

(No Model.)

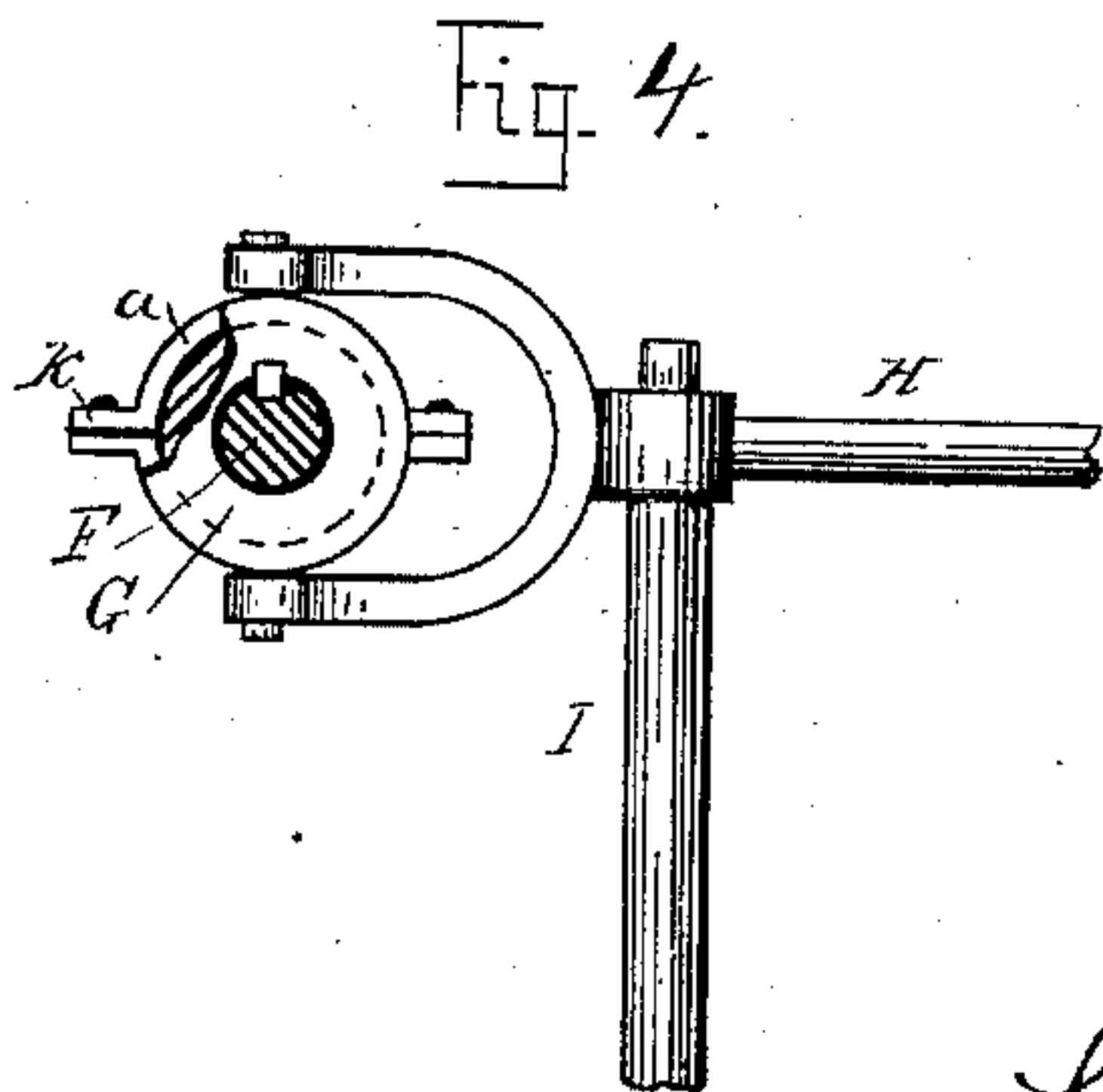
