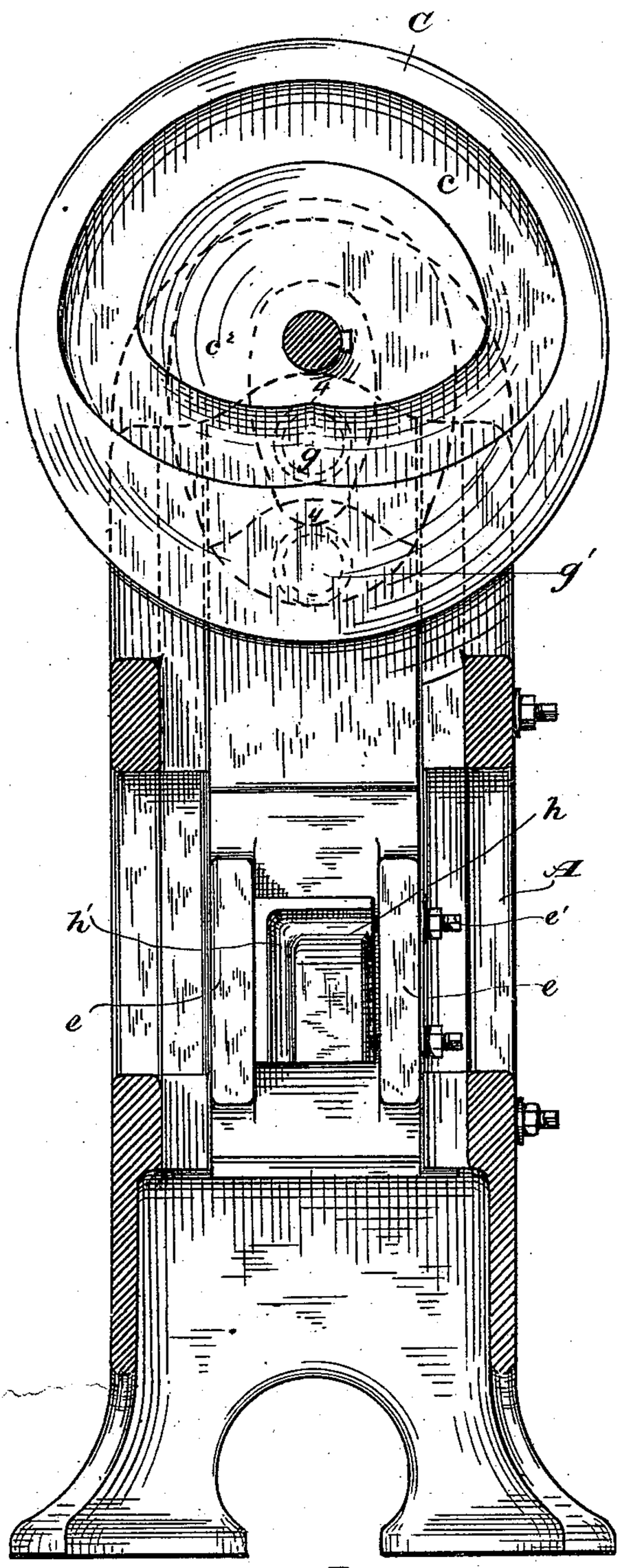

FIG. 2.

