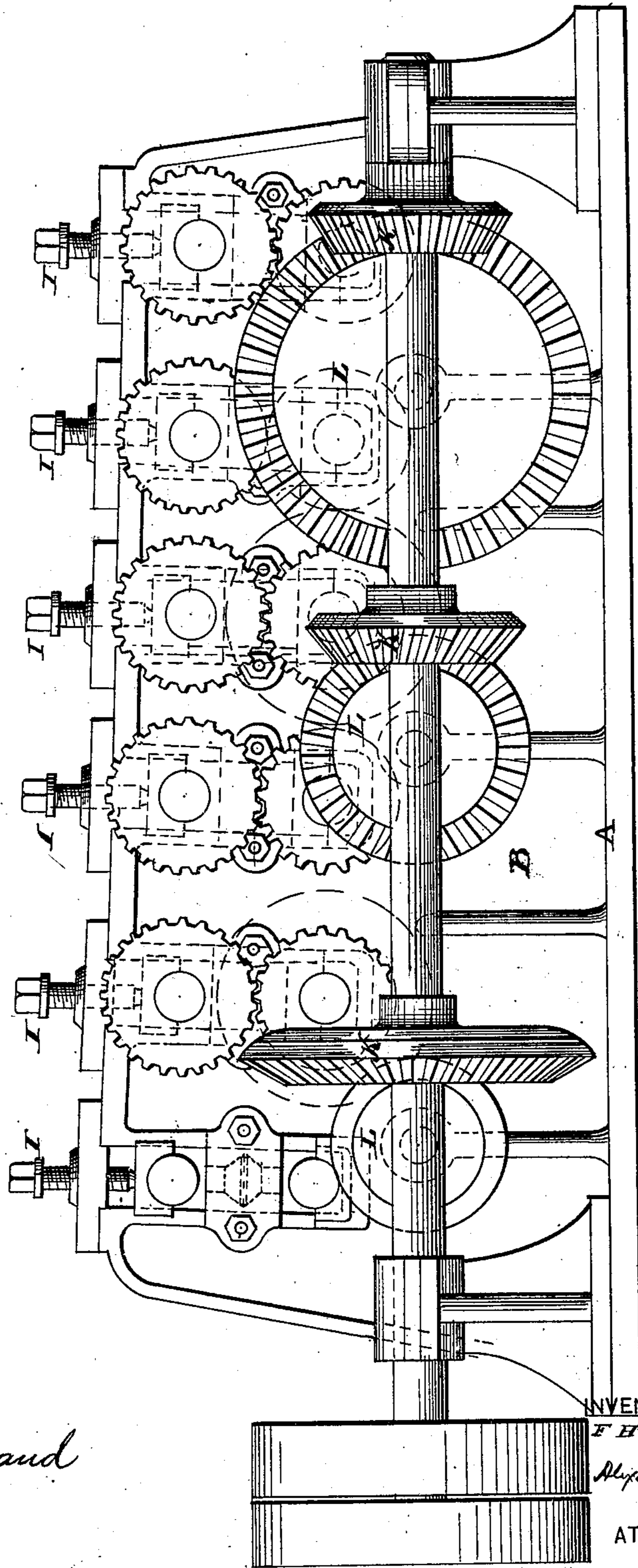


F. HICKMAN.
MACHINES FOR ROLLING METAL.

No. 195,129.

Patented Sept. 11, 1877.

Fig. 1.



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Fig. 3.