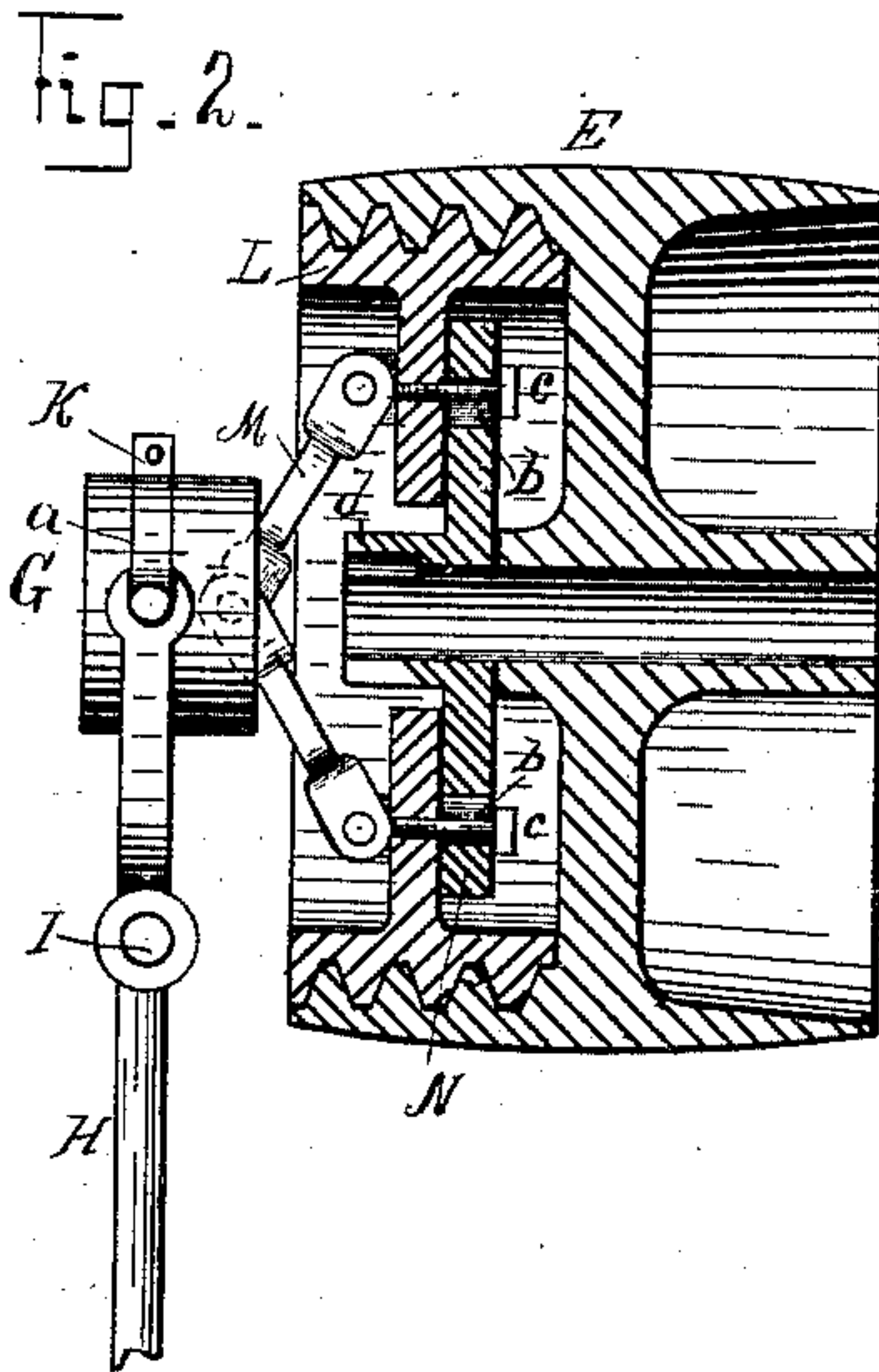