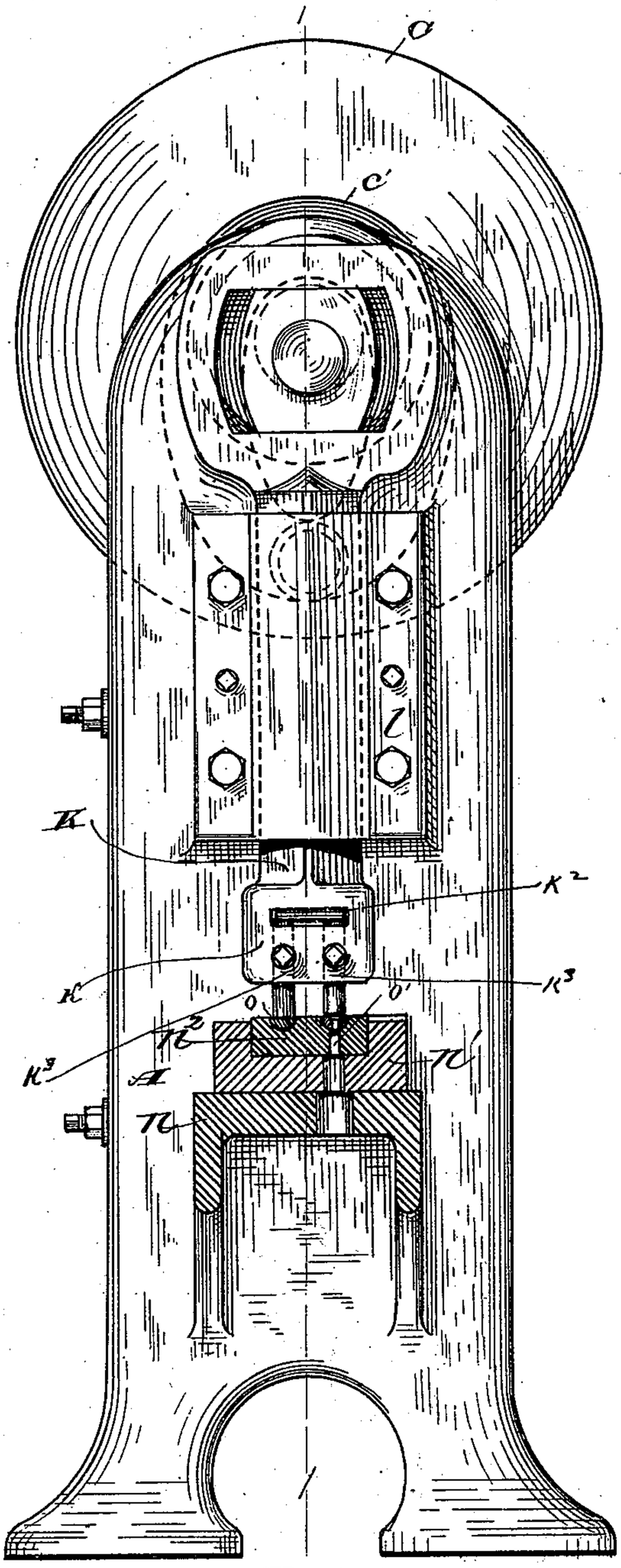

FIG. 3.

WITNESSES:-

B. F. Eibler

Wm. M. Monroe

INVENTOR

William C. Hogg

BY

H. T. Fisher

ATTORNEY

(No Model.) 3 Sheets—Sheet 3.

W. C. HOGG.

COMBINED METAL ROLLING AND PUNCHING MACHINE.

No. 355,693. Patented Jan. 11, 1887.

