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H. G. TIDEMANN.

LINK BENDING MACHINE.

No. 280,097. Patented June 26, 1883.

Fig. 1.

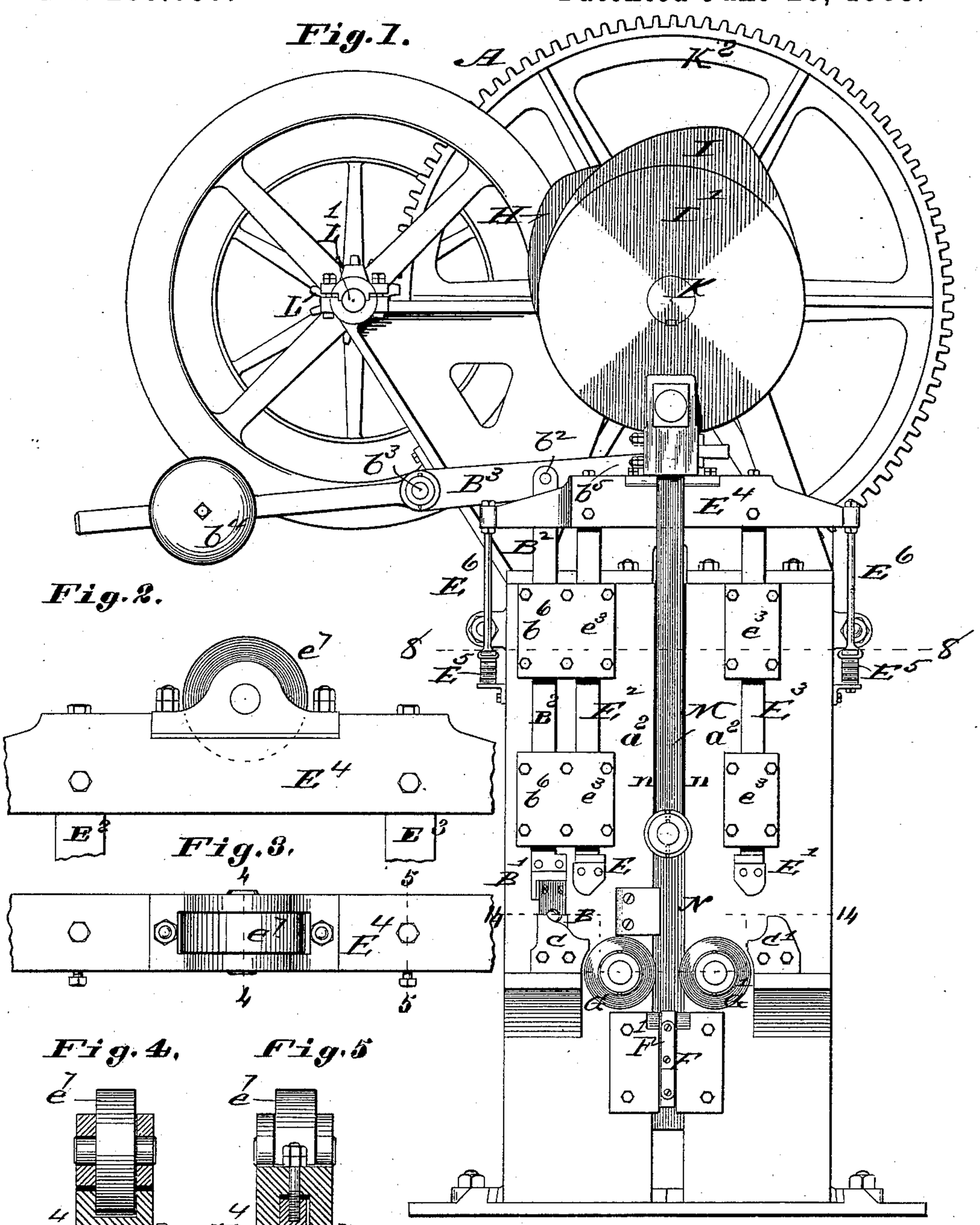

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5

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LINK BENDING MACHINE.