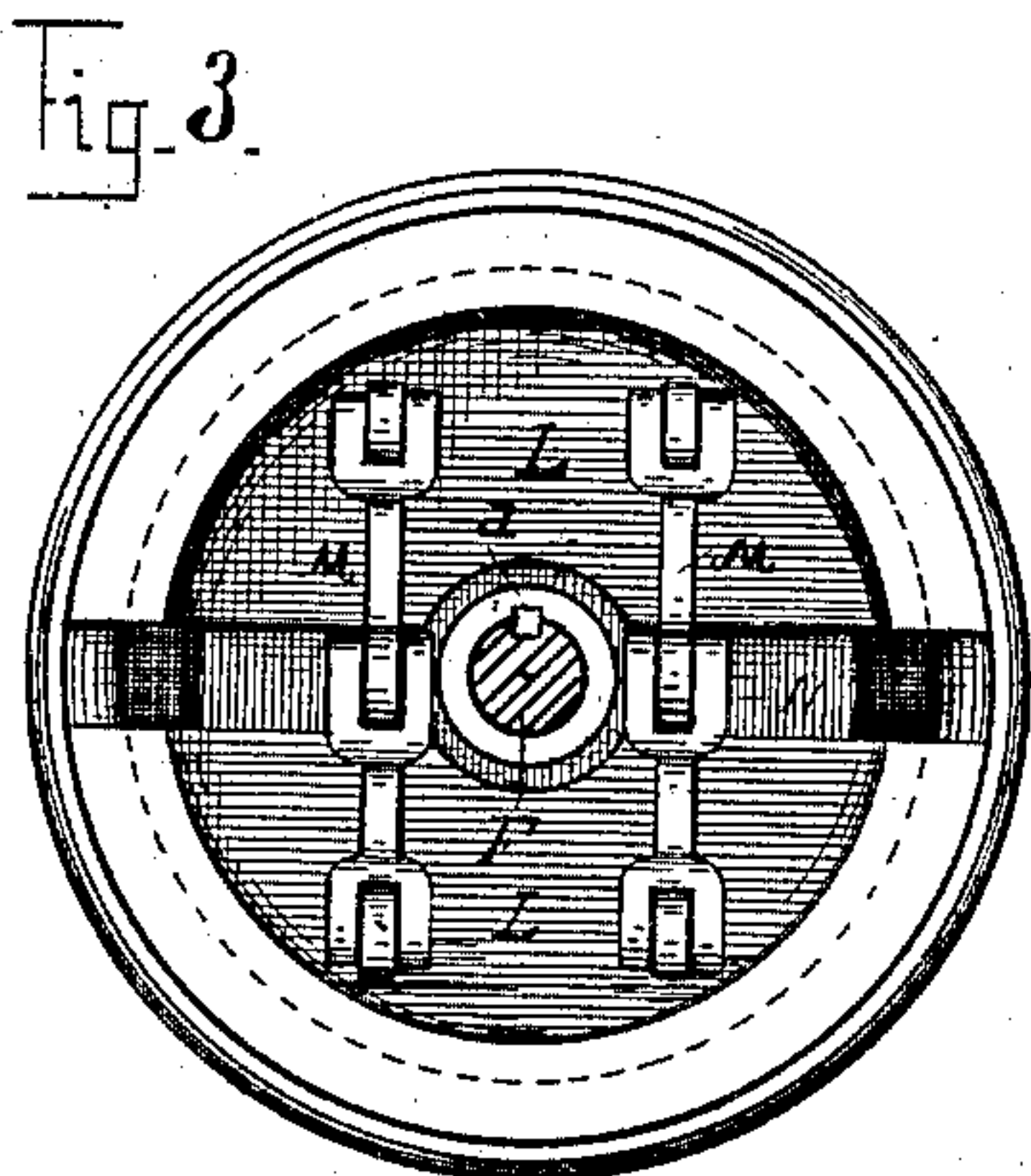
