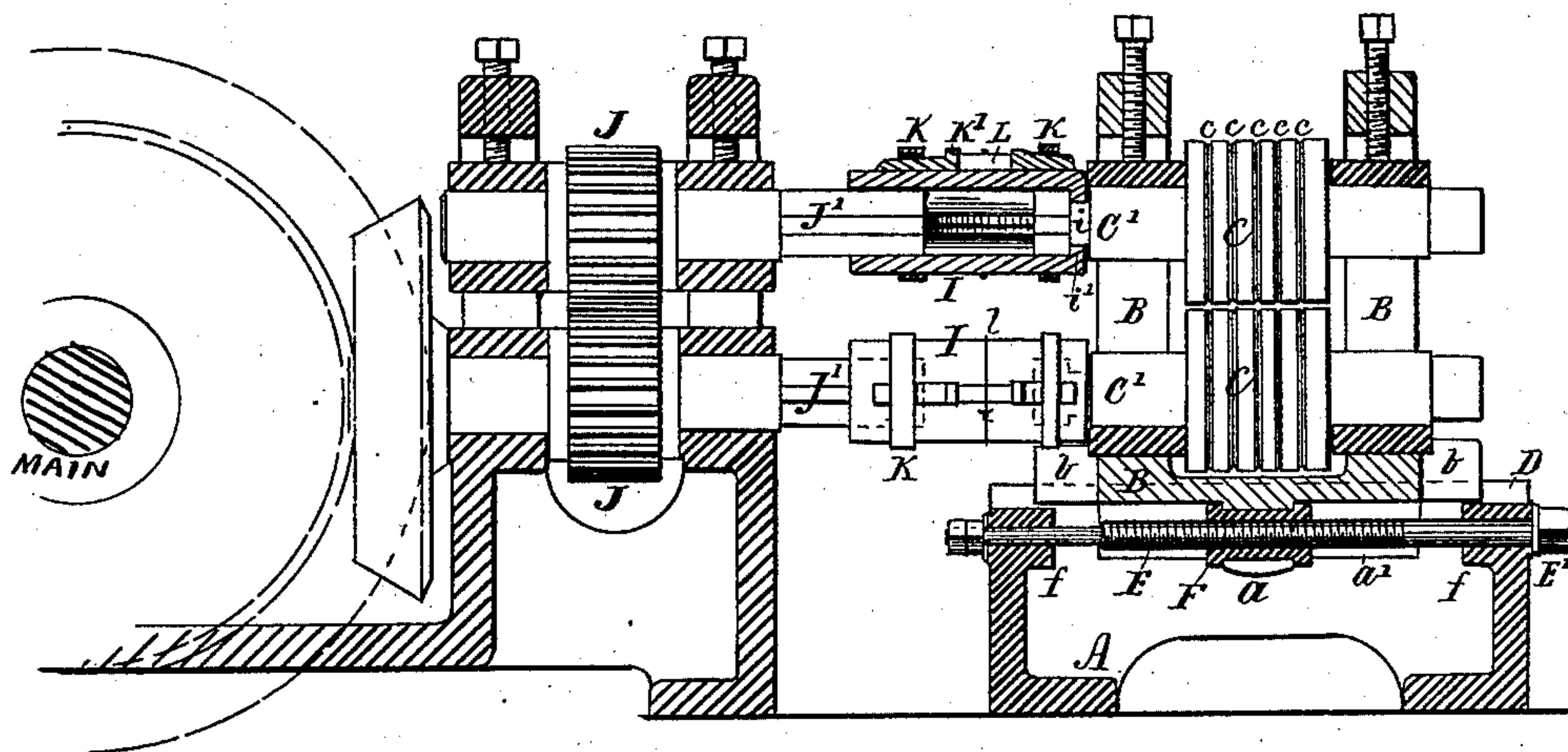


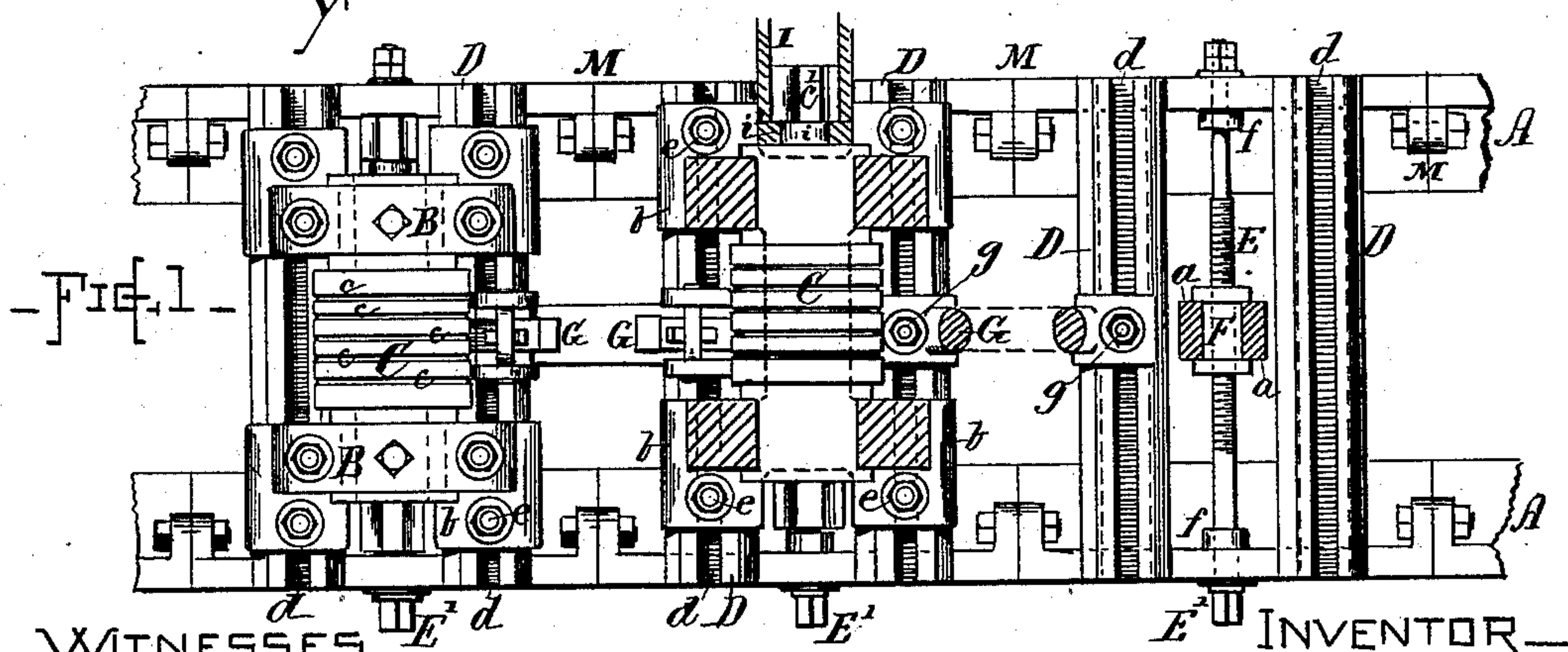