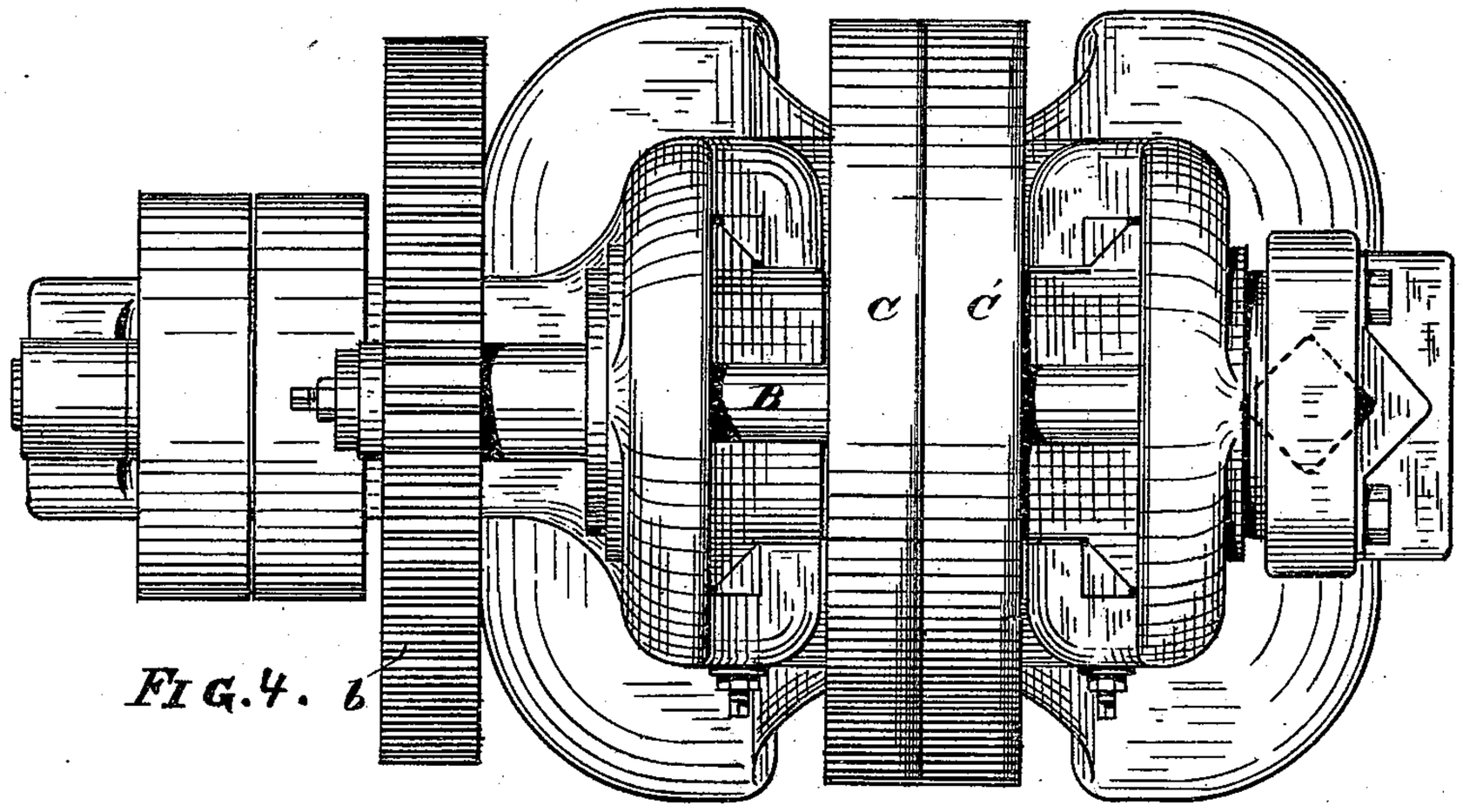

FIG. 4.

