

(No Model.)

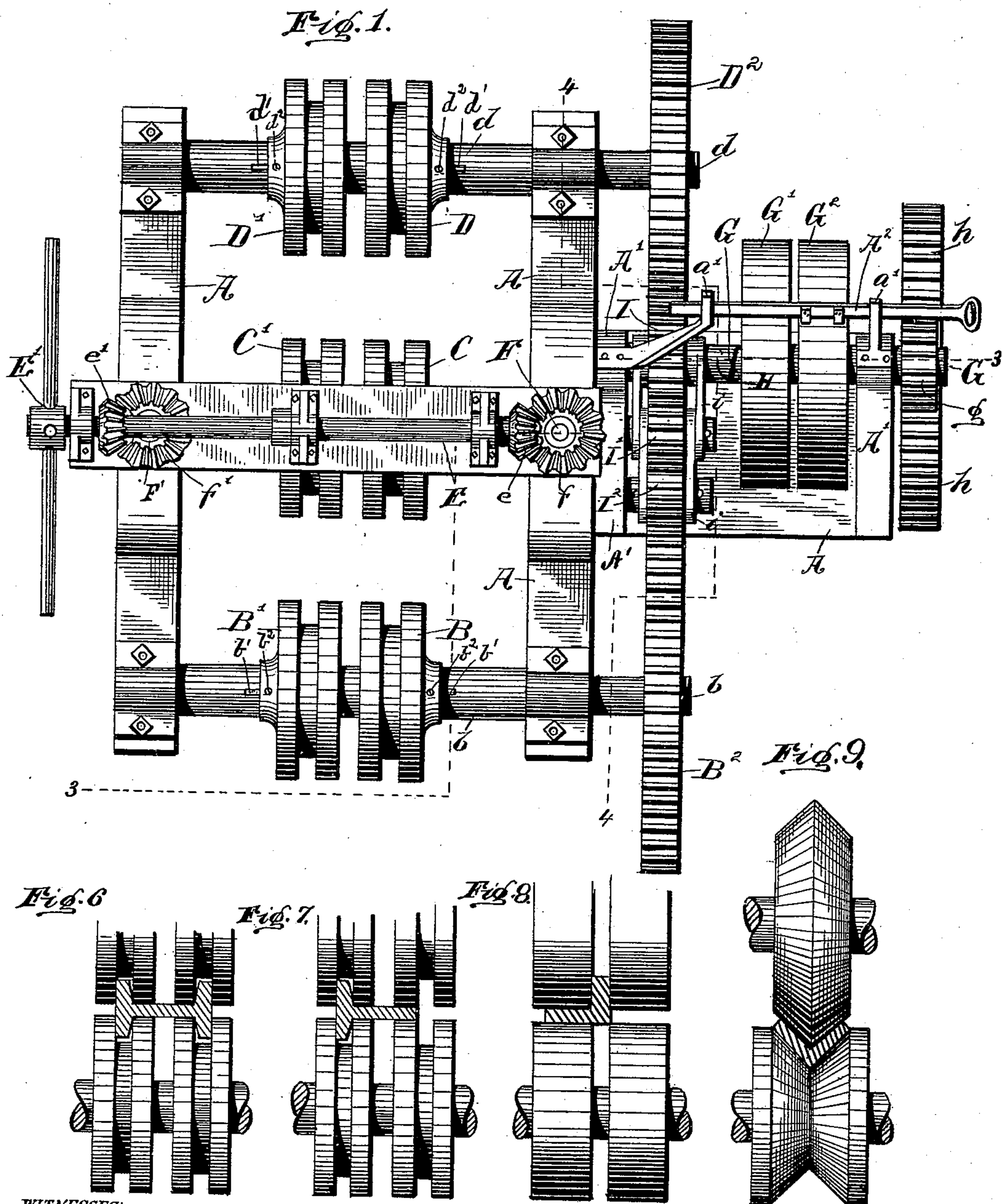
4 Sheets—Sheet 1.

B. F. HAUGH.

MACHINE FOR CURVING IRON BARS OR BEAMS.

No. 446,132.

Patented Feb. 10, 1891.



WITNESSES:

G. W. St. Brown,

G. W. Wood,

INVENTOR:

Benjamin F. Haugh,

per
Chas. E. Bradford,

ATTORNEYS.

(No Model.)