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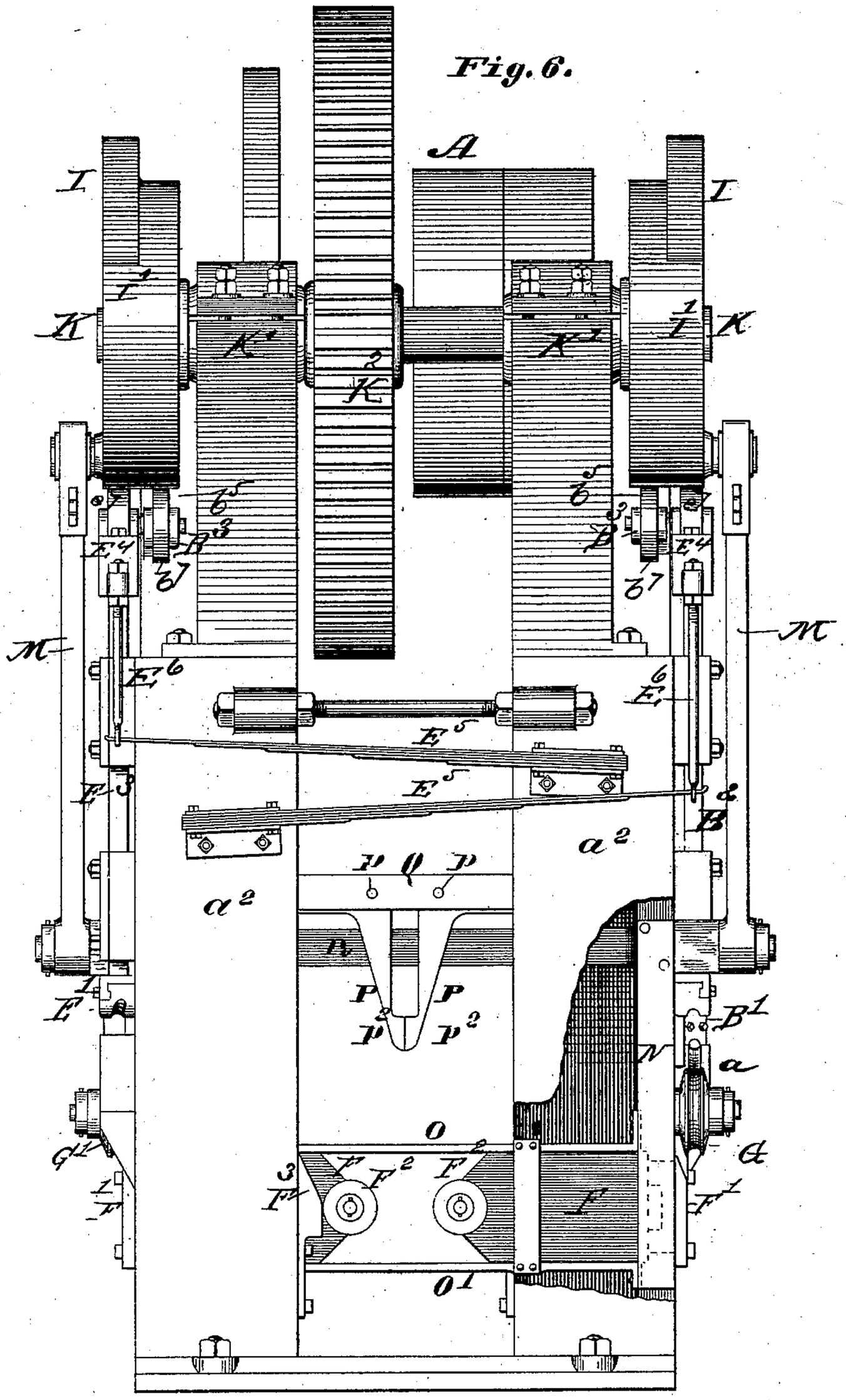
Fig. 6.



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LINK BENDING MACHINE.

No. 280,097. Patented June 26, 1883.

Fig. 7.