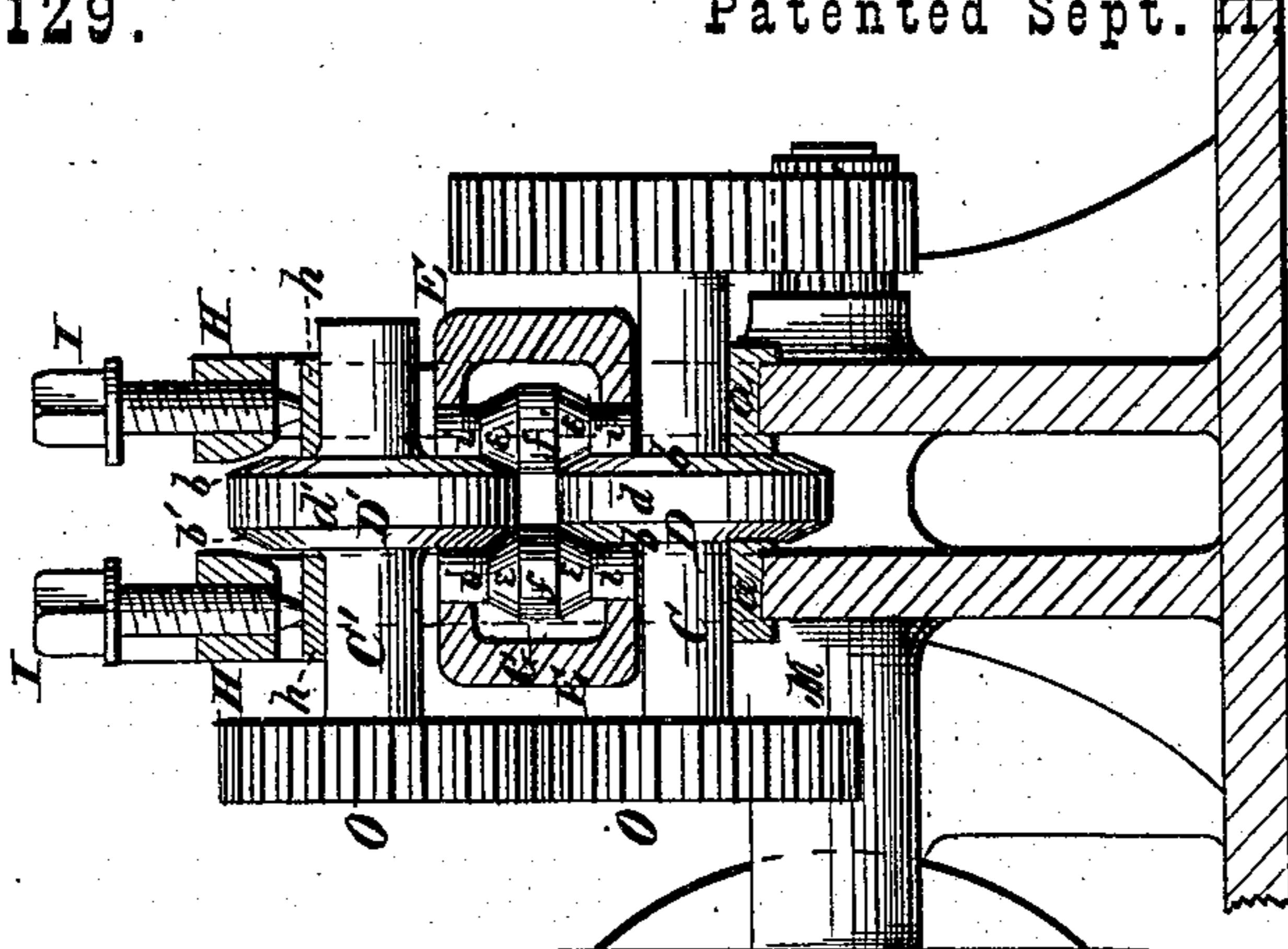