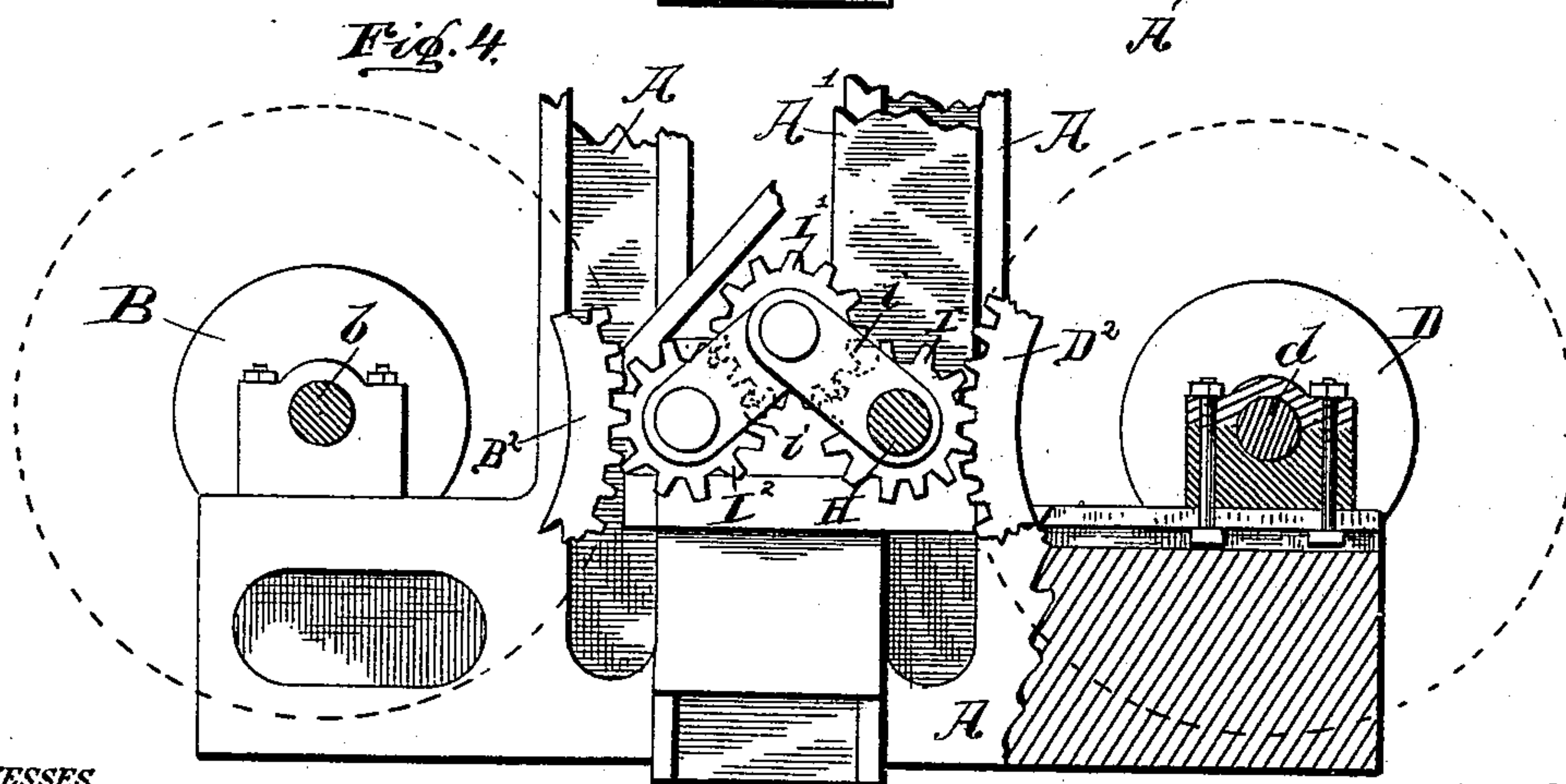
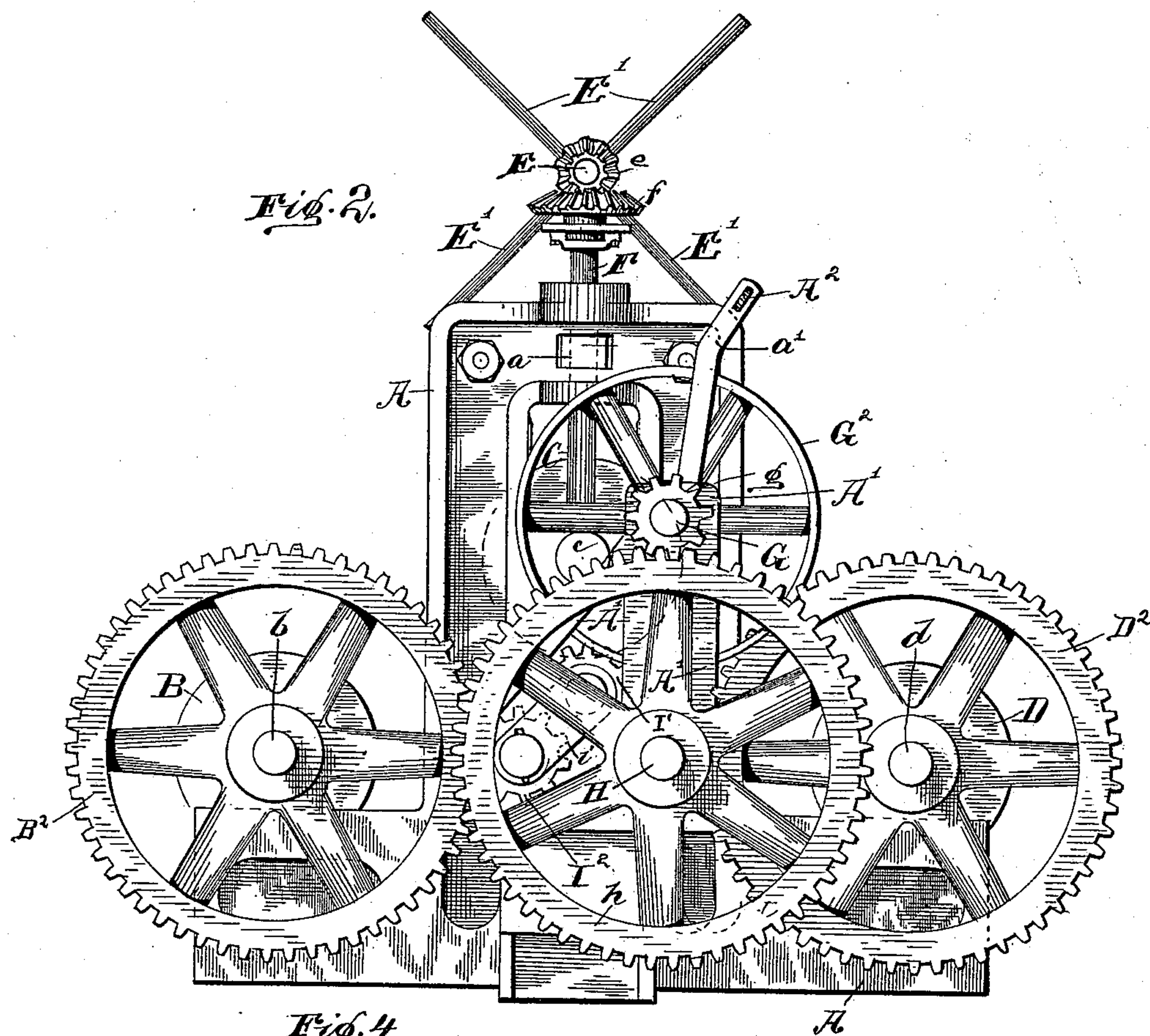