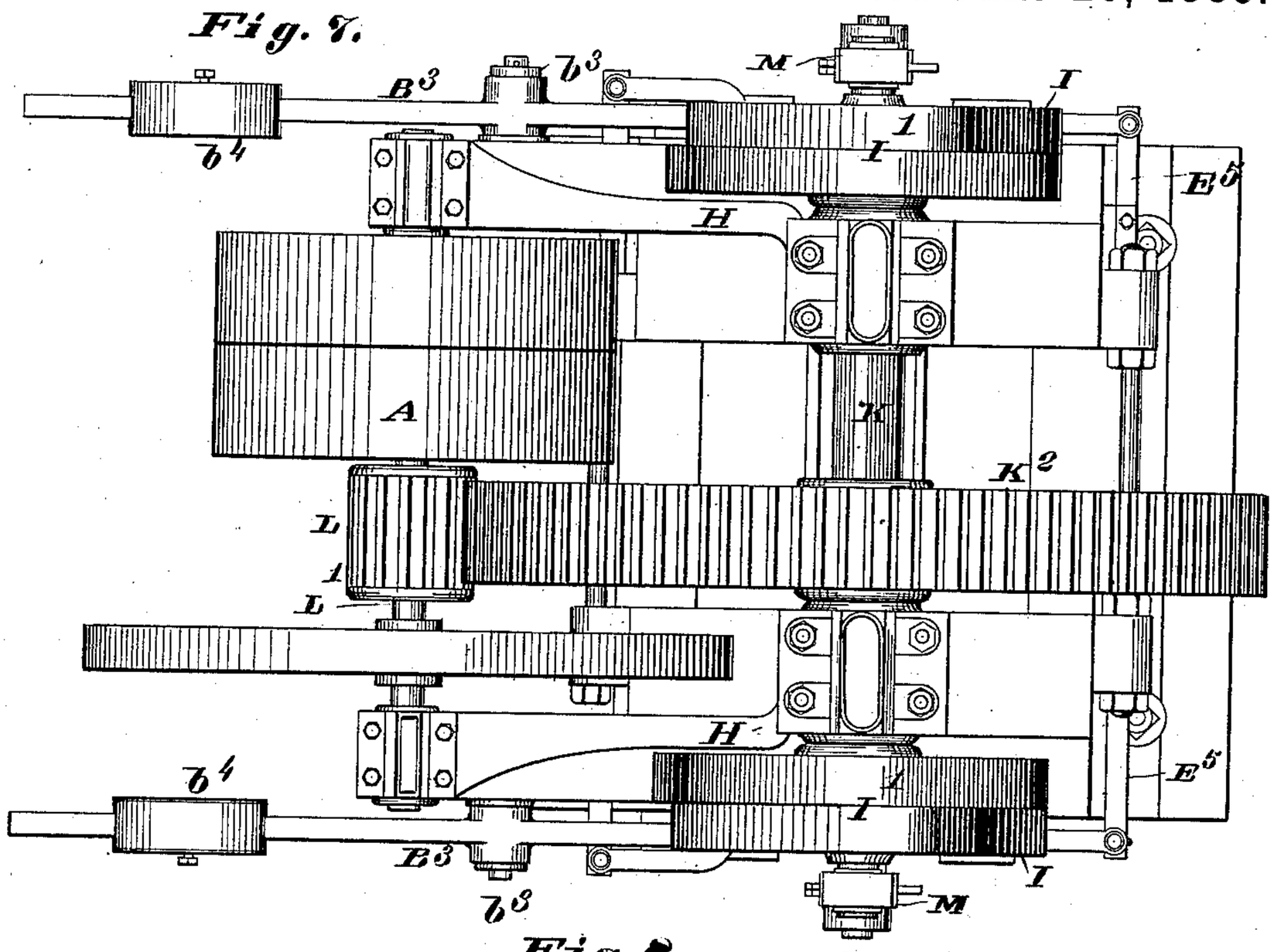

Fig. 8.

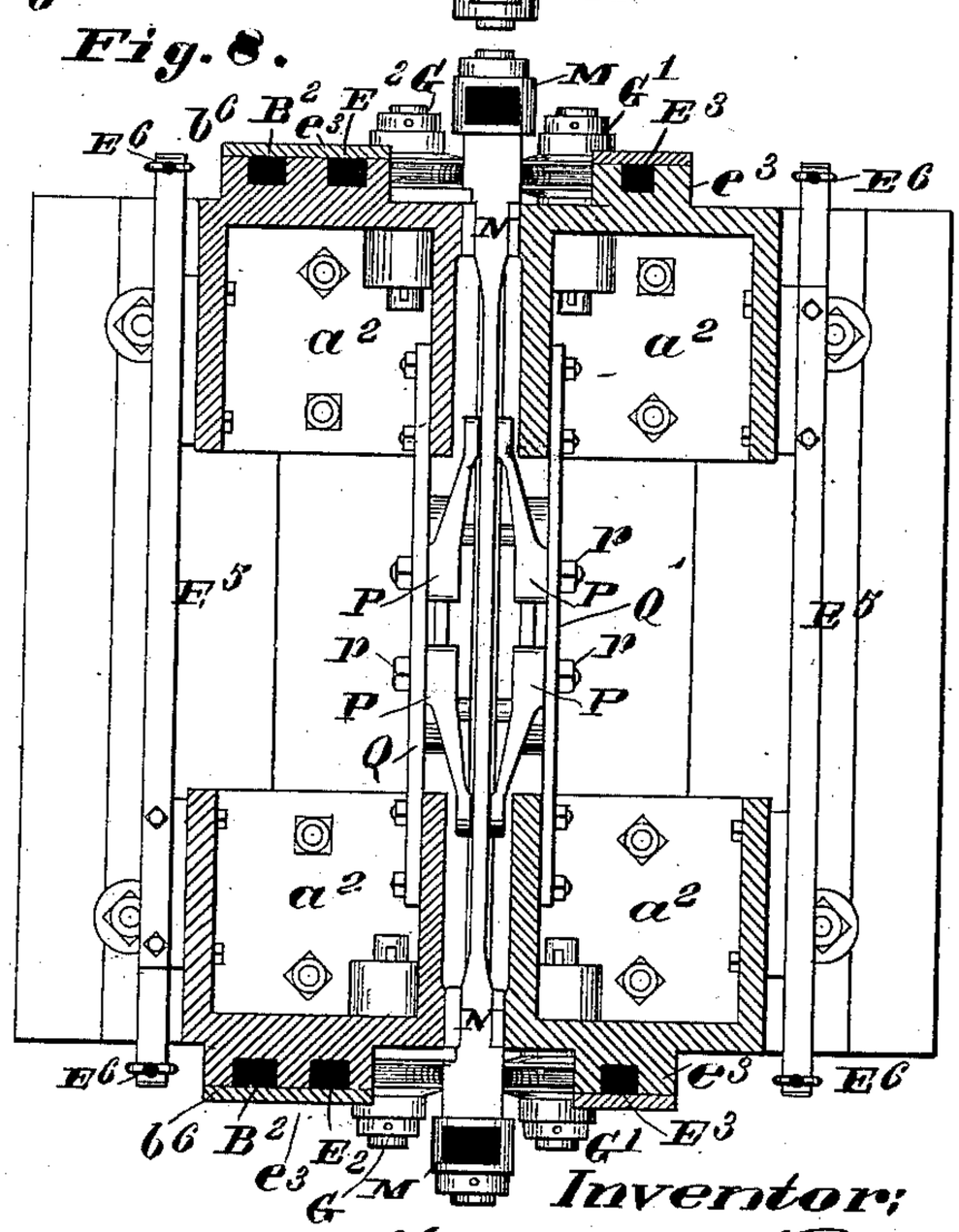

Fig. 9.

Fig. 10

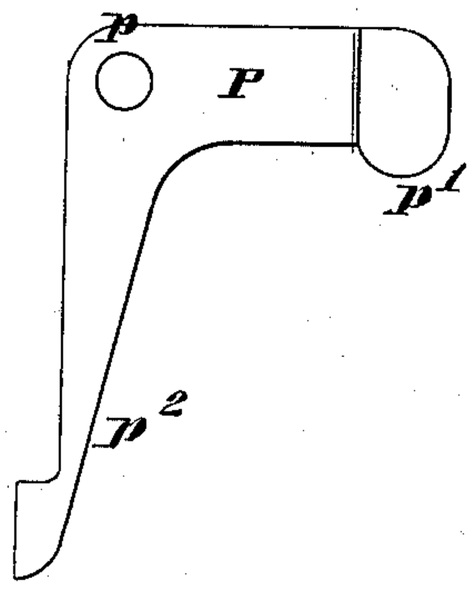

Fig. 11.

