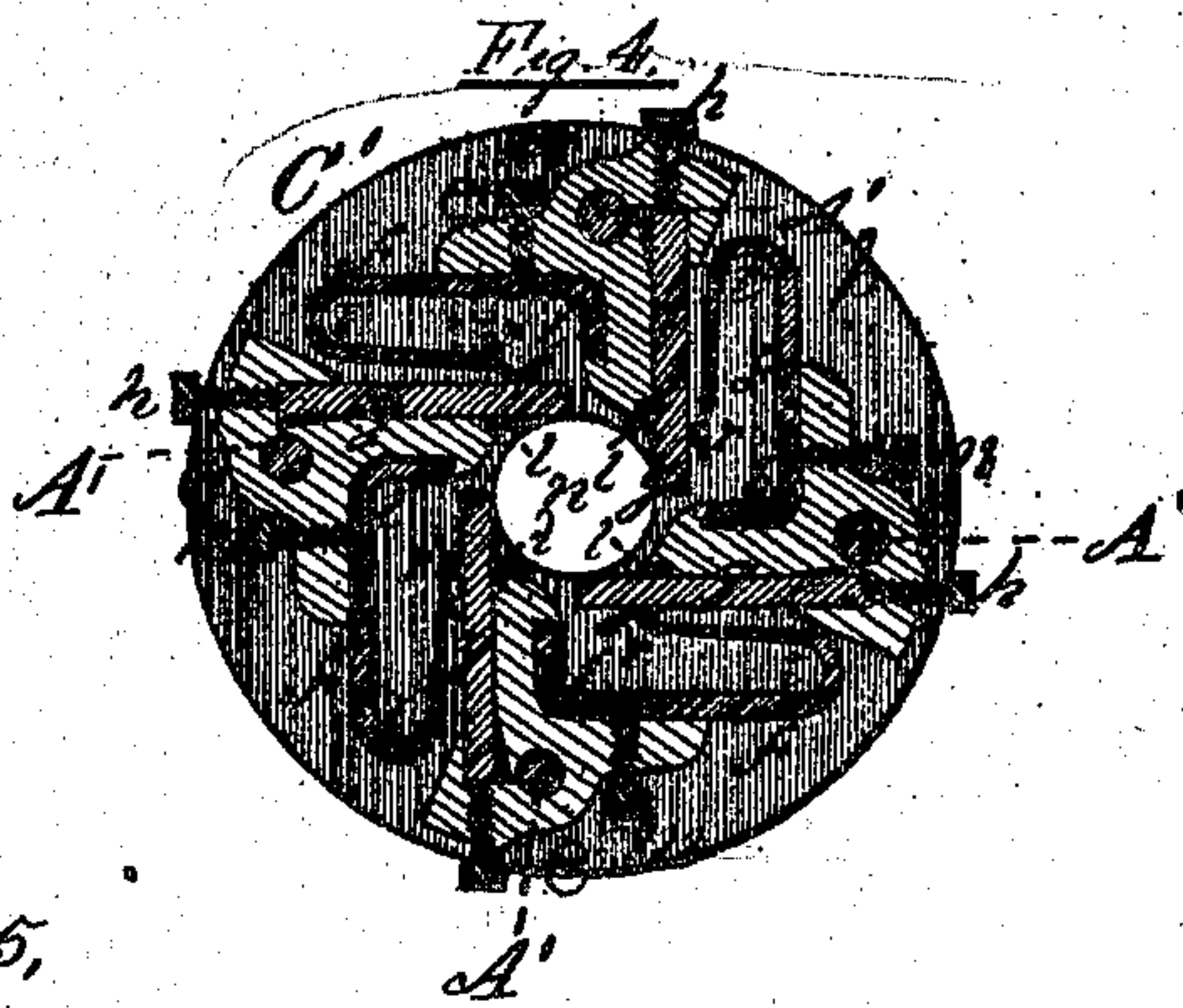