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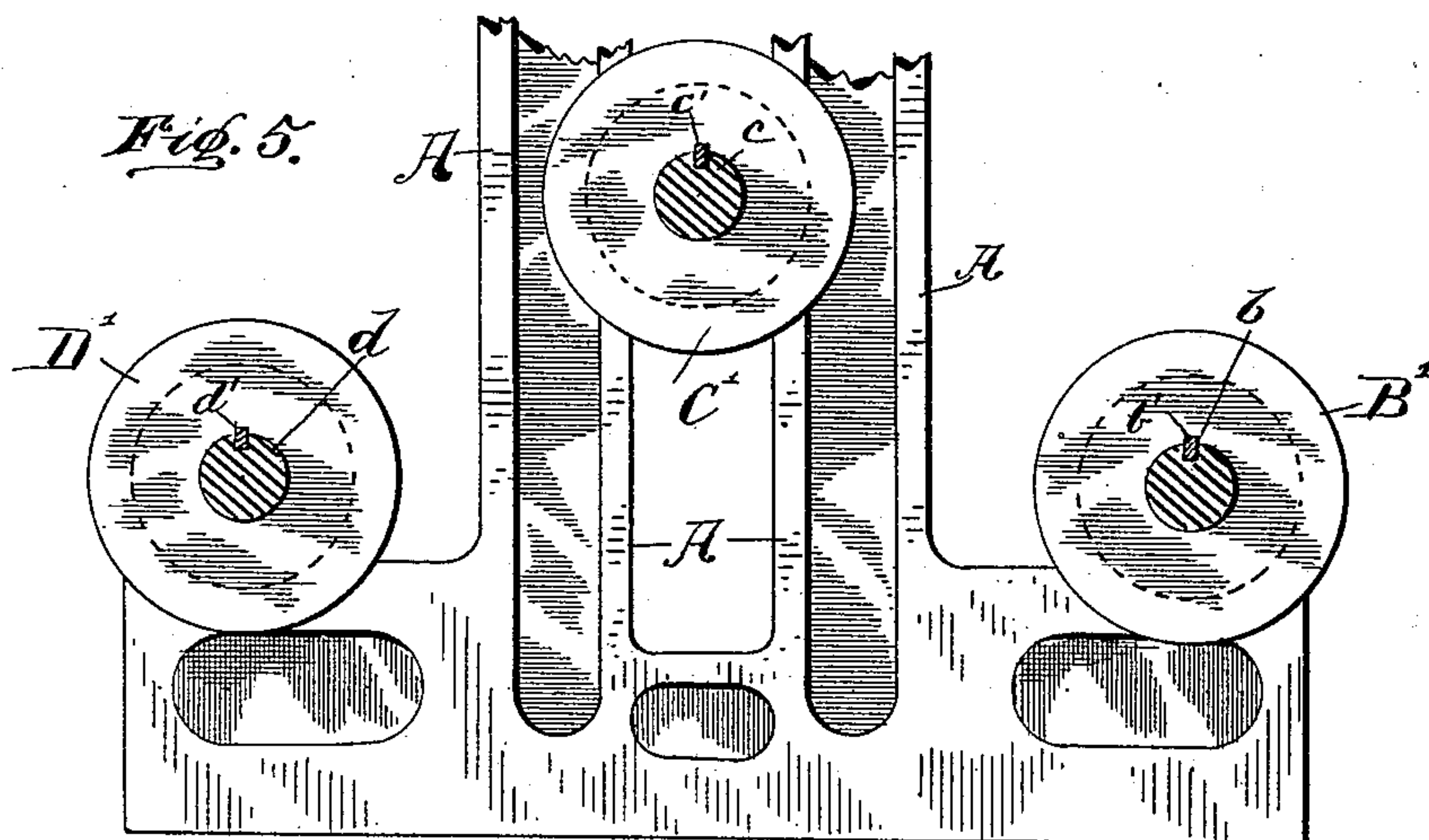