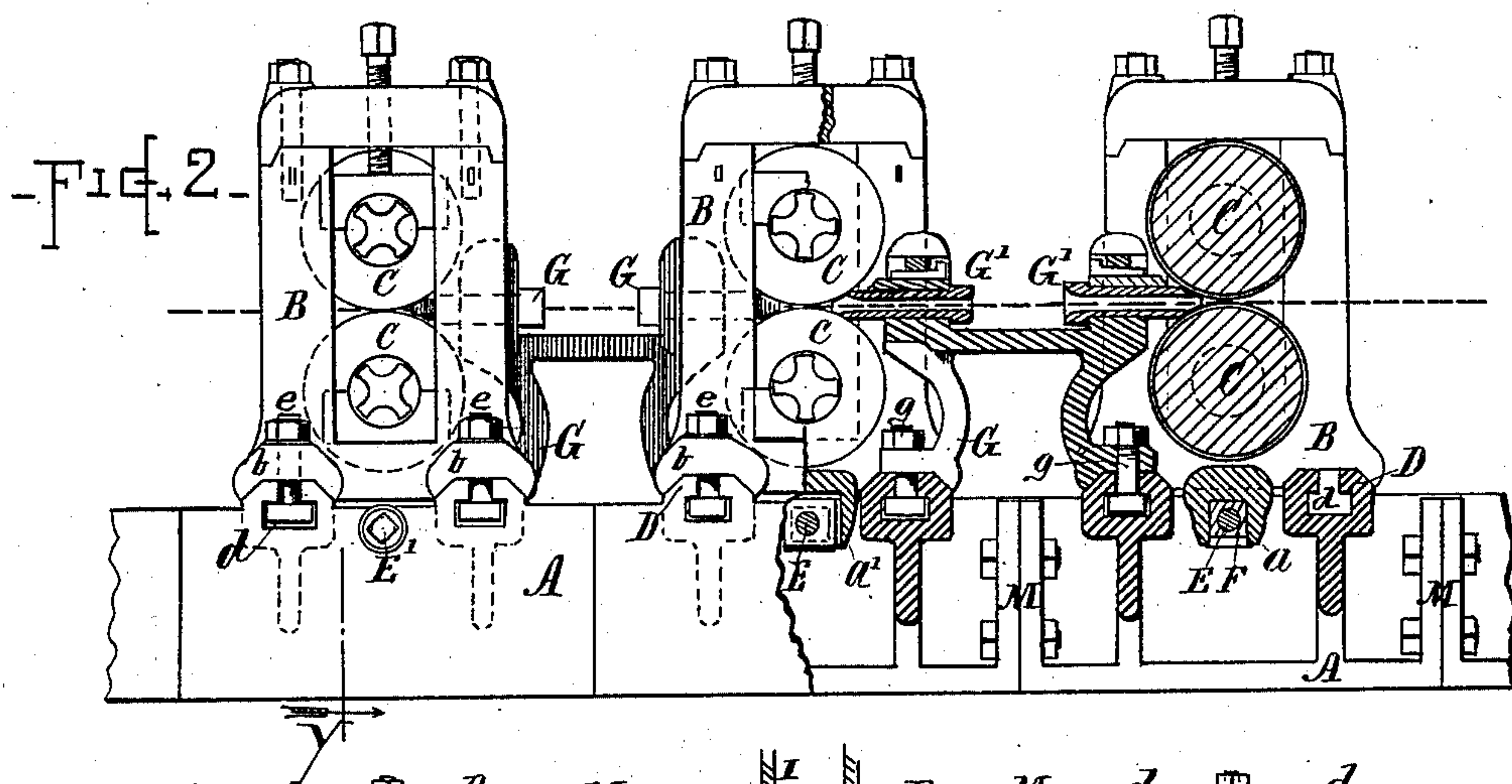
2 Sheets—Sheet 1.