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LINK BENDING MACHINE.

No. 280,097. Patented June 26, 1883.

Fig. 12

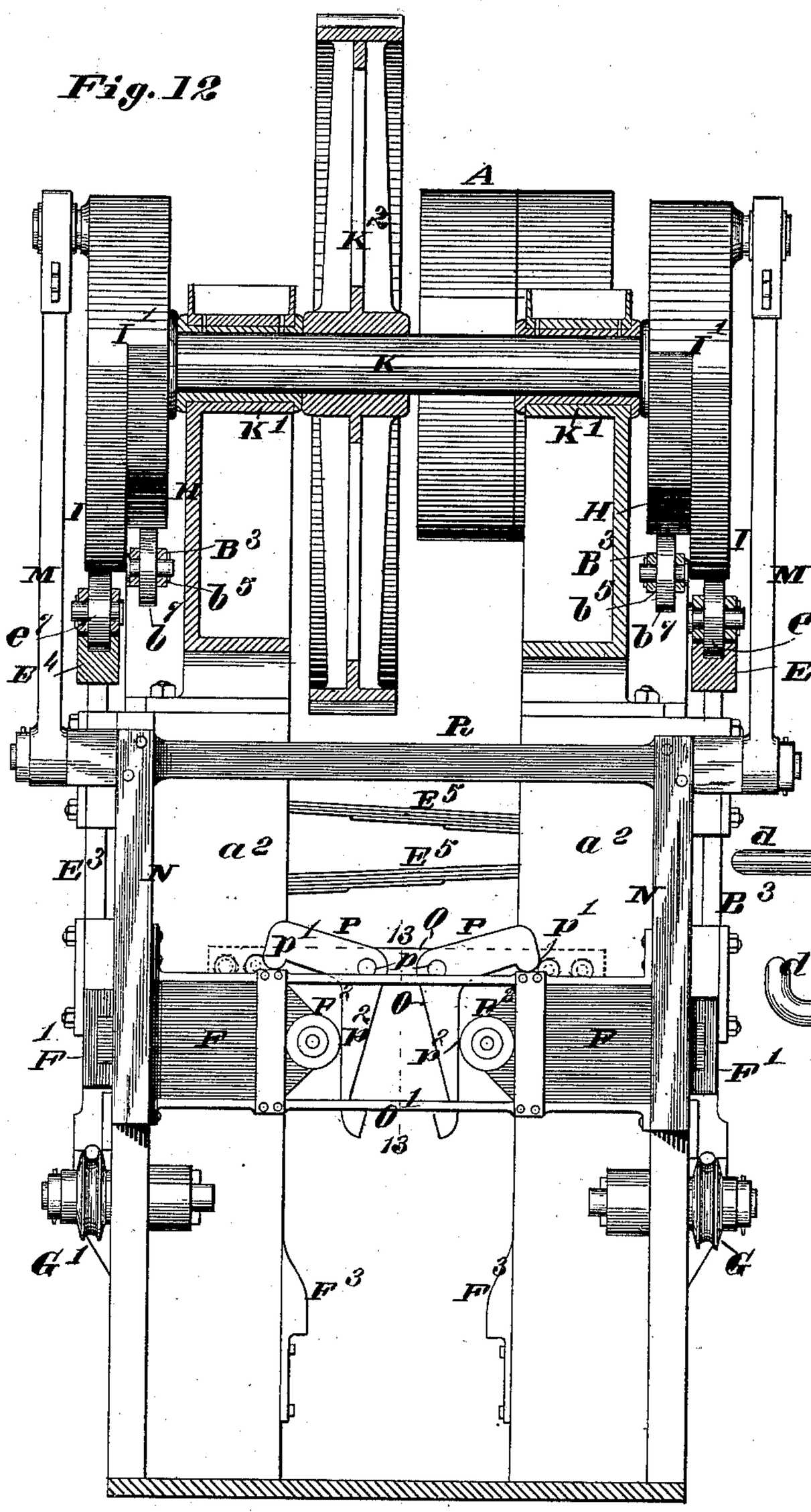


Fig. 13.

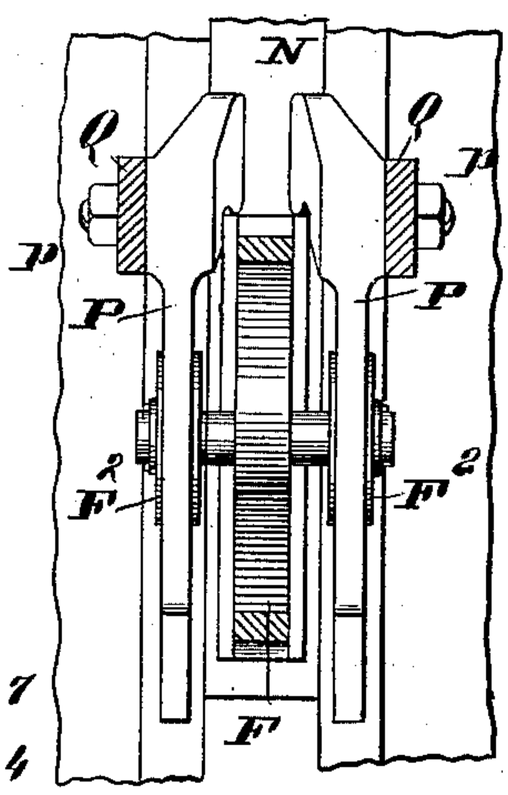


Fig. 23.