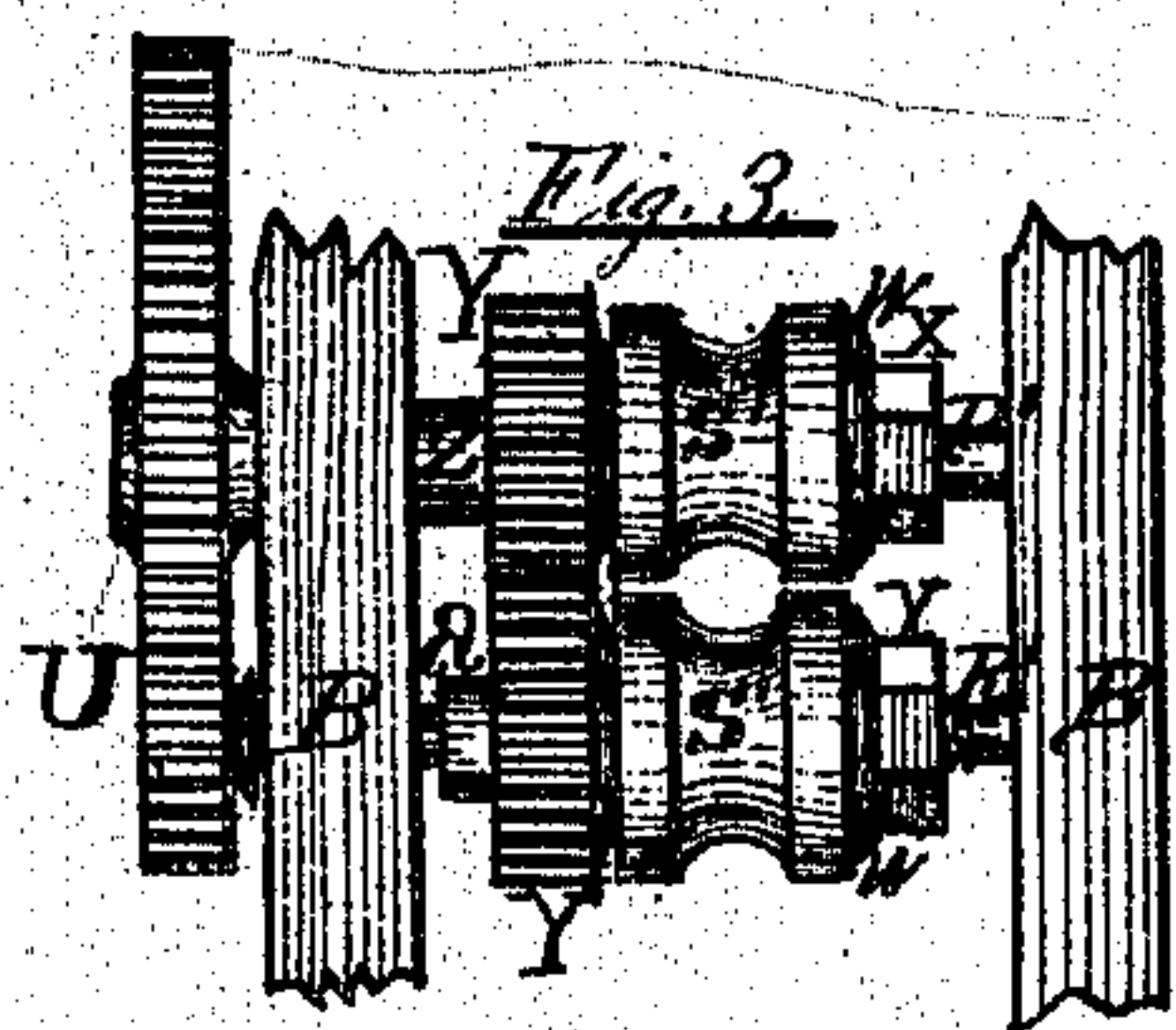
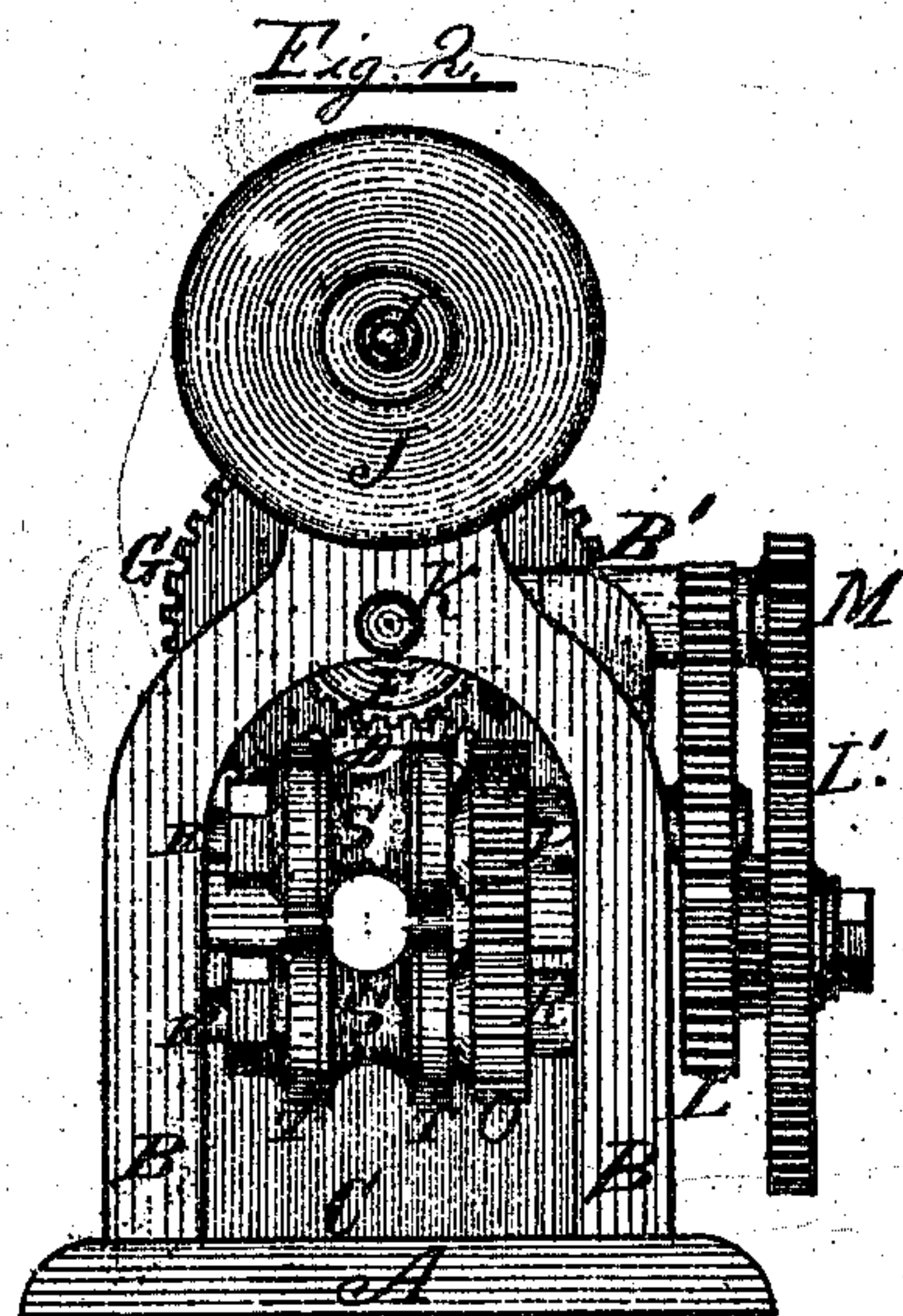