No. 287,008.

Patented Oct. 23, 1883.



— F I E + 3 —



WITNESSES

INVENTOR\_

Edw R. Gates  
Wilber W. Hobbs.

Fred H. Daniels  
By Chas H. Burleigh  
Atty.

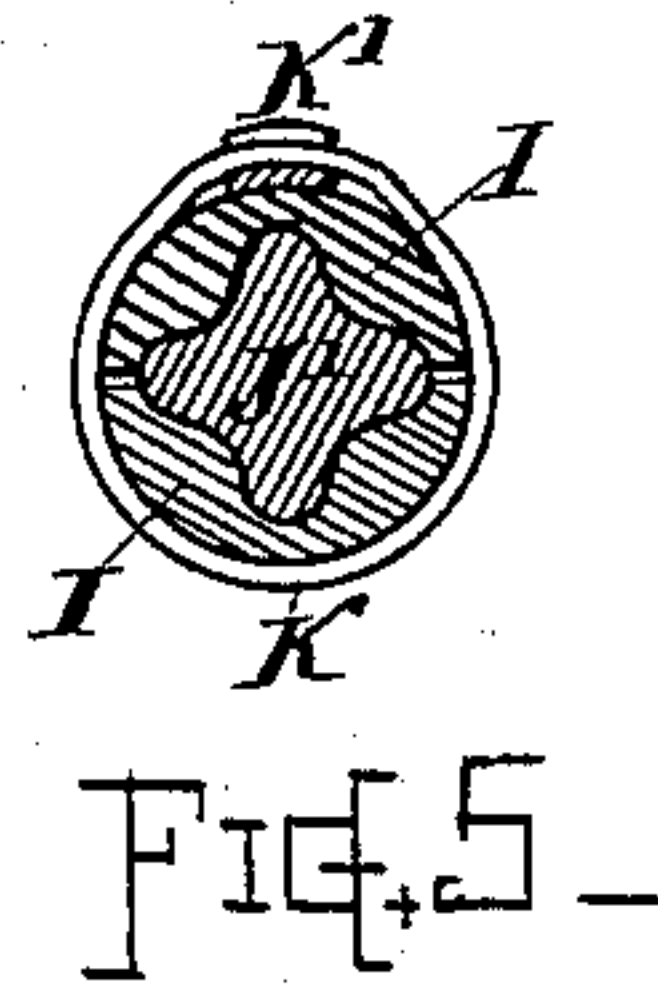
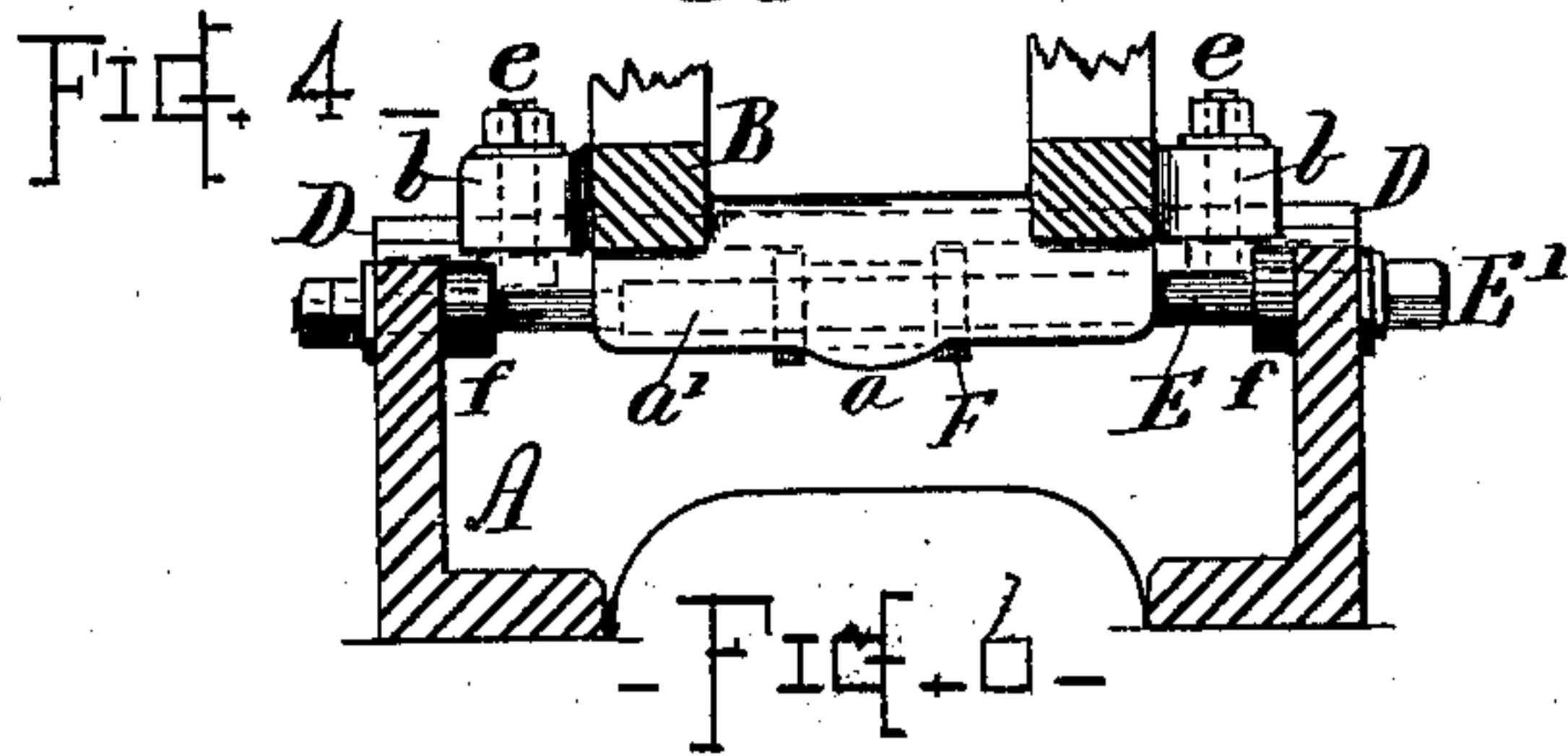
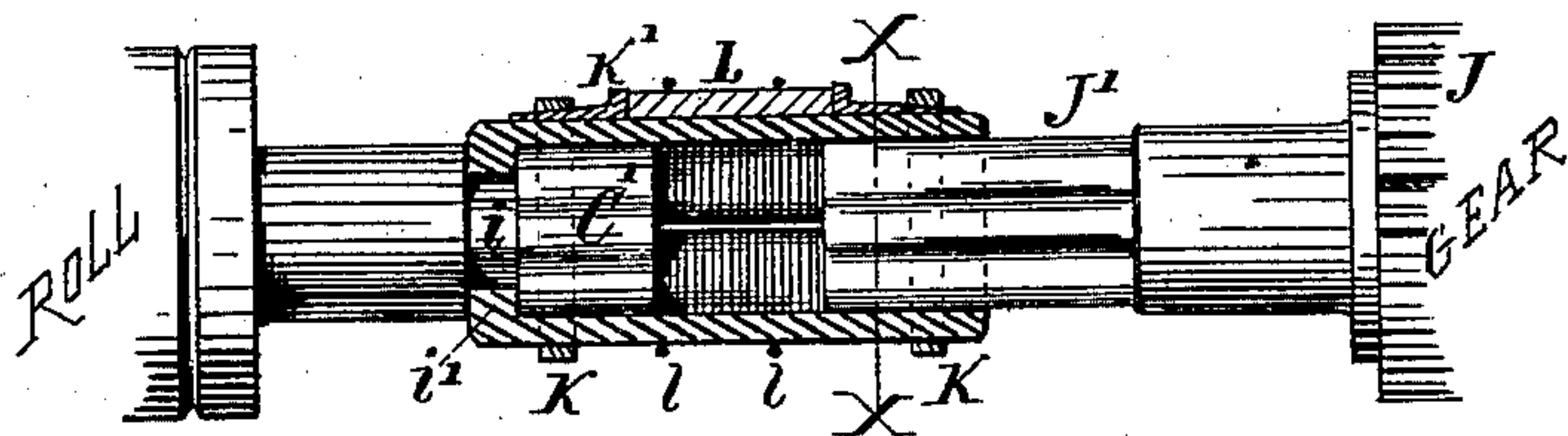
(No Model.)