Fig. 24.

Fig. 25.

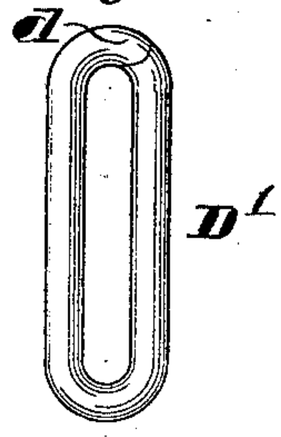
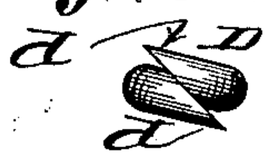


Fig. 26.



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LINK BENDING MACHINE.

No. 280,097. Patented June 26, 1883.

Fig. 14.

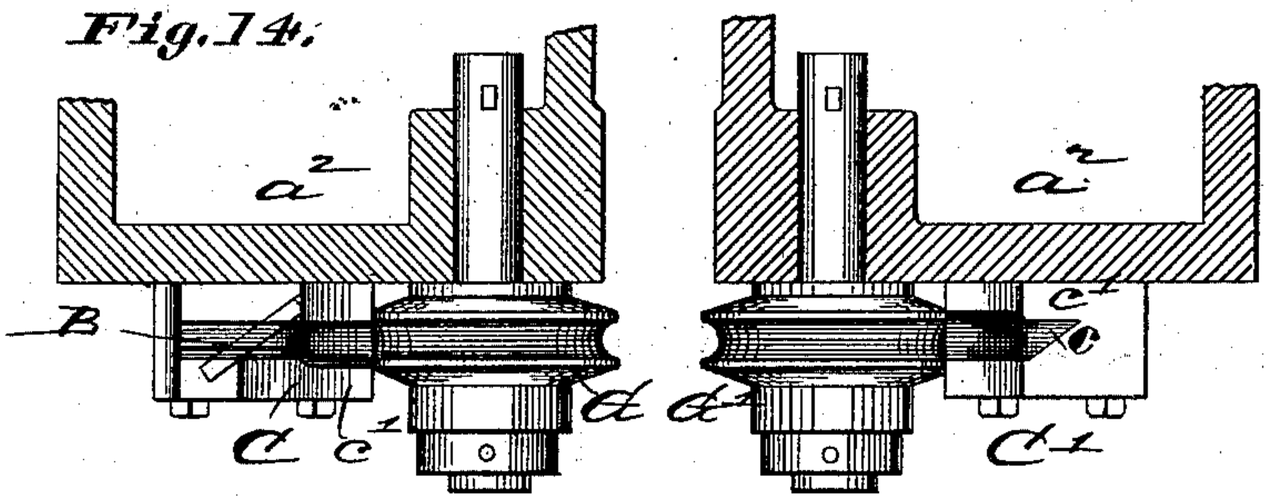

Fig. 17

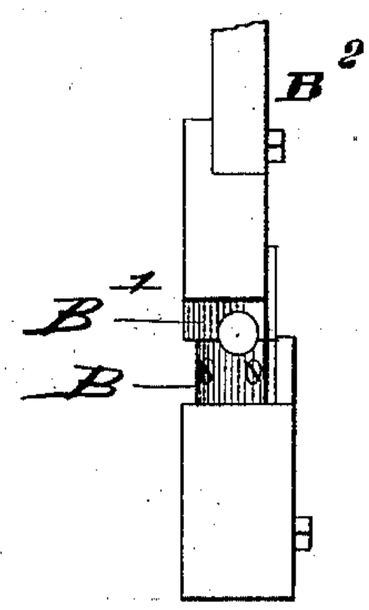

Fig. 15.