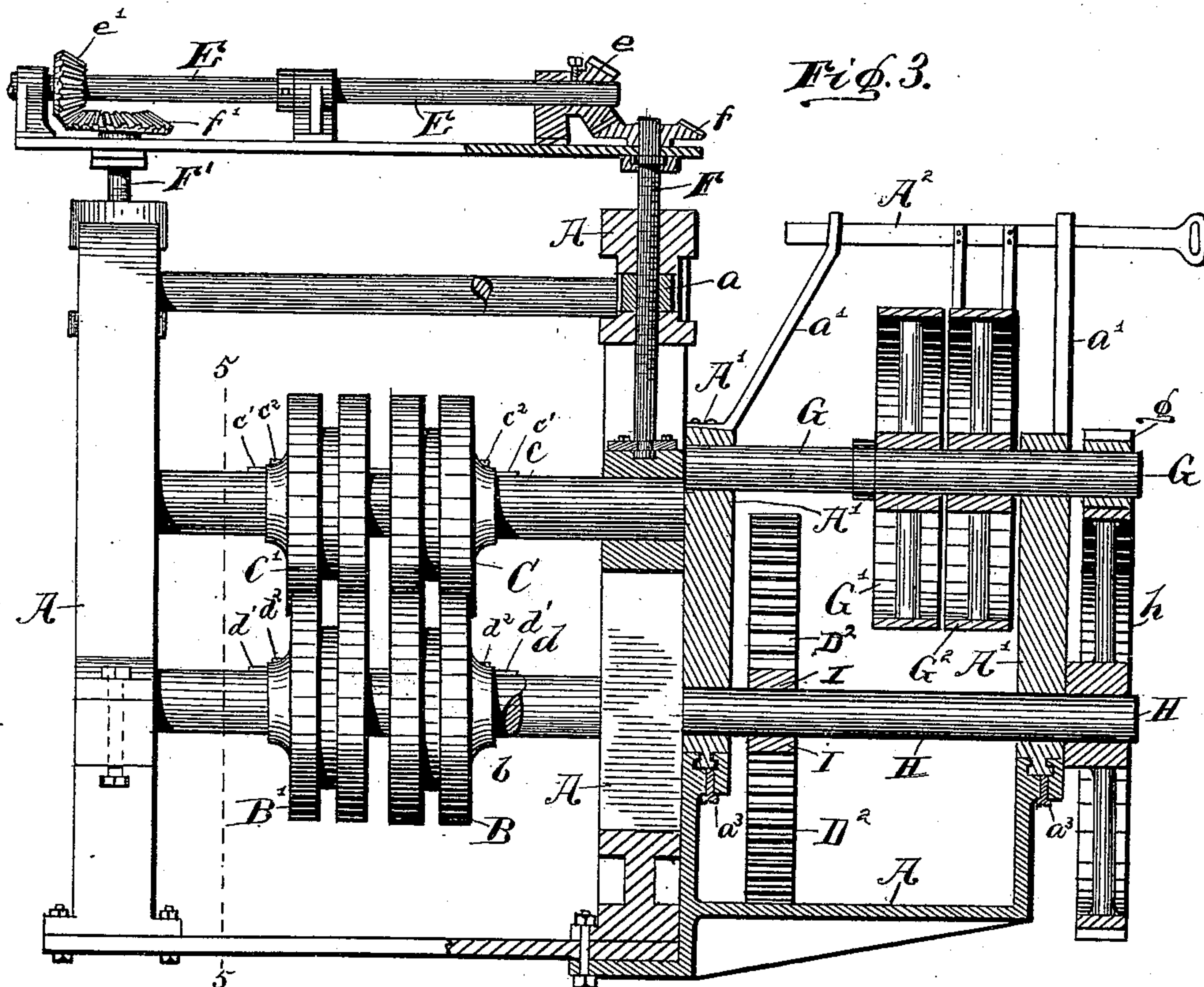
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(No Model.)