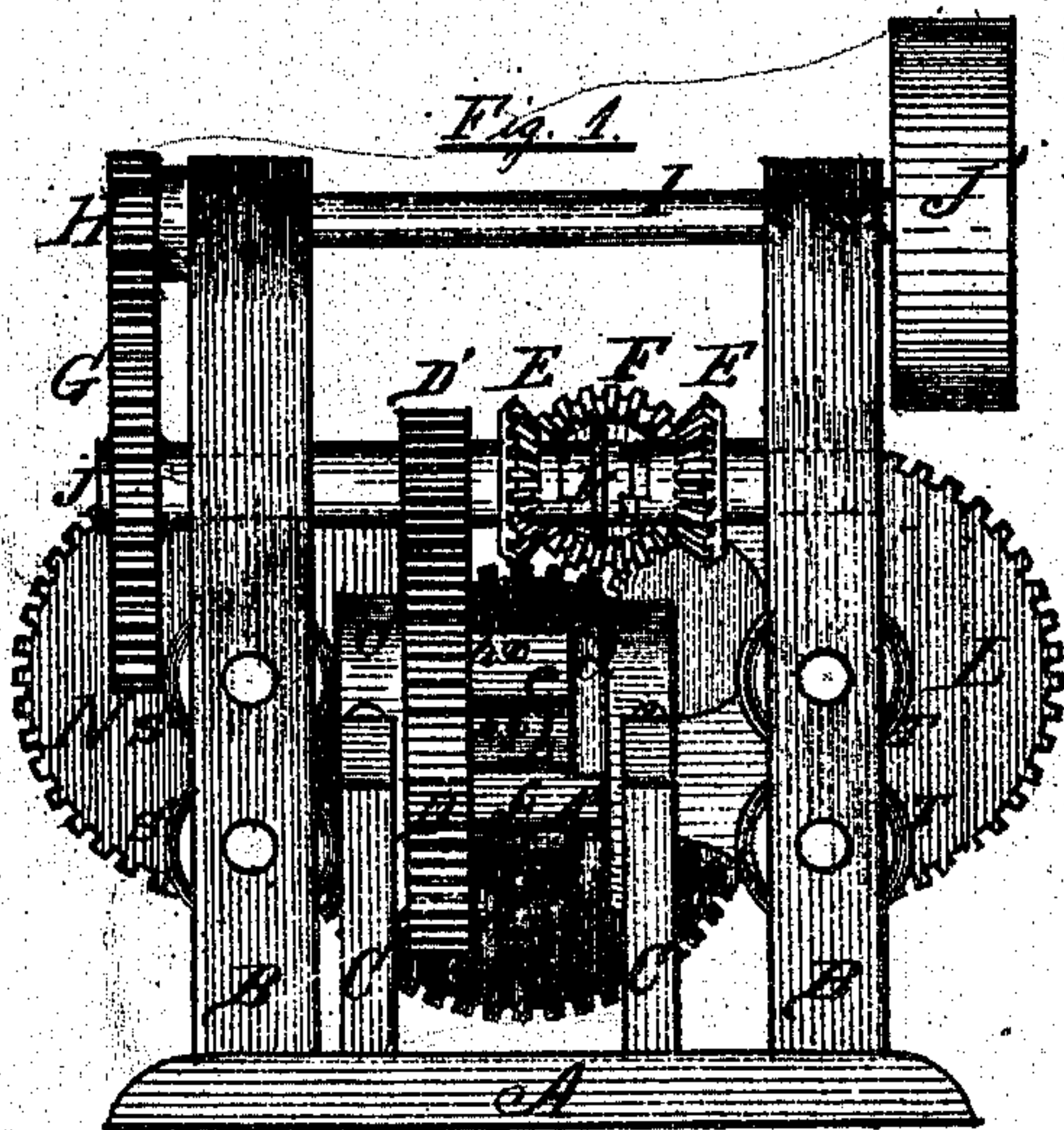