2 Sheets—Sheet 2.

F. H. DANIELS.  
CONTINUOUS ROLLING MILL.

No. 287,008.

Patented Oct. 23, 1883.



WITNESSES -

*Edw. R. Gates*  
*Wilber W. Hobbs*

INVENTOR -

*Fred H. Daniels*  
*By Chas. H. Burleigh*  
*Atty.*



# UNITED STATES PATENT OFFICE.

FRED H. DANIELS, OF WORCESTER, MASSACHUSETTS.

## CONTINUOUS ROLLING-MILL.

SPECIFICATION forming part of Letters Patent No. 287,008, dated October 23, 1883.

Application filed January 26, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, FRED H. DANIELS, of Worcester, in the county of Worcester and State of Massachusetts, have invented certain  
5 new and useful Improvements in Continuous Rolling-Mills for Rolling Metal Bars and Rods; and I declare the following to be a description of my said invention sufficiently full, clear,  
10 and exact to enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

The objects of my present invention are to  
15 provide facilities for supporting, guiding, and securing the feet of the roll-housings upon the bed-frame in a practical and efficient manner, and for maintaining the proper relation of the several pairs of rolls while effecting lateral ad-  
20 justment of the same; also, to afford a connection for the housings and the mechanism for effecting lateral adjustment which will permit removal of the rolls and housings without removing the adjusting-screw; also, to pro-  
25 vide a supporting-bed which can be conveniently constructed and fitted for the reception of laterally-adjustable roll-housings; also, to provide improved bearing-connection which will permit lateral adjustment of the rolls;  
30 also, to provide means for supporting the rod-guides upon the bed-frame independently of the roll-housings. I attain these objects by mechanism constructed and organized for operation substantially as illustrated and de-  
35 scribed, the particular subject-matter claimed being hereinafter definitely specified.