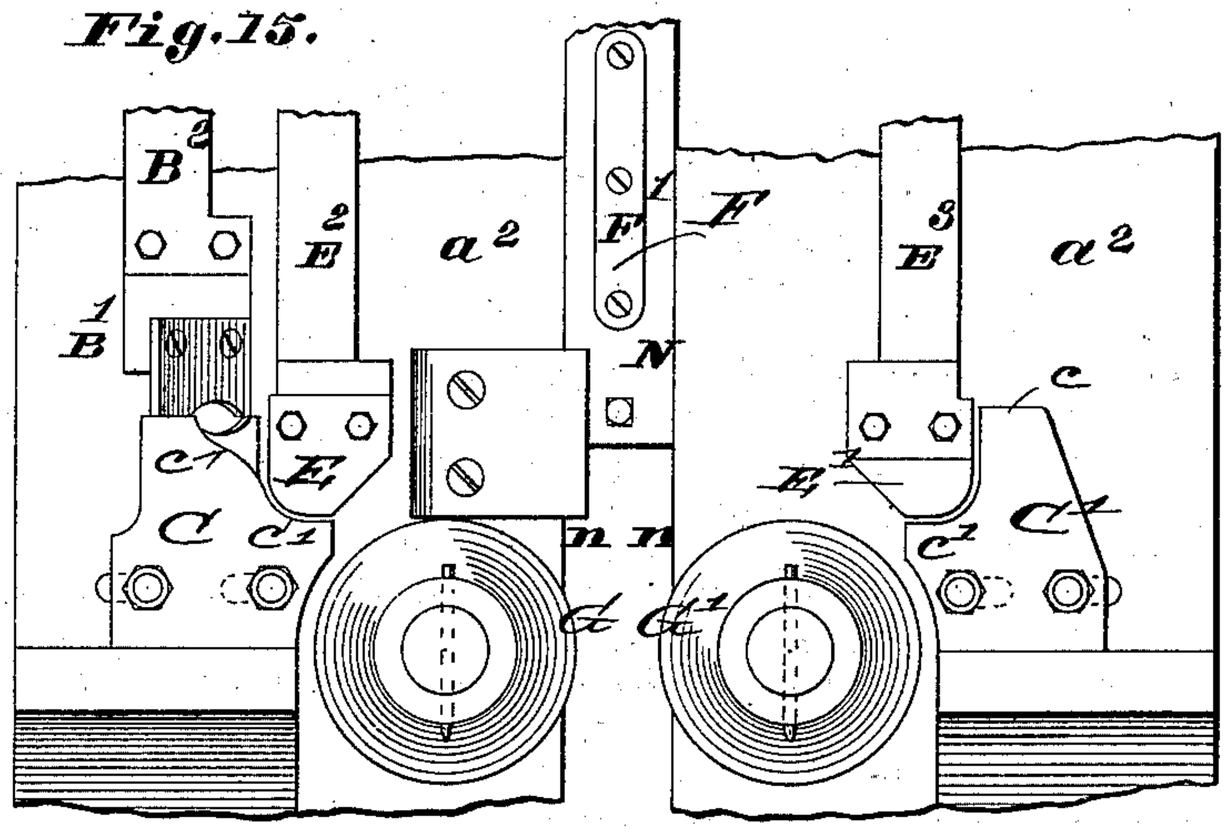

Fig. 18.

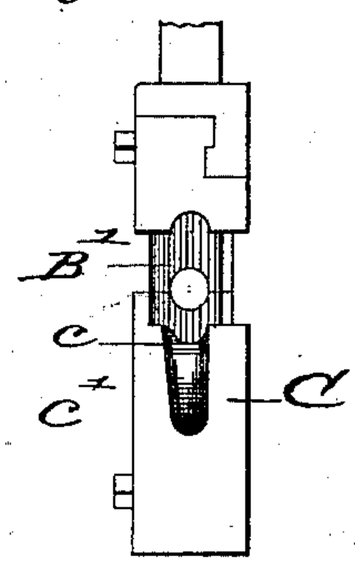

Fig. 16.

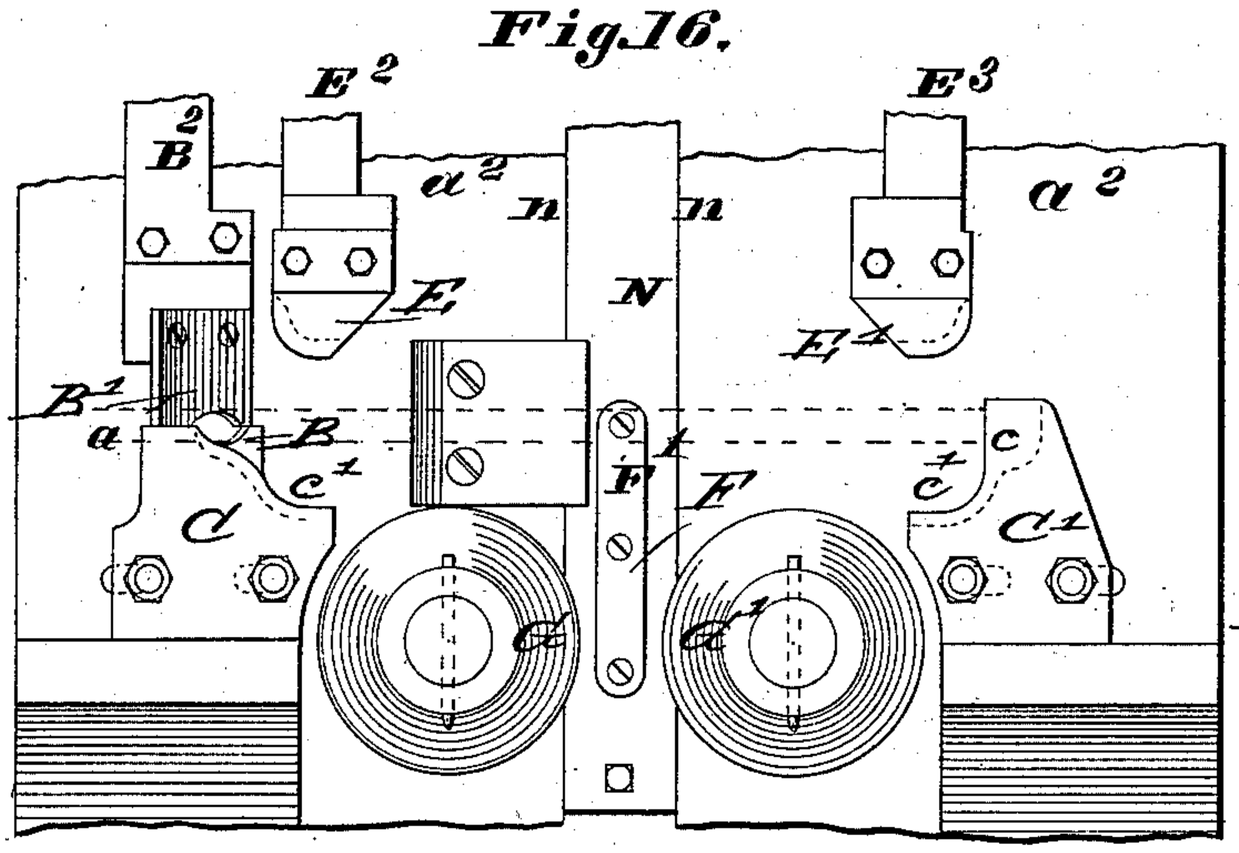

Fig. 19.