*Smith & Hughes,*

*Polishing Machine.*

*No. 100460.*

*Patented Mar. 1. 1870.*



Witnesses

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Inventors

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*Wm. Hughes,*  
*By their attorney,*  
*G. S. Chapin*



# UNITED STATES PATENT OFFICE.

HORACE S. SMITH AND WILLIAM HUGHES, OF BLOOMINGTON, ILLINOIS.

## IMPROVEMENT IN MACHINES FOR CLEANING AND POLISHING TUBES.

Specification forming part of Letters Patent No. 100,460, dated March 1, 1870.

*To all whom it may concern:*

Be it known that we, H. S. SMITH and W. HUGHES, of Bloomington, in the county of McLean, in the State of Illinois, have invented an Improved Machine for Cleaning Boiler-Flues; and we do hereby declare that the following is a full 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, in which—

Figure 1 is a longitudinal elevation of our invention; Fig. 2, an end elevation of the same; Fig. 3, an elevation of the rollers at the opposite end of the machine from those shown in Fig. 2; Fig. 4, a sectional elevation taken through scouring-cylinder on the line 2 2, Fig. 1; Fig. 5, a section of one of the rollers shown in Fig. 2.

The object of the present invention is to provide more convenient means for cleaning the flues of ordinary tubular boilers; and its nature consists more especially in the novel construction of the rollers which carry the flues through the cleaning-cylinder, and the novel construction of the cleaning-cylinder itself, as the whole is hereinafter fully described.