In the drawings are represented such parts of a continuous rolling-mill as are necessary to illustrate the nature of my invention.

40 Figure 1 is a part plan, part horizontal sectional view. Fig. 2 is a part elevation, part vertical sectional view. Fig. 3 is a transverse vertical section of the mill. Fig. 4 is a longitudinal section of a telescoping journal-con-  
45 nection. Fig. 5 is a cross-section of the same at line *x x*; and Fig. 6 is a transverse section of the bed-frame and foot of the housing at line *y*, showing the manner in which the housing-casting may be made for protecting the  
50 adjusting-screws.

In the drawings, A denotes the bed-frame,

which extends longitudinally of the mill and supports the housings B, that carry the journal-bearings of the rolls C, said bed-frame being of sufficient extent to accommodate the  
55 requisite number of pairs of rolls, twelve to sixteen pairs being ordinarily employed, although a greater or less number may be used, as desired. The housings B and boxes for the roll-journals C' are constructed sub-  
60 stantially in the ordinary form, and the rolls C are supported and adjusted to and from each other within their housings B in the usual or any suitable manner. The bed-frame A is provided with lateral guideways D,  
65 having undercut grooves *d*. The feet *b* of the housings B are fitted to said guideways D, and are secured thereto by means of bolts *e*, the heads of which are locked into the under-  
70 cut grooves *d*, while the bolts extend up through the feet *b*, and are provided with nuts on their upper ends, by which said feet can be clamped down upon the guides or bed-  
75 frame for retaining the housings at any desired position of adjustment.

Beneath the housings, and extending trans-  
versely across the bed or stationary portion of the frame, are arranged shafts E, the ends of which are supported to turn freely in bear-  
80 ings *f*, but are held by suitable nuts, shoulders, or collars from endwise movement. Said shafts are screw-threaded along their central portion, and are provided with nuts F, running upon said screw-threads and fitted to engage downward-projecting portions of the  
85 housing-castings in such manner that revolution of said screw-shafts will effect the lateral movement of the housings B and the rolls C, mounted therein. The ends of the screw-shafts project at the front of the frame at E',  
90 and are properly formed and fitted to receive a suitable wrench or key, by means of which said shafts can be conveniently turned when required. In the present instance the nuts F are formed with end flanges, and are arranged  
95 to fit into a suitable recess between lugs *a*, that depend from the bottom transom of the housings, the flanges of the nuts resting against the shoulder of the lugs *a*, as illustrated, thus forming a lock-connection which will insure  
100 the lateral movement as required, while permitting of the housings being lifted off from



the bed-frame without disturbing the adjusting devices. I do not, however, desire to confine myself to this particular manner of connecting the nut and housing, as other modifications could be employed without departure from the nature of my invention. The sides of the bottom frame or transom-bar of the housing may be extended downward along the screw-shaft in the manner indicated at *a'*, so as to protect the screw and its connections from the water, dirt, and scales falling from the rods and rolls.

The supporters or standards *G* for the rod-guides *G'* are made independent of the housing-frames *B*, and are independently secured to the bed-frame *A*, so that the position of the housings can be shifted, while the guides *G* remain stationary in position. Said guide-standards in the present instance have their feet fitted to the transverse parts of the bed-frame, or portions which form the guideways, and they are held by bolts *g*, having heads that lock into the undercut grooves, and nuts that clamp the standards in position in the manner indicated. The rod-guides *G'* may be constructed and retained upon their supports substantially in the ordinary or any suitable manner.