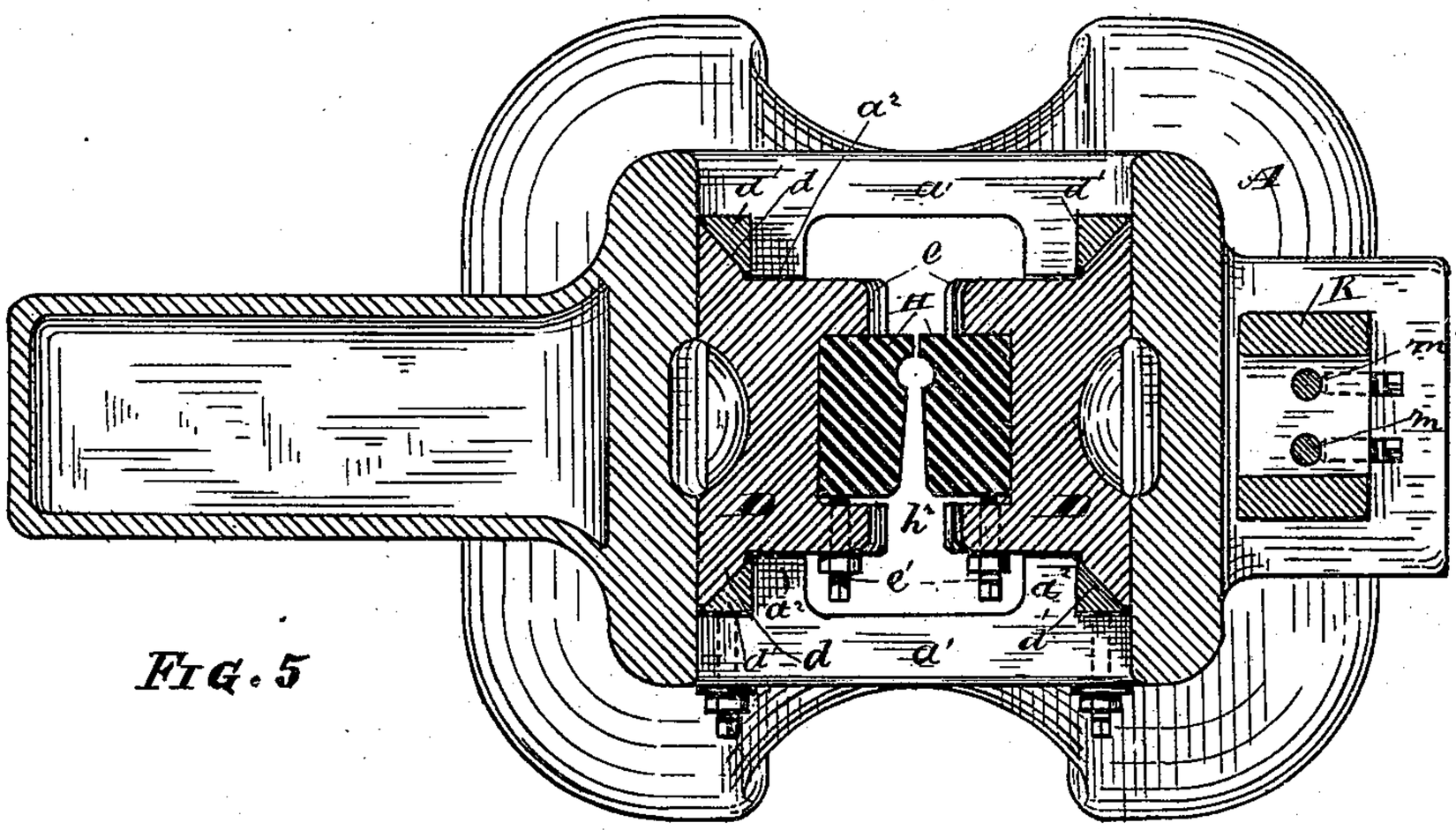

FIG. 5

WITNESSES:

B. F. Eibler

Wm. McDermott

INVENTOR

William C. Hogg

BY

H. T. Fisher

ATTORNEY

UNITED STATES PATENT OFFICE.

WILLIAM C. HOGG, OF CLEVELAND, OHIO.

COMBINED METAL ROLLING AND PUNCHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 355,693, dated January 11, 1887.

Application filed April 16, 1886. Serial No. 199,150. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. HOGG, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in a Combined Metal Rolling and Punching Machine; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

The invention will first be described in connection with the accompanying drawings, and then pointed out in the claim.

In the accompanying drawings, Figure 1 is a vertical section of my machine, taken on line 1 1, Fig. 3. Fig. 2 is a vertical section on line 2 2, Fig. 1. Fig. 3 is a side view, partly in section, near the bottom to illustrate the operation of the ram. Fig. 4 is a plan view, and Fig. 5 a cross-section, on line 3 3, Fig. 1.

Similar letters refer to similar parts throughout the several views.

A represents the main frame of the machine, which may be fashioned as shown, or in any other suitable form, it only being necessary that the structure should be adapted to this particular use, and of such strength and firmness as to withstand the strain to which it will be subjected. As here shown, the frame consists of two plain sides, *a a*, which are connected by heavy tie-bars *a' a'*. As the principal strain is lateral, these tie-bars should be made very strong, and be so secured in the sides that they will not yield or break away from their fastenings.

B is a shaft supported in suitable bearings in the sides of the main frame, near its top, and carrying a gear-wheel, *b*, at one end to apply the power. On this shaft centrally within the frame are rigidly mounted two wheels, C C', which have cam-grooves *c c'* in their outer faces. These grooves are of the shape shown in full and dotted lines, respectively, in Fig. 2, and have different outlines to give the necessary movement to the sliding frames, as will be seen further on.

D D represent two sliding frames, which, as here shown, are provided with beveled edges *d d*, that work in guides formed by projections a^2 on the tie-bars *a' a'*, and triangular gibs *d' d'*, resting against said projections. Manifestly this part of the structure might be varied without affecting the invention. The said frame is further provided with a flat outer face, which bears against the inner face of the main frame, and on its inner side with strips or supports *e e*, running longitudinally along the respective edges of said frame and serving to hold the dies H. Set-screws *e'* are employed to lock the dies in the supports. Pins *g*, projecting inwardly from near the top of the sliding frames, and provided with anti-friction rollers, if desired, engage with the cams *c c'*, and serve to operate the said frames in their bearings, according to the movements of the cams. The two cam-wheels may be made in a single wheel, if desired; but I prefer them separate, as shown.

I have shown but a single form of the dies H. An indefinite number and variety of dies may be used with my machine, and there is no limit to the forms and shapes that may be wrought in this way, except that they will in all instances take the form of the dies, the rolling action of the dies producing this result.