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Fig. 10.

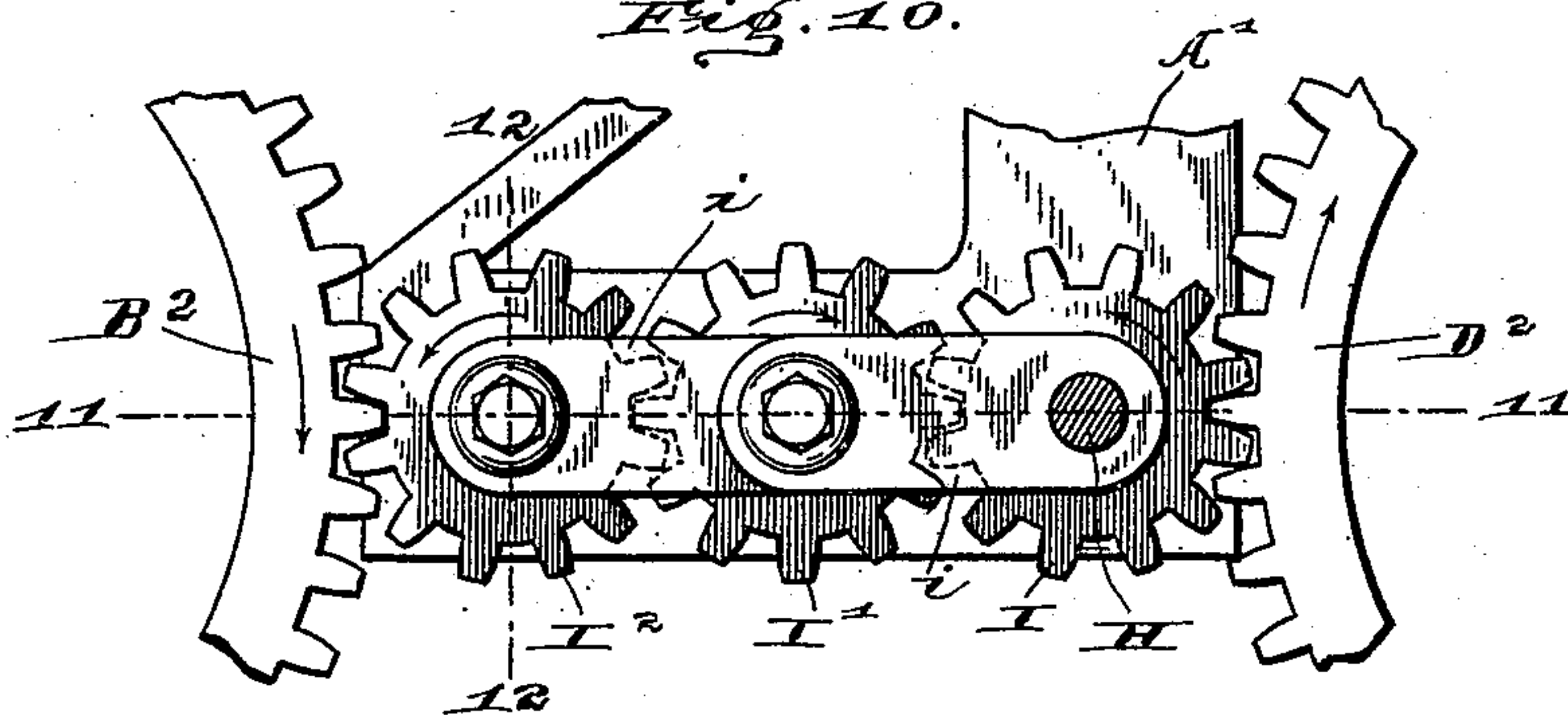


Fig. 11.

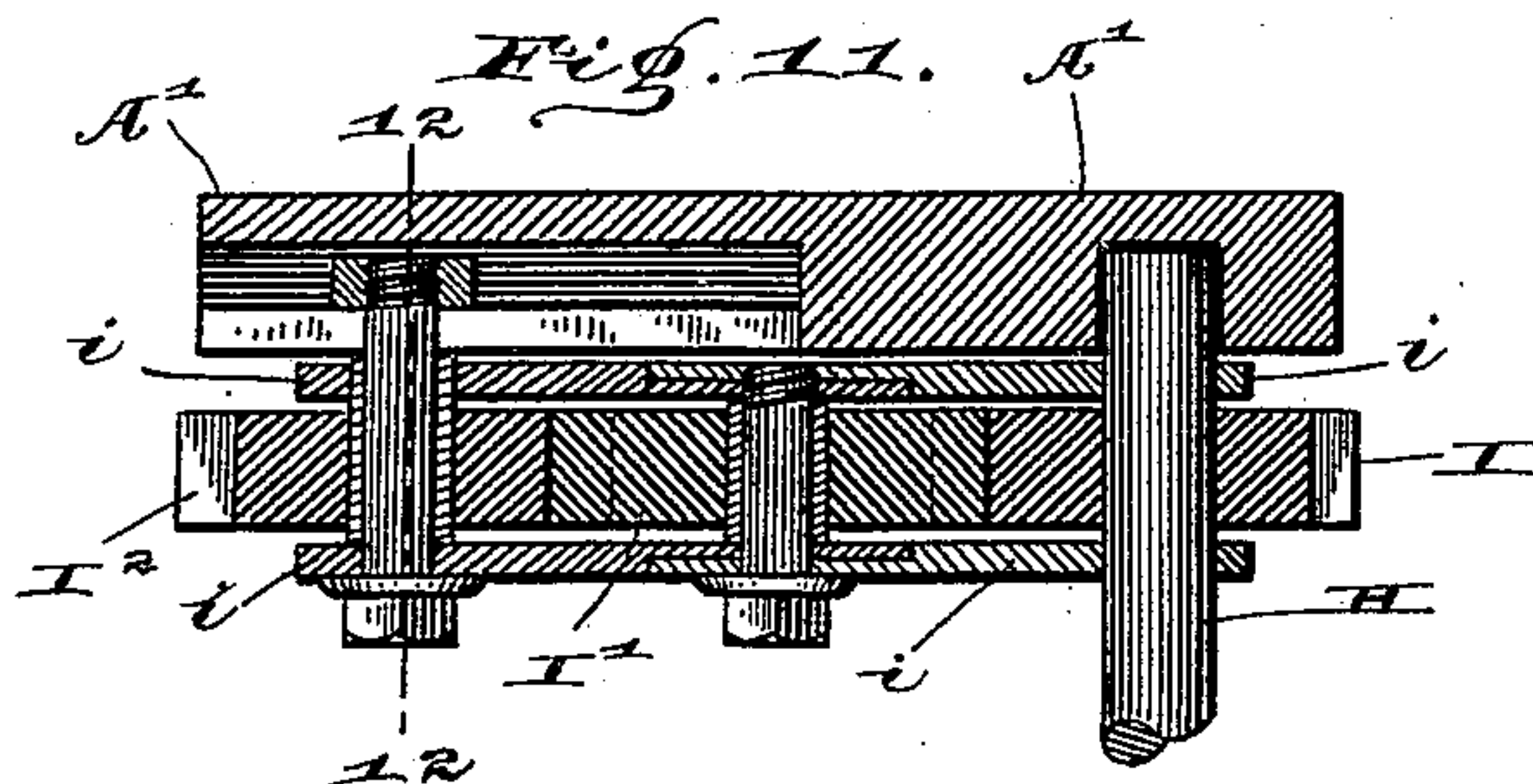


Fig. 12.

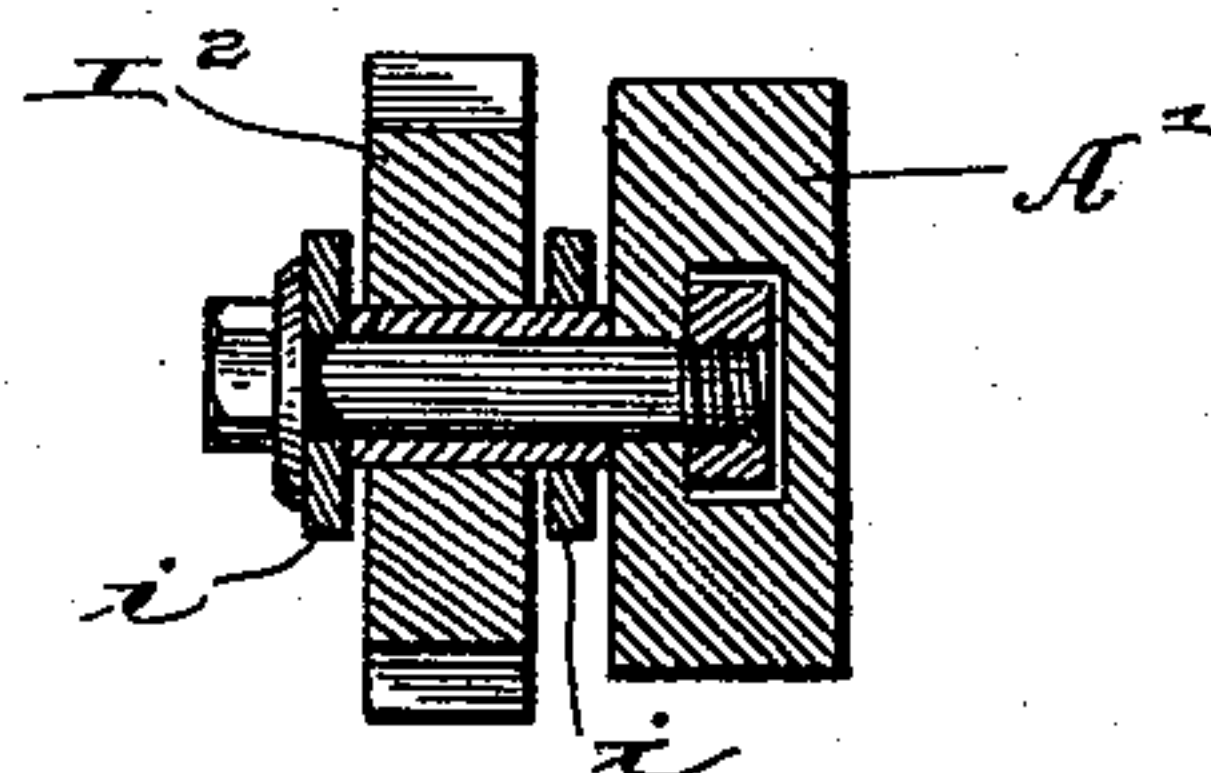
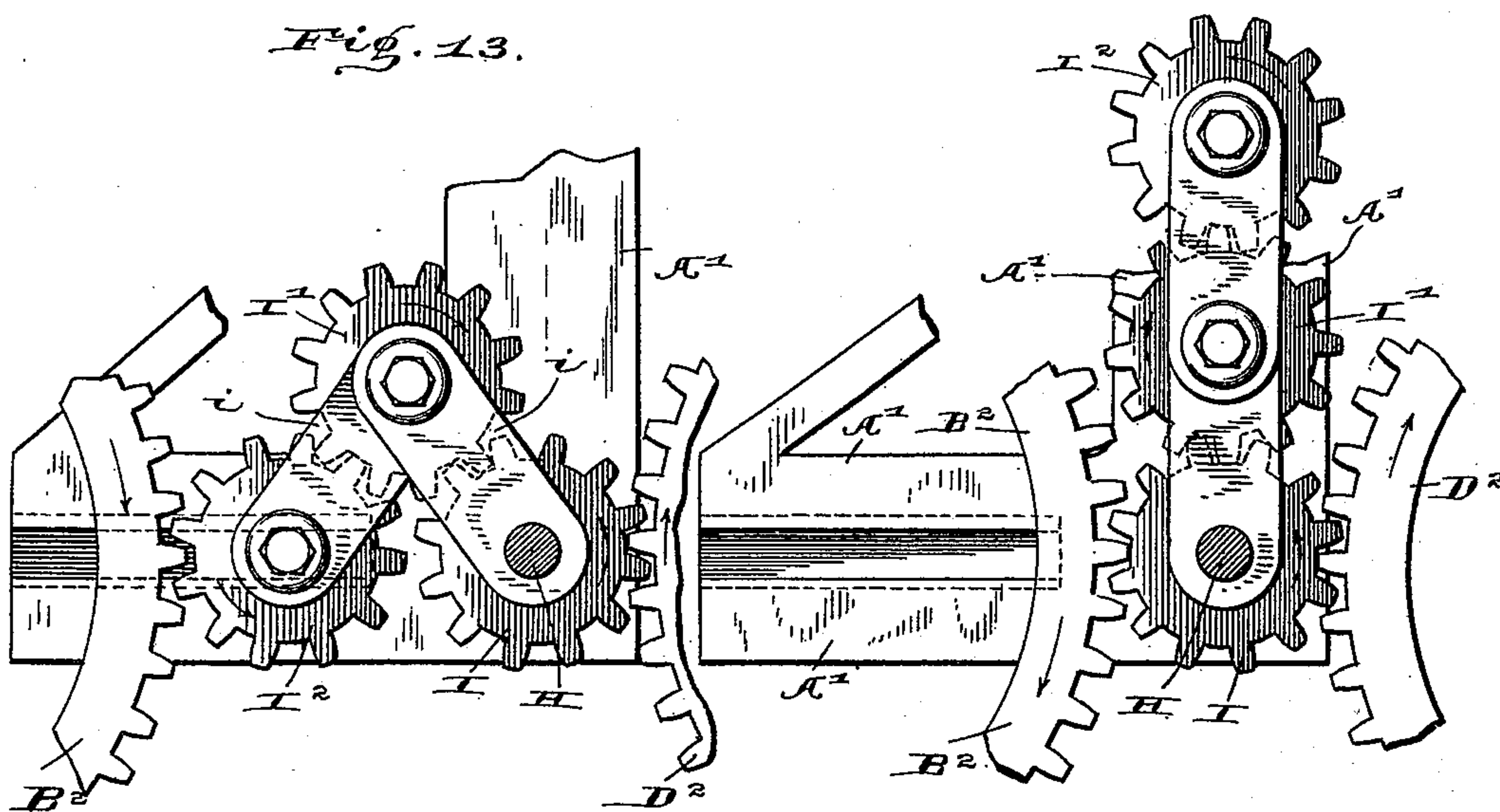


Fig. 14.

Fig. 13.



WITNESSES:

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UNITED STATES PATENT OFFICE.

BENJAMIN F. HAUGH, OF INDIANAPOLIS, INDIANA.

MACHINE FOR CURVING IRON BARS OR BEAMS.

SPECIFICATION forming part of Letters Patent No. 446,132, dated February 10, 1891.

Application filed September 22, 1888. Serial No. 286,105. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN F. HAUGH, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Machines for Curving Iron Bars or Beams, of which the following is a specification.

The object of my said invention is to produce a machine by which beams, angle-irons, or other similar forms of iron bars (used principally in architectural iron-work) may be brought to a uniform degree of curvature throughout their length in an inexpensive and expeditious manner.

Referring to the accompanying drawings, which are made a part hereof, and on which similar letters of reference indicate similar parts, Figure 1 is a top or plan view of a machine embodying my said invention, the inner end of the shaft G being, however, broken away to show the shaft H and other parts below; Fig. 2, an end elevation thereof showing the driving mechanism; Fig. 3, a view, partly in elevation and partly in section, as seen when looking upwardly from the dotted line 3 3 in Fig. 1; Fig. 4, a detail view looking toward the left from the dotted line 4 4 in Fig. 1; Fig. 5, a view looking toward the right from the dotted line 5 5 in Fig. 3; Figs. 6, 7, and 8, detail views showing how different forms of bars are operated upon by the rolls, the form of rolls shown in Fig. 8 being also slightly different; Fig. 9, a similar view showing an alternative form of rolls; Fig. 10, a view of the driving and intermediate pinions and their connections and adjacent parts, similar, except in position, to a portion of Fig. 4; Fig. 11, a horizontal sectional view of the same on the dotted line 11 11 in Fig. 10; Fig. 12, a transverse vertical sectional view looking toward the left from the dotted line 12 12 in Fig. 10; and Figs. 13 and 14, views similar to Fig. 10, except that the pinions are in different positions, two of them being shown in Fig. 14 as disengaged and out of use, illustrating the extreme adjustment in one direction, as Fig. 10 does in the other.

In said drawings, the portions marked A represent the frame-work of the machine; B, C, and D, the operating-rolls; E, a shaft by

which, through suitable gears and screw-shafts, the central rolls are raised and lowered; F F', said screw-shafts; G, a driving-shaft carrying the belt-pulleys; H, an intermediate shaft, and I, I', and I² intermediate pinions by which the gears on the roll-shafts are connected.

The frame-work A may be any suitable frame-work for supporting the operating-rolls and driving and adjusting mechanism and has the bearings for the various shafts mounted thereon. That portion A' which carries the driving mechanism is adjustable as a whole upon said frame A, being mounted and secured thereon by any suitable mechanism to permit the adjustment, such as the tongue-and-groove connection (shown most plainly in Fig. 3) and the set-screws *a*³ for securing it in position. Large nuts *a* are inserted in mortises in the frame-work, as shown most plainly in Fig. 3, through which screw-shafts F F' pass. Extending up from the part A' are standards *a'*, which carry the belt-shifter A².

The arrangement of the rolls B, C, and D is most clearly indicated in Fig. 5. As shown in Figs. 1 and 3, the preferred form of these rolls includes two parts, or perhaps, more strictly speaking, there are pairs of rolls, the before-mentioned rolls being accompanied by counterparts B', C', and D' arranged upon the shafts alongside thereof, and the rolls of said pairs are adjustable toward and from each other, so as to accommodate wider or narrower bars or beams of iron. Said rolls are shown as secured on their respective shafts by means of splines *b'*, *c'*, and *d'*, and set-screws *b*², *c*², and *d*² are provided in their respective hubs to secure them in any desired position; but of course other means could be substituted for this purpose without departing from my invention.

In Fig. 9 I have shown a V-shaped form of rolls, which I employ when it is desired to curve an angle-iron on the plane of its median line, and in Figs. 6, 7, and 8 I have shown the rolls separately (similar to those shown in the principal figures) with the various forms of iron beams and bars in section between them, illustrating how my invention operates on these several forms.

In order to produce a greater or less curva-

ture in the iron being operated upon, it is necessary to adjust the rolls, and this I do in most cases through the medium of the shafts E, F, and F' and the gears connecting them, 5 by means of which the central roll C may be elevated or depressed. The shaft E is mounted in suitable bearings above the frame-work and carries bevel-pinions e and e' , which engage with the bevel gear-wheels f and f' on 10 the screw-shafts F and F'. These shafts F and F' pass down through the large nuts a in the frame-work and engage with the bearings in which the shaft of the roll C is mounted, and thus by revolving the shaft E (by means 15 of the spider E' thereon or otherwise) said shafts F and F' are turned and the roll C elevated or depressed, and the curvature in the iron bar or beam being operated upon is varied accordingly.

20 The shaft G carries the tight and loose belt-pulleys G' and G², by which, through a suitable belt running from a power-shaft, the machine is driven. The belt-shifter A² is employed to shift the belt from one of these 25 pulleys to the other in the usual and well-known manner. Upon the end of this shaft G is a spur-pinion g , which engages with the spur gear-wheel h on the shaft H, and through these gear-wheels said shaft H is driven.

30 The shaft H, as well as the shaft G, is mounted in the part A' of the frame-work, which, as before described, is adjustable on the main frame-work A. As above stated, it carries upon the outer end the gear-wheel h , 35 through which it is driven, and near its inner end the pinion I is mounted thereon, which engages with the spur gear-wheel D² upon one side and the pinion I' upon the other, the connection being continued on this side through 40 the pinion I² to the gear-wheel D² on the shaft b .

The intermediate pinions I, I', and I² are arranged as shown most plainly in Fig. 4, the supports of the first and third being in the 45 same horizontal plane, one being adjustable toward the other, and the support of the second I' being in the form of toggle-links i , by which its position is permitted to be varied. By this means an adjustment of the roll- 50 shafts b and d toward or from each other is provided for, when, as is sometimes the case, it is desired that the radius of the curvature to be produced in the iron operated upon be shortened.

55 As will be noticed by an examination of Fig. 4, the bearings are all adjustable, except those for the shaft H, and the adjustment of this shaft and the pinion thereon is provided for by making the part A' of the frame ad- 60 justable.

When it is desired to effect the adjustment last described, the fastenings to the various bearings are loosened and (supposing it is de- 65 sired that the shafts b and d shall be nearer together) the frame part A' is moved somewhat to the left and secured, the bearings

carrying the shaft d are similarly moved and secured, then the bearings to the shaft of the pinion I² are moved to the right (the pinion I' 70 being at the same time raised) and secured, and, finally, the bearings to the shaft b are moved to the right and secured, care being of course taken that the various gear-wheels shall engage properly, as before. The pinion 75 I' being free to move up and down as the pinions I and I² are brought nearer together or farther apart, and being coupled to said pinions by the links, as shown, the same movement is maintained throughout the train of gearing 80 as well when in one position as in another. When it is desired that the shafts b and d and the rolls thereon shall be farther apart, the operation just described is of course reversed. The purpose of adjusting these shafts b and 85 d nearer to or farther from each other is to secure a greater or less curvature in the bars or beams being treated, and in some cases to continue the curving to points somewhat nearer to or farther from the extreme ends of 90 the beams. The former purpose is supplementary to that for which the roll-shaft c is given a vertical adjustment. The latter purpose is not substantially modified by any adjustment of said roll-shaft c . It is also con- 95 venient to have these rolls at greater or less distances from each other in treating larger or smaller sizes of bars or beams.

When it is desired to curve or vary the curvature of an iron bar or beam, the machine is first adjusted correspondingly and 100 the end of the beam inserted properly between the rolls, which, through the mechanism described, are continually driven forward, and the beam or bar thus carried through, producing the result desired. 105

In many cases in treating very long iron it is inconvenient to use a machine having its rolls in a horizontal position, and I therefore by some modifications of construction sometimes 110 construct my machine so that the rolls are in vertical position. I do not, however, regard this as a departure from my invention, as the machine is in all the essential features substantially the same.

Having thus fully described my said inven- 115 tion, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, in a machine for curving iron bars or beams, of the frame A, the frame A', adjustably secured thereon, the sev- 120 eral sets of operating-rolls adjustably arranged in said frame A, and the driving mechanism geared to the shafts thereof and mounted on the adjustable frame A', substantially as set forth. 125

2. The combination, in a machine for curving iron bars or beams, of the frame A, the operating-rolls B B', C C', and D D', ar- 130 ranged in pairs and adjustably mounted on their shafts, said shafts supported in bearing adjustably mounted on said frame A, the frame A', adjustably mounted on said frame

A, and the driving mechanism mounted on said frame A' and geared to the operating-rolls, substantially as set forth.

3. The combination, in a machine for curving or varying the curvature of iron bars, of three sets of rolls and a train of gearing for driving the same, consisting of spur gear-wheels upon the shafts of the end rolls, three intermediate spur-pinions, and toggle-links upon which the central one of said pinions is

mounted, substantially as shown and described.

In witness whereof I have hereunto set my hand and seal, at Indianapolis, Indiana, this 18th day of September, A. D. 1888.

BENJAMIN F. HAUGH. [L. s.]

Witnesses:

C. BRADFORD,

C. W. H. BROWN.