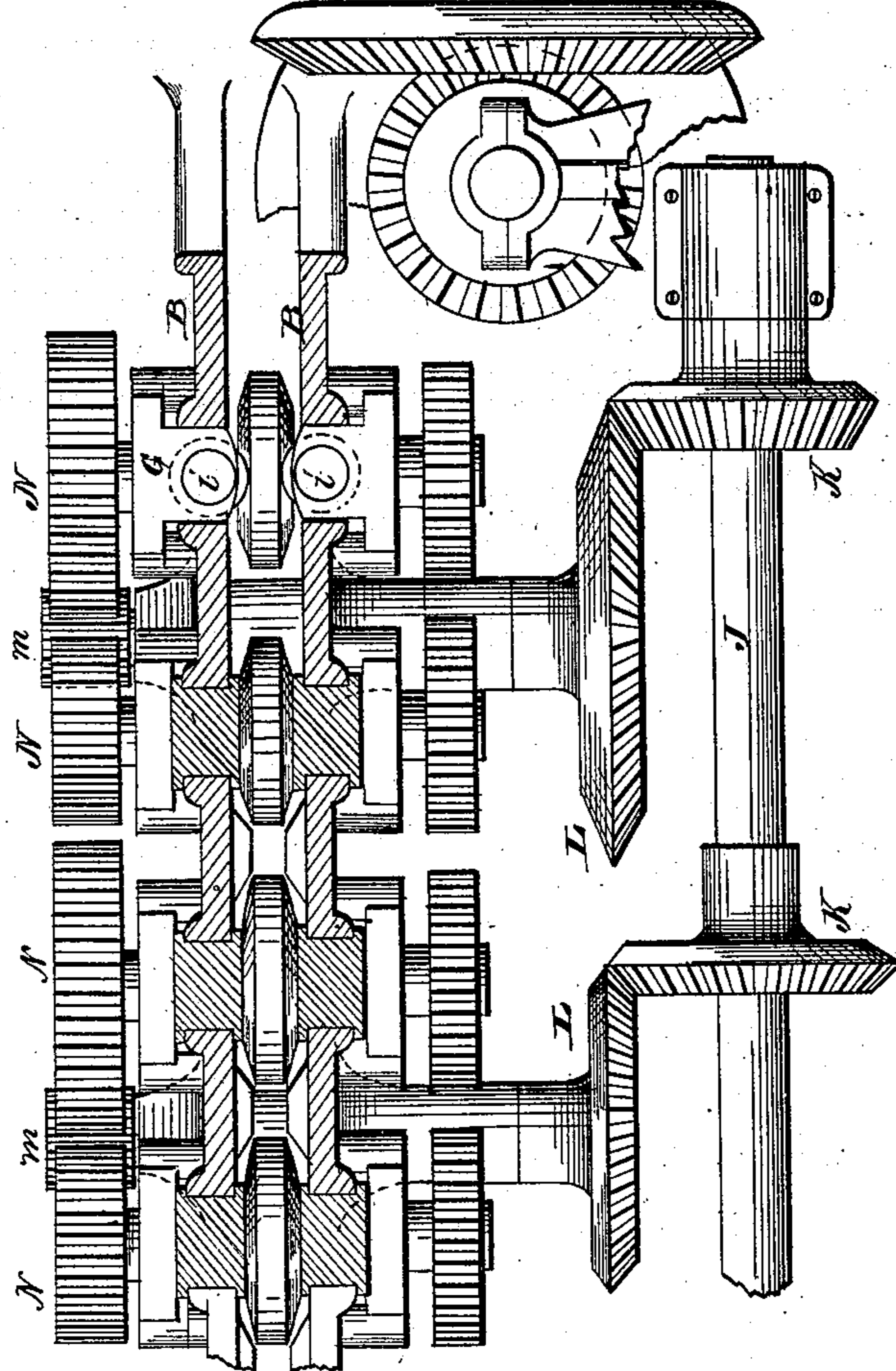