A represents a substantial foundation, supporting an outside frame, B B, and an inside frame, C C, as shown at Figs. 1 and 2, in which are made the bearings of the working parts of our device, said frames being made of iron or other suitable material in order to give the required strength.

In the frame C C are formed bearings for supporting a scourer or flue-cleaning cylinder, A', Figs. 1 and 4. This cylinder is composed of heads *d b* and staves *e e e e*, which are held together by bolts put through said heads in the usual manner of fastening similar devices. The staves *e* of said cylinder are so formed as to support one or more springs, *f*, Figs. 1 and 4. These springs have a peculiar construction, consisting of plates *f*, curved around at *t* and *i*, so that the parts *r* may have a firm bearing on the knives or tools *g*, and hold them in place for cleaning flues. The knives or tools aforesaid have square ends, and they may be so reversed as to bring any of their edges to bear against the surface of a flue passing through the machine, this adjustment being made by means of set-screws *h* put through the staves *e*. The staves *e* are detached from

the heads *d b*, when the aforesaid knives *g* are to be reversed, by removing bolts which pass through holes A', Fig. 4.

Beneath the inner ends of the knives *g* and in the staves *e* are placed rubber seats *l l l l*, which extend the entire length of the knives, and prevent scales removed from flues from getting under said knives, and so raising them out of place as to make them inoperative for cleaning flues. If said rubber or some other similar device is not employed for that purpose, the cylinder *b* cannot be so well operated, for the knives may be raised from the flue, passing through the cylinder, by means of scales or curves on the flues. In such a case the scales which are removed from the flues would be carried under the knives or tools *g*, and thus prevent them from returning to the proper position for successful use. In making the knives they should be long enough to pass a little by the center of the periphery of the flue when set on the line of a tangent to the same, by means of which arrangement a flue cannot be bruised or injured, as is the case when the knives are set on a radial line of the flue. The inside of the cylinder *b* is made to correspond with the size of the ordinary boiler-flues to be cleaned.

The means used to carry the flue through the cylinder *b* consists of feed-rollers S S', Figs. 1, 2, and 3. The rollers S are made of metal and have conical forms, so that boiler-flues may be carried through between them, and to prevent them from bruising the flues, annular rubber seats T, Figs. 1 and 2, covering the shafts and ends of the rollers, are employed, so that flues having more scales on in some places than others may pass through without being crushed, and so that a crooked flue may also pass through. The rubber seats are firmly held to the rollers S' and to the shafts P R, Fig. 2, by means of nuts R' R', the rollers S' by this means having easy vertical and lateral movements. The rollers at the opposite end of the machine are made of rubber, clamped to the shoulders Z *a* of their respective shafts P' R' by means of nuts X X, Fig. 3. These rubber rollers S' each have a conical form, similar to the rollers S, but are not cased with metal, as the flues passing between them have been previously cleaned, and consequently they are so smooth that the rubber is not easily worn.



We are not particular as to the combination of the gearing used to operate the machine, but the following-described gear is found to be very convenient for that purpose: A cog-wheel, D, is fastened to one of the heads of the cylinder *b*, and it has bearings in the inner frame, C C. This wheel is driven by a pinion, D', rigidly fastened to a shaft, J, having bearings in the frame B, and supporting reversible shipping-gear E E V, which is loosely fitted on said shaft and drives a bevel-pinion, F, Fig. 1. This bevel-pinion turns on a shaft having a bearing in a support, B', and to its outer end is fixed a pinion, M, Fig. 2, which drives a gear-wheel, L', the shaft of which is provided with an inner pinion for driving the wheels L N, Figs. 1 and 2. The shaft of said wheels L N support the rollers S' S, and consequently when the wheel E, attached to the end of shaft J, is rotated by means of a pinion, H, and pulley on shaft I, the rollers S S'

will be so rotated as to carry a flue through the rotating cylinder *b*.

Having thus described our invention, what we claim, and desire to secure by Letters Patent of the United States, is—

1. The conical rollers S, when provided with rubber seats, T, on their internal peripheries and ends, for the purpose of feeding crooked and uneven flues into the cylinder, as described.
2. The combination of the rollers S, constructed as described, with the cylinder *b* and rollers S', as and for the purpose set forth.
3. The cylinder *b*, provided with staves *e*, in combination with the peculiar-shaped springs *f*, reversible knives *g*, and rubber seats *l*, as described and shown.

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Witnesses:

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