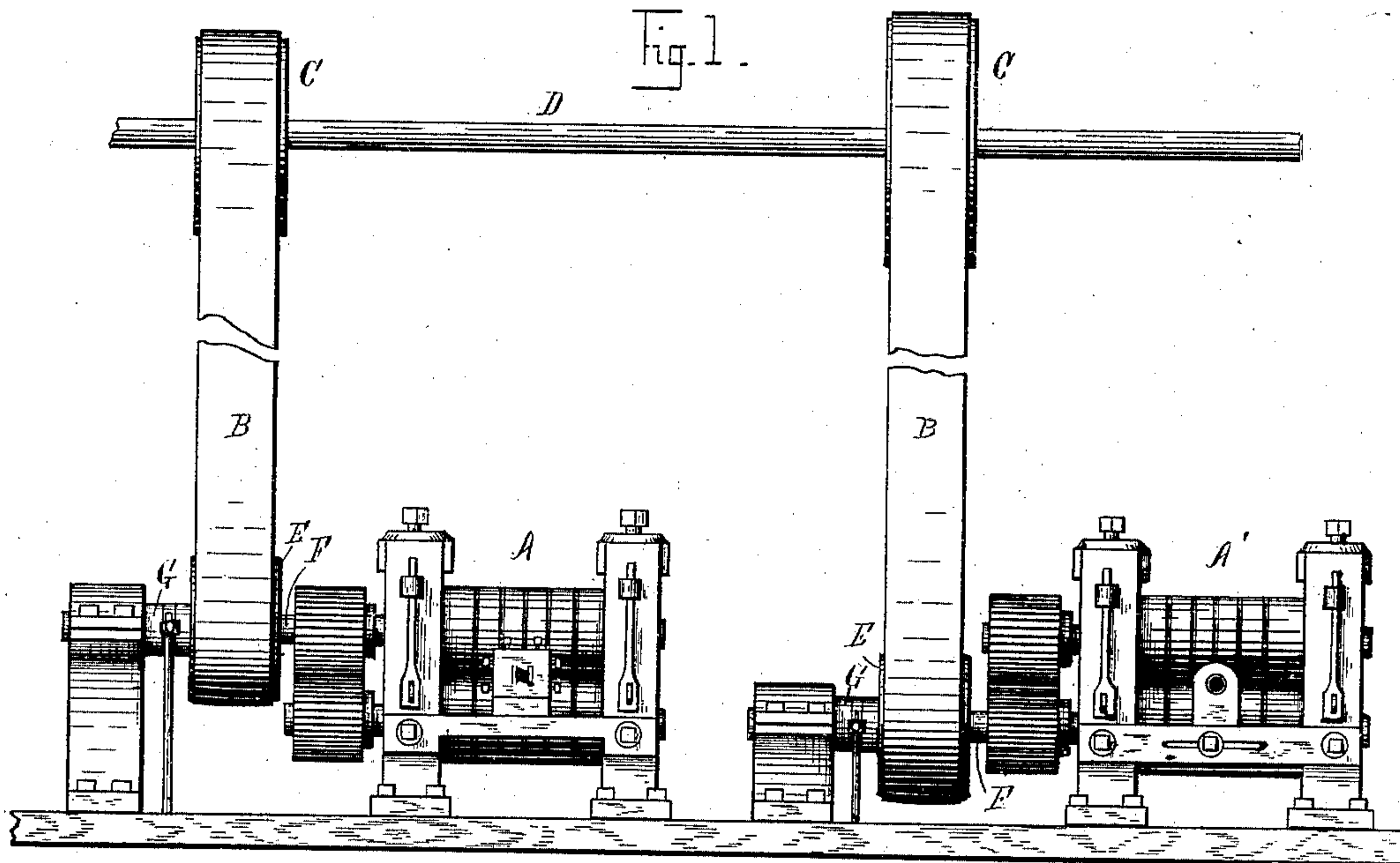
2 Sheets—Sheet 1.

