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