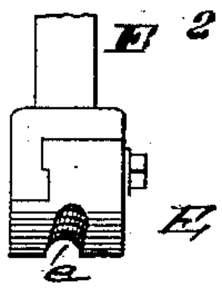

Fig. 20

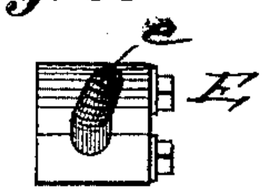

Fig. 22.

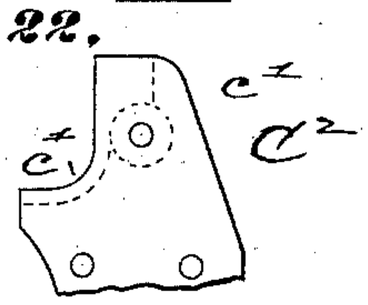

Fig. 21.

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atty

UNITED STATES PATENT OFFICE.

HENRY G. TIDEMANN, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-HALF TO THE HELMBACHER FORGE AND ROLLING MILLS COMPANY, OF SAME PLACE.

LINK-BENDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 280,097, dated June 26, 1883.

Application filed January 15, 1883. (No model.)

To all whom it may concern:

Be it known that I, HENRY G. TIDEMANN, of St. Louis, Missouri, have made a new and useful Improvement in Link-Bending Machines, of which the following is a full, clear, and exact description, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 is a front elevation of the improved machine. Figs. 2 to 5, details upon an enlarged scale, Figs. 2, 3 being respectively a side and top view of the central portion of the yoke used in connecting a pair of the former-bars; Fig. 4, a section taken on the line 4 4 of Fig. 3, and Fig. 5 a section taken on the line 5 5 of Fig. 3; Fig. 6, a side elevation of the machine, a portion of the housing being broken away; Fig. 7, a plan; Fig. 8, a horizontal section taken on the line 8 8 of Fig. 1; Figs. 9, 10, 11, respectively, an end elevation, a side elevation, and a top view of one of the levers used in effecting the horizontal outward movement of the mandrels; Fig. 12, a vertical central section of the machine; Fig. 13, a section taken on the line 13 13 of Fig. 12; Fig. 14, a detail upon an enlarged scale, being a section taken on the line 14 14, Fig. 1; Fig. 15, a front elevation of the parts shown in Fig. 14, the former being down; Fig. 16, a similar elevation, the former being raised and the parts as when the link is being bent; Fig. 17, an elevation from the outer side of the shear; Fig. 18, an elevation from the inner side of the shear; Fig. 19, an end view of the former; Fig. 20, a bottom view of the former; Fig. 21, an edge view of the die; Fig. 22, a side view, showing a modification of the die; Fig. 23, a view of the bar from which the link is made; Fig. 24, a view of the bar after being shaped by the formers; and Figs 25 and 26, respectively, a plan and an elevation of the link as finished by the present machine.

The same letters denote the same parts.

The present invention consists partly in the method of bending the links and partly in the means employed in carrying out the method. A prominent step in the improved method is the preliminary bending of the ends of the bar before bending the bar at the center.

A, Figs. 1, 6, 7, 8, 12, represent the improved machine. The bar from which the links are made is fed into the machine at the point *a*, passing horizontally between the stationary shear B, Figs. 1, 6, 14, 15, 16, and the movable shear B′ into the machine, as indicated by the broken lines in Fig. 16, until inner end encounters the farther die C′. The shears then sever the bar, cutting off a length, D, Fig. 23, sufficient to form the link. The shears, as seen in Figs. 14, 15, 16, are set obliquely for the purpose of beveling the ends *d d* of the piece D. The piece, after being cut off, is supported by reason of its ends *d d* resting in the offsets *c c* of the dies C C′. The formers E E′ then descend and force the piece D into the dies C C′, respectively, and in so doing cause the piece D to be bent into the shape shown in Fig. 24, the ends *d d* being upturned at a right angle, or thereabout, to the main portion *d′* of the piece. The recesses *c′ c*, respectively, in the dies and formers (the recesses in the former and die E C and the recesses in the former E′ C′ being inclined in opposite directions) are extended obliquely, as shown in Figs. 18, 19, for the purpose of enabling the ends *d d* to lap when ultimately closed together. After this preliminary bending of the ends *d d*, the piece D rests in the recesses *c′ c′* of the dies C C′. The formers E E′ then rise and a movable mandrel, F, descends, encountering and bending the piece D at its center, and forcing the piece between the rollers G′ G′, and in so doing causing the piece D to be bent into the link form shown at D′, Figs. 25, 26. The mandrel F then retreats horizontally into the machine, causing the link D′ to drop from the mandrel. The mandrel is then carried upward and into position to descend again and the operation is repeated. In thus shaping the bar at its ends before bending it at the center, in place of first bending the bar at the center and afterward closing its ends, the forming of a link—such as a railway-car coupling-link—is greatly facilitated. The metal during all the steps of the operation is under better control and more easily shaped, and the mechanism for effecting the bending is simpler and more positive in its action.