J. McILVRIED.

ROLLING MILL.

No. 370,487.

Patented Sept. 27, 1887.



Witnesses

O. B. Nash.

E. J. Chino.

Inventor  
John McIlvried  
By his Attorney  
Thos. D. Hall

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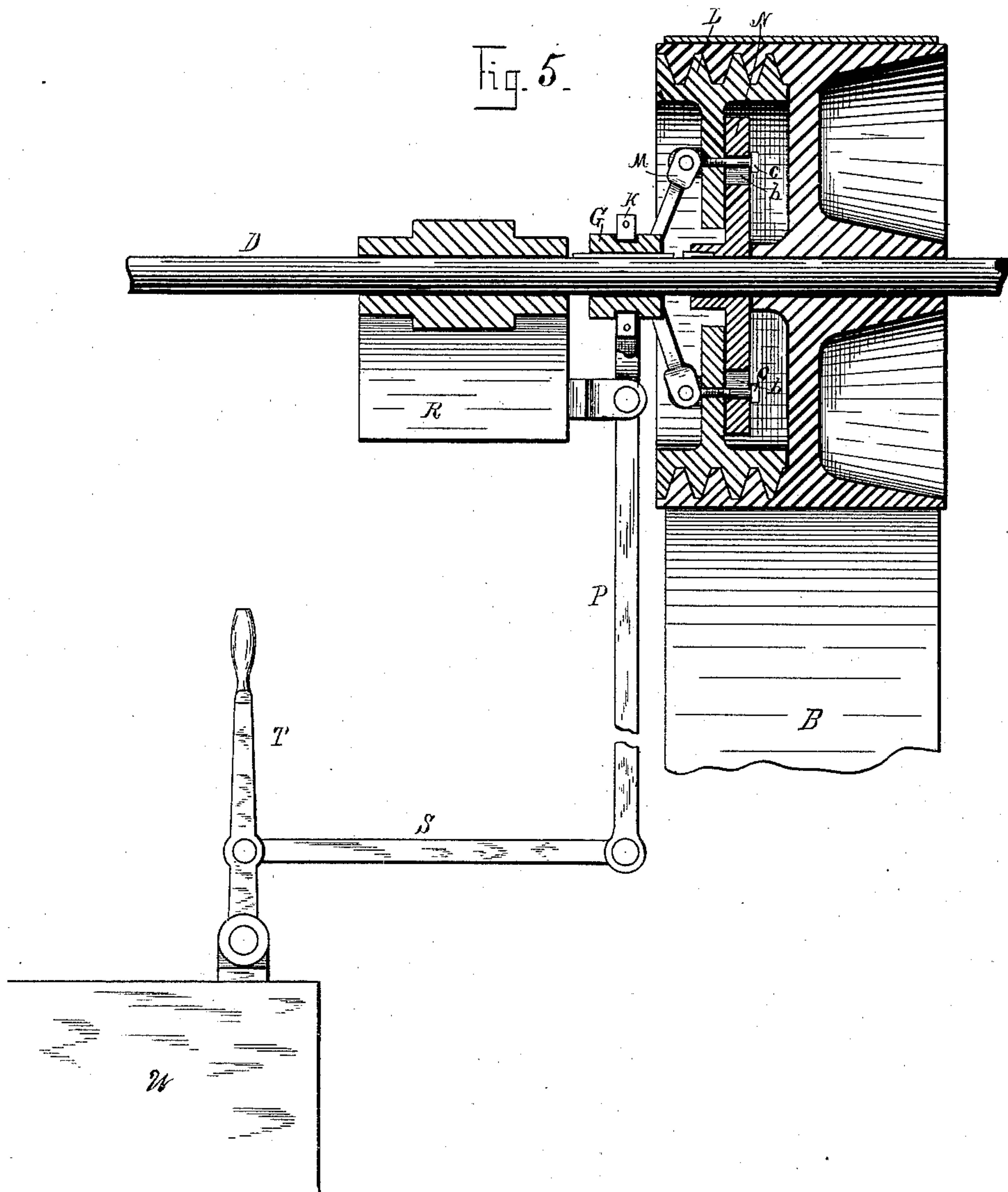
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C. B. Nash.  
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Thos B Hall



# UNITED STATES PATENT OFFICE.

JOHN McILVRIED, OF CLEVELAND, OHIO, ASSIGNOR TO CLIFTON B. BEACH,  
OF SAME PLACE.