The couplings *I*, for connecting the axles *C'* of the rolls *C* with the axles or shafts *J'* of the driving-gears *J*, are arranged as indicated in Figs. 3, 5, and 6. The axle ends are corrugated or made in irregular form, as in ordinary mills, and in addition thereto the roll-axles *C'* are provided with a groove or neck, *i*. The coupling *I* is made in two parts, with inner surfaces to conform to the shape of the axles, and provided with inward flanges or projections *i'*, to fit into the necking *i* of the roll-axle. The parts are formed somewhat shorter than the distance between the journal-bearings. The halves of the coupling *I* are placed together, embracing the axles *C'* *J'*, with the flange *i'* locked into the groove *i*. Wrought-iron rings *K* are then slipped over the coupling, and wedges *K'* are driven beneath the rings to force the parts of the coupling firmly together. A block, *L*, is then secured between the heads of the wedges by a binding wire or cord, *l*, to prevent the wedges from jarring loose. This coupling *I* is confined to the axle *C'*, and is free to telescope with the axle *J'* as the rolls are moved laterally nearer to or farther from their driving-gears, so that the couplings do not require to be taken off or disarranged when effecting adjustments.

The rolls *C* are formed with several grooves or dies, *e*, and when one groove on any set of rolls becomes worn out or injured in the running of the mill the pair of rolls can be quickly and conveniently shifted to bring another of the grooves into line with the rod-guides by simply loosening the nuts on the clamp-bolts *e*, then applying a wrench to the heads *E'* and revolving the screw-shaft *E* to effect the lat-

eral movement of the housings to the required position, and then retightening the clamp-bolt *e*. The first pair of rolls of a continuous rolling-mill, working on wire rods, will run about two weeks before the grooves therein become sufficiently worn to require replacing, while the grooves of the finishing-rolls, or sixteenth pair, will last only about half a day. The grooves in rolls intermediate between these extremes wear for a longer or shorter period, according to their respective positions in the mill. In practice, therefore, the finishing-rolls and those near the latter end of the mill are preferably provided with a greater number of grooves than those nearer the first pair, thereby permitting the greater number of changes or lateral shifts necessary to compensate the more rapid wear. By arranging the rod-guides stationary and adjusting the housings and rolls laterally, as hereinbefore described, the course of the rod through the mill is always maintained in a direct line, and the mill is caused to operate in a much more satisfactory manner than with the usual practice of offsetting the guides and deviating the course of the rod in order to use an adjacent groove.

The bed-frame *A*, for convenience of fitting up, may be made in short sections, separately cast and fitted, and the whole bolted together, as at *M*, or connected in other suitable manner to form the continuous bed for the housings *B*. This construction permits of the convenient and accurate planing off of the guideways *D* and the formation of the grooves *d*. Another modification of this construction would be to secure sections containing the guideways *D* and adjusting-screw devices *E* upon long bed bars or rails extending longitudinally of the mill; or, if preferred, the entire frame or bed can be made continuous or integral and the guides for the housings be formed in or arranged thereon in any manner convenient.

Having described my improvements in continuous rolling-mills, what I claim as of my invention, and desire to secure by Letters Patent, is—

1. The combination, with the gear-shaft and roll-shaft having a neck or recess, *i*, of the coupling-sleeve *I*, formed in halves or longitudinal sections, provided with projections *i'* for engaging said neck-recess, and the rings and keys *K K'*, or means for securing said sections together, substantially as and for the purposes set forth.

2. The bed-frame for a continuous rolling-mill, composed of a number of attached sections provided with transverse undercut grooves or guideways, substantially as hereinbefore described.

3. The combination, with the laterally-adjustable roll-housing and its adjusting shaft or screw, of a nut or connecting device engaging with or fitted to said housing by detachable lock-connection, substantially as set forth, whereby said housing may be removed from



the bed without disturbing said screw mechanism.

4. The combination, with the adjusting-screw E and its connecting devices, of the housing-frame or transom-bar *a'*, adapted to cover and protect said screw, substantially as and for the purpose set forth.

5. The guide-standard G, formed substantially as shown, for retaining the rod-guides

G', supported and secured upon the bed or lateral guideways D, independently of the housings, as and for the purpose set forth.

Witness my hand this 20th day of January, A. D. 1883.

FRED H. DANIELS.

Witnesses:

CHAS. H. BURLEIGH,  
EDWIN GLEASON.