Fig. 2.



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UNITED STATES PATENT OFFICE.

FRANCIS HICKMAN, OF READING, PENNSYLVANIA.

IMPROVEMENT IN MACHINES FOR ROLLING METAL.

Specification forming part of Letters Patent No. 195,129, dated September 11, 1877; application filed August 30, 1877.

To all whom it may concern:

Be it known that I, FRANCIS HICKMAN, of Reading, in the county of Berks, and in the State of Pennsylvania, have invented certain new and useful Improvements in Machines for Rolling Metal; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

The nature of my invention consists in the construction and arrangement of a machine for rolling band or hoop iron, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawings, in which—

Figure 1 is a side elevation of my machine. Fig. 2 is a horizontal section, and Fig. 3 a transverse vertical section of the same.

A represents the bed of the machine, upon which is secured a housing composed of two parallel sides, B B. In these sides are series of vertical slots at suitable distances apart, and extending from the upper edge downward for a suitable distance. In the bottoms of these slots are placed suitable half-boxes *a a*, to receive horizontal shafts C C, which rest in corresponding boxes in the two sides, and extend a suitable distance beyond said sides. On each shaft C, between the two sides B B, is secured a horizontal roller, D, which has a central flat surface, *d*, and beveled surface *b* on each side thereof, as shown in Figs. 2 and 3.

G G represent two vertical rollers, each of which is formed with a central flat surface, *f*, and beveled surfaces *e e* above and below the same, and with elongated journals *i i*. These journals are placed in boxes or bearings E E, attached to exterior of the sides B B, and projecting into the slots therein above the shaft C. The boxes E E are adjustable laterally to and from the sides B B, thereby adjusting the distance between the two vertical rollers G G. These rollers rest with their lower beveled surfaces upon the beveled surfaces of the roller D, and the upper beveled surfaces of the rollers G G support a top horizontal roller,

D', which is mounted on a shaft, C'. The roller D' is made exactly of the same size and of the same form of the lower roller D—that is, it has a central flat surface, *d'*, and a beveled surface, *b'*, on each side thereof, the beveled surfaces *b' b'* resting upon the upper beveled surfaces of the vertical side rollers G G.

It will readily be seen that by adjusting the boxes E E out or in from the sides B B the rollers G G are also adjusted out or in, and at the same time will adjust themselves down or up on the beveled surfaces *b b* of the lower roller D. The upper roller D' also conforms to the position of the side rollers G G, and when the rollers have been thus adjusted, the upper roller is held down on the side rollers by means of screws I I passing through caps H H covering the slots in the sides B B, and the screws bearing upon half-boxes or upper bearings *h h* placed on the shaft C'.

By thus grouping the four rollers close together, the metal is rolled on top and bottom and both edges at the same time, and the different groups of rollers of the machine can be arranged so close together that no guides of any description are needed between the groups.

J represents the driving-shaft of my rolling-mill, supported in suitable boxes or bearings on the base-plate A. On this shaft is secured a series of beveled cog-wheels, K K, each of which drives two groups of rollers in the following manner: Each cog-wheel K gears with a beveled cog-wheel, L, upon one end of a shaft, M, which passes through and has its bearings in suitable hubs formed on the sides B B below and between the two shafts C C of the two groups of rollers, which are to receive their motion from the same. On the other end of the shaft M is secured a pinion, *m*, which meshes with two cog-wheels, N N, of unequal diameter, secured on the projecting ends of the two lower shafts C C. The other end of each shaft C is geared with its corresponding upper shaft C' by means of cog-wheels O O of the same diameter. It will thus be seen that the two shafts C C' of each group revolve with the same speed, while the shafts of the two groups operated from the shaft M revolve at different speed. The series

of beveled cog-wheels K and L are also made of varying diameters, so that the various groups of rollers will rotate with a gradually-increasing rate of speed from one end of the machine to the other. By this arrangement of the various parts the machine can be put up in a close and compact manner, so as to take up considerably less room than machines heretofore built for the same purpose.

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

1. The combination of the horizontal roller D, having flat surface *d* and beveled surfaces *b b*, the vertical rollers G G having flat surfaces *f*, beveled surfaces *e e*, and elongated journals *i i*, and placed in the adjustable boxes E E, and the top gravitating roller D', having flat surface *d'* and beveled surfaces *b' b'*, the rollers G G being supported by the roll D, and they in turn supporting the roll D' and receiving their rotary motion by contact there-

with, as described, all substantially as and for the purposes herein set forth.

2. In combination with the series of groups of rollers D D' G, constructed and arranged as described, the driving-shaft J, with beveled cog-wheels K of varying size, the shafts M, with beveled cog-wheels L of varying size, and pinions M, the cog-wheels N N of varying size, and the cog-wheels O O of the same size, whereby each cross-shaft M operates two sets or groups of rollers, the rollers of each group rotate at the same speed, and the speed of the groups varies from one end of the machine to the other, all substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 19th day of December, 1876.

FRANCIS HICKMAN.

Witnesses:

J. M. MASON,
FRANK GALT.