## ROLLING-MILL.

SPECIFICATION forming part of Letters Patent No. 370,487, dated September 27, 1887.

Application filed October 29, 1886. Serial No. 217,539. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN McILVRIED, 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 Rolling-Mills; and I do hereby declare the following to be a description of the same and of the manner of constructing and using the invention in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it appertains to construct and use the same, reference being had to the accompanying drawings, forming a part of the specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle so as to distinguish it from other inventions.

The object of this invention is to provide certain improvements in the driving apparatus of the form of rolling-mill shown in C. B. Beach's two applications for United States patents, numbered, respectively, 203,927 and 215,131, and filed, respectively, June 2, 1886, and October 2, 1886. The end in view in my said improvements is to adapt the said mill to be operated by tight belts depending from the overhead driving-shaft, in contradistinction to slack belts shown in said Beach applications.

Referring to the drawings, Figure 1 is a front elevation of two stands of rolls in a train of rolls, provided with one form of embodiment of my said improvement. Fig. 2 is a detail view showing the pulley-wheel of one of the roll-stand shafts in horizontal section, and also showing the corresponding shaft-sliding sleeve in plan view. Fig. 3 is a detail view in end elevation of the preceding figure, but omitting therefrom the said sliding sleeve, and also showing the roll-stand shaft in addition. Fig. 4 is a detail view in end elevation of the said sliding sleeve and its immediate connecting parts, while it shows the roll-stand shaft in cross-section. Fig. 5 is a detail view representing a form of embodiment of my said improvement differing from the preceding referred-to form, said second form being shown as applied directly to the overhead driving-shaft instead of to the shaft of a stand of rolls, as in the first form shown.

Said Fig. 5 shows the driving-pulley and its immediate connecting parts in vertical section, while the remaining parts of the apparatus are shown in side elevation.

The two stands of rolls, A A', are in duplicate construction, and respectively provided in duplicate with driving apparatus. I will therefore now describe one of said stands of rolls and driving apparatus, the same being as follows: A tight belt, B, connects the driving-pulley C of overhead driving-shaft D with driven pulley E on shaft F of the stand of rolls. Said pulley E is loose on said shaft F, so as to run idle on the latter except when thrown into clutch-gear with said shaft by the mechanism shown for that purpose, and which is as follows in description: Sleeve G is feather-keyed to shaft F, so as to have free movement longitudinally on the latter and yet cause the two said parts to move in revolution together, said sleeve being actuated in its movement longitudinally on the shaft by horizontal hand-lever H, fulcrumed on a standard, I, and having its bifurcated end loosely connected with a bipartite band-clamp, K, fitted loosely within an annular groove, *a*, formed about the peripheral surface of said sleeve, said band-clamp not partaking in the revolutionary movement of said sleeve and serving to shift the sleeve endwise on the shaft.

Two semicircular clutch-plates, L, are fitted within the inner periphery of the band-pulley on its side adjacent to the sliding sleeve, and are connected with the latter by toggle-jointed arms M. There are four of said arms, two for each said plates. Said two pairs of arms are respectively pivoted in toggle-joint connection to opposite sides of the sliding sleeve. Each clutch-plate L has radial movement on the outer face of a disk, N, having its hub *d* rigidly keyed to shaft F. The teeth of the clutch-plates fit in corresponding serrated recesses formed in the inner periphery of the pulley-wheel. Each clutch-plate is adapted to have said movement radially on said disk N, and yet revolve the latter with it by means of a bolt, *e*, threaded in a hole of plate L and fitting loosely in a radial slot, *b*, of disk N.