In the drawings the die is shown as having a horizontal groove, *h*, extending from the front to near the back edge thereof. Connected with this groove at the rear is a vertical groove, *h'*, represented equally in both sections of the die, (it being necessary, of course, that the two sections should in all instances be duplicates of one another,) and in front of this the opposed faces are flared slightly to the front, as seen in Fig. 5. Now, suppose a bar of iron, either round or angular and suitably heated, to be thrust into the dies through the groove *h*, so that its end will extend across the vertical groove *h'*, and the dies forced by the cams in opposite directions, it will follow that the iron bar will be rotated on its axis between the dies or sections and take the shape imparted by the vertical groove, which of course will be perfectly round, and of the flaring faces, which will give a taper to the rod running toward the round head corresponding exactly to the flare of the dies.

The operation of the machine to get this result is as follows: In Fig. 1 the dies are in position to be fed as above indicated, the grooves *h* being exactly opposite each other and ready to receive a bar so thoroughly heated that it

can easily be shaped by rolling. When the dies are in this position, the pins *g g* on the sliding frames are passing through the circular half of the cams *c c'*, (shown in Fig. 2 as being above shaft B;) but of course as the pins *g g* are always below the shaft B the rest of the sliding of the frames here referred to will occur when the circular part of the cams is in the reversed position to that shown. Then as soon as the irregular part of the grooves *c c'* strikes the pins *g g* the sliding frames will begin to move, and being carried to the limits of their movement in one direction, will be carried by the opposite sides of the cams back exactly the same distance until they are again restored to position from which they started. The reverse action of the sliding frames carrying the dies occurs when the pins reach the points in the cams indicated by the figure 4 in Fig. 2. The cams are given the different shape indicated in Fig. 2, so that the precise action of the sliding frames here described may be obtained. By this means I get all the rolling required to give the irons the desired shape and have sufficient pause in the movements of the dies to remove the finished iron and insert a new one.

When the irons are removed from the roller they still retain a sufficient amount of heat to be further worked. Frequently it is desirable to flatten them at the ends and to provide them with holes to secure them in their fastenings. When this occurs the flattening and perforating can be performed in a single movement by subjecting the iron to the action of the ram K, placed at the side of my machine, as seen in Figs. 1 and 3. This ram is operated by a wrist, *k*, fixed eccentrically on the end of the shaft B, and provided with a suitable bearing in the end to work on the wrist. The ram plays in guides *l* on the side of the main frame, and at its lower end has a head, *k'*, provided with a transverse slot, k^2, and vertical openings k^3 extending from the bottom of the ram up into the slot k^2. In these openings I place punches of such style as the particular irons may require. The punch here shown is adapted to flatten one side of the head of the iron formed in the dies in the rolling-machine, and to perforate and countersink it after being flattened. The punch *m* serves to flatten the head, and the punch *m'*, with its reduced point and convex shoulder above the point, to perforate and countersink it. Metallic liners or plates may be inserted in the transverse slot to make the punches project more or less from the head, so as to increase or diminish their action, and different forms of punches may be employed.

Beneath the ram, at the side of the main frame, I have a table or ledge, *n*, on which is rigidly fixed a block, *n'*, having a socket in its center to receive the die n^2. This die, like the punches, is only one of a variety that may be used, and is to be replaced by any other form that may be preferred. The die n^2 fits snugly in its socket, and, as here shown, has two semi-spherical depressions in its face and a perforation, with one of said depressions registering with a like perforation in the block *n'*. The ram being operated by a continuous motion, the two punches are in constant readiness for use. In this way, when desired, I can pass the heated iron beneath the first punch to flatten its end, and then immediately beneath the second punch to perforate and countersink it in quick succession. The entire operation from the time the iron is first placed in the dies to be rolled till it is flattened and punched is the work of but a few moments, and the whole can readily be accomplished by the single heating given the iron at the beginning of the process. It will be further observed that in carrying out this process there is from first to last no loss of iron by scraps or otherwise.

By rolling the irons they are gradually drawn into the desired shape, thus preserving their tensile strength and giving them a smooth neat finish.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

A combined metal rolling and punching machine consisting of the main frame A, provided with brackets supporting the pulley-shaft, a ledge supporting the punch die-block, uprights *a a*, forming bearings for the main shaft B, and guides *l* for the punch-carrier, the disks C C', having cam-grooves *c c'*, reciprocating die-carriers D D, provided with pins *g*, to engage said cam-grooves, and carrying dies H, and the punch-carrier K, provided with a punch and connected by a crank to the main shaft B, all of said parts being constructed, combined, and operated substantially as set forth.

WILLIAM C. HOGG.

Witnesses:
H. T. FISHER,
WM. M. MONROE.