The means preferably employed in operating the shears, formers, and mandrel will now be described.

The movable shear B′ is attached to the rod B^2, which in turn, at b^2, is pivoted to a lever B^3. This lever moves upon the fulcrum b^3, is weighted at b^4, the weight being adjustable upon the lever, and its inner end, b^5, extended to come beneath the cam H, the movement of which depresses the end b^5 and causes the shears to operate. When the cam has passed the end b^5, the weight b^4 acts to lift the shear B′ sufficiently to admit beneath it another bar.

The formers E E′, the shape of which is shown more distinctly in Figs. 15, 16, 19, 20, are attached, respectively, to the rods E^2 E^3, which in turn are attached to the yoke E^4. The rods B^2 E^2 E^3 work in suitable guides, such as b^6 e^3 e^3. The yoke E^4, carrying the rods E^2 E^3 and formers E E′, is, by means of the springs E^5 E^5 and rods E^6 E^6, elevated so as to lift the formers E E′ sufficiently to admit beneath them the bar D. A cam, I, above the yoke E^4, acts in its rotation to depress the yoke and force the formers E E′ into the dies C C′. The cams H I preferably bear upon the friction-rollers b^7 e^7, with which the lever B^3 and the yoke E^4 are respectively provided. The cams H I, as well as the crank I′, used in operating the mandrel F, are preferably in one piece, and are attached to the shaft K, Figs. 1, 6, 7, 12. The shaft turns in the bearings K′ K′, and is provided with the gear K^2. The pinion L upon the driving-shaft L′ engages with the gear K^2.

A pitman, M, connects the crank I′ and the thrust-bar N, moving the bar upward and downward in the guides *n n*. The bar N, toward its lower end, is slotted to receive the mandrel F, the construction being such as to enable the bar, in its downward movement, to bear upon the mandrel just in the rear of the facing F′ of the mandrel and force the mandrel between the rollers G G′, and in its upward movement to be sufficiently free of the mandrel to enable the latter to be withdrawn horizontally from the bar into the interior of the machine.

The mandrel F is provided with rollers F^2 F^2, and after the mandrel has passed downward between the rollers G G′ inclined planes F^3 F^3, which are attached to the frame of the machine, act to move the mandrel, through the rollers F^2 F^2, horizontally inward into the interior of the machine, and sufficiently to cause the facing F′ of the mandrel to come behind the plane of the shears, formers, and dies. This movement also discharges the link from off the mandrel.

Cross-bars O O′ are attached to the thrust-bar N and move with it. They serve as guides for the mandrel in its horizontal movement. The lower bar, O′, also serves, as the bar N is drawn upward by the crank I′, to lift the mandrel. As the mandrel rises the rollers F^2 F^2 encounter the levers P P, Figs. 6, 8, 9, 10, 11, 12, 13. The levers are bell-crank in form, and are pivoted at *p p* to the cross-bars Q Q. The mandrel and bar O, in rising, also strike the part *p′ p′* of the levers P P. This causes the levers to turn on the pivots *p p* and force the part p^2 p^2 of the levers against the rollers F^2 F^2, and thereby thrust the mandrel horizontally outward through the thrust-bar N again. The various parts are so arranged and constructed as to effect this outward movement of the mandrel after it has been elevated sufficiently to be above the position of the bar D. The shears, formers, and mandrel are then successively moved downward again, bending a second link, and so on.

Thus far but a single-acting machine has been described. I preferably, however, make it double-acting, and, as seen in Figs. 6, 7, 8, 12, a double set of shears, formers, dies, and mandrels, together with the parts necessary to their operation, are used. The two bars N N are united by the cross-bar R and the bars O O′. Each bar N works between a pair of the housings a^2 a^2, the edges of which form or support the guides *n n*.

I claim—

1. In a link-bending machine, the dies E E′, by which the link ends are bent, the yoke E^4, carrying said dies, and the mandrel F, by which the body of the link is bent, all combined with and operated by the two-faced cam H I, substantially as described.

2. The combination, in a link-bending machine, of the dies C C′, the formers E E′, the rods E^2 E^3, the yoke E^4, roller e^7, and the cam I, by which the movable parts are operated, substantially as described.

3. The combination of the shears B B′, the rod B^2, the lever B^3, the roller b^7, and the cam H, substantially as described.

4. The combination, in a link-bending machine, of the shaft K, the cams H I, the crank I′, the rod B^2, the lever B^3, the rods E^2 E^3, the yoke E^4, and the pitman M, as and for the purpose described.

5. The combination, in a link-bending machine, of the yoke E^4, the rods E^6 E^6, the springs E^5 E^5, the rods E^2 E^3, and the formers E E′, substantially as described.

6. In a link-bending machine, the combination of the dies C C′, having the recesses *c′ c′*, and the formers E E′, having the recesses *e e*, said recesses *c′ e* being inclined, as and for the purpose described.

7. In a link-bending machine, the combination of the mandrel F, the rollers F^2 F^2, the planes F^3 F^3, and the bar O′, substantially as described.

8. In a link-bending machine, the combination of the mandrel F, the bar O′, the bar N, and the levers P P, substantially as described.

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Witnesses:
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SAML. V. BOYD.