The operation of this form of mill is as follows: The overhead driving-shaft D being in constant revolution, these several stands of rolls



in the train may be respectively thrown into or out of work independently of one another at the will of the operator. So, also, the several stands of rolls in the train may be respectively speeded up in their revolution or slowed down independently of one another at the will of the operator. This broad feature of independently operating the different stands of rolls in a rod-train or other form of metal-rolling mill constitutes no part of my invention, inasmuch as the same is not original with me, but is found in the form of mill shown in the Beach patent applications heretofore referred to; but to make my improvement clearly understood, I should say that this feature of independently speeding up or slowing down the respective stands of rolls in a rod-train is for the purpose of controlling the length of the loop of the working metal. Each loop which is formed between any two consecutive stands of rolls in the train is thereby made subject to instant and independent regulation as regards its length; hence the loops may all be maintained of short length and close up to the train of rolls.

By my said improvement, as thus far described, the operator may by due handling of lever H cause the clutch-plates to be thrown into frictional gear with the corresponding band-pulley, E, so as to cause the latter to carry with it the roll-stand shaft F at any desired speed of revolution.

I will now describe the second form of embodiment of my said improvement, which is as follows: In this instance the overhead driving-shaft D, instead of having its band-pulley rigidly keyed therewith, as hereinbefore is the case, is provided with a band-wheel and clutch apparatus in duplicate of the band-wheel and clutch apparatus heretofore described as on shaft F of each stand of rolls. It is therefore unnecessary to again describe the construction of said duplicate parts. It will be understood that in this second form of my improvement the belt B passes about a pulley fast on its appropriate roll-stand shaft, such shaft-connecting belt portion, shaft, and stand of rolls all being omitted from Fig. 5 of the drawings; hence each said belt is stationary; except during such time when its corresponding driving-pulley is thrown into clutch with the overhead driving-shaft. This second form of my improvement, therefore, is understood to employ a series of tight belts, B, depending from a series of loose pulleys on the overhead driving-shaft, and connecting with a series of driven pulleys fast on the respective shafts of the different stands of rolls in the rod-train.

A vertical lever, P, is fulcrumed to the bearing-block R, which supports the driving-shaft D, and has its upper bifurcated extremity connected to the clamp-band K, while its lower extremity is pivoted to link S. An upright

lever, T, is pivoted to the said link S, and is fulcrumed to the stand W, upon which latter the operator may stand and have good view of the train of rolls located in a horizontal plane below said stand.

The advantage of my improvement is that a tight belt is not subject to running off either of its pulleys as the stand of rolls which it operates is being slowed down in speed, for it is apparent that by my improvement the belt is maintained as tight while the stand of rolls which it operates is being slowed down as when the said stand of rolls is being driven at maximum speed, whereas in the Beach mill the specific construction of driving apparatus shown in said Beach applications for patent employs a slack belt, which is tightened by a belt-tightener as its appropriate stand of rolls is to be speeded up, said belt-tightener necessarily being withdrawn from pressure against its belt and leaving the latter slack upon its pulleys when the stand of rolls is to be slowed down or stopped, said slack belt being in such instance liable to run off either one of its pulleys.

Reference to the detail parts shown in the drawings has been had in the foregoing description to avoid any possibility of confusion. It will, however, be understood that each roll-stand shaft F, together with the corresponding pinion mechanism, is considered as substantially part of the respective stand of rolls, and hence in the claims the term "stand of rolls" will be understood as inclusive of said incidental parts or their known mechanical equivalent.

I claim—

1. A rolling-mill consisting of the combination of a series of independent stands of rolls, driving-shafting, a series of tight belts connecting the said stands of rolls with the driving-shafting, and a series of friction-clutches, substantially as set forth.

2. The rolling-mill consisting of the combination of the series of independent stands of rolls located end to end, the single overhead driving-shaft in common for the same, the series of depending tight belts respectively connecting the latter with the stands of rolls, and the series of friction-clutches, substantially as set forth.

3. The combination of two or more independent stands of metal-reducing rolls, driving-shafting, two or more tight belts, and two or more friction-clutches, substantially as set forth.

In testimony that I claim the foregoing to be my invention I have hereunto set my hand this 18th day of October, A. D. 1886.

JOHN McILVRIED.

Witnesses:

HORACE DUNN,  
J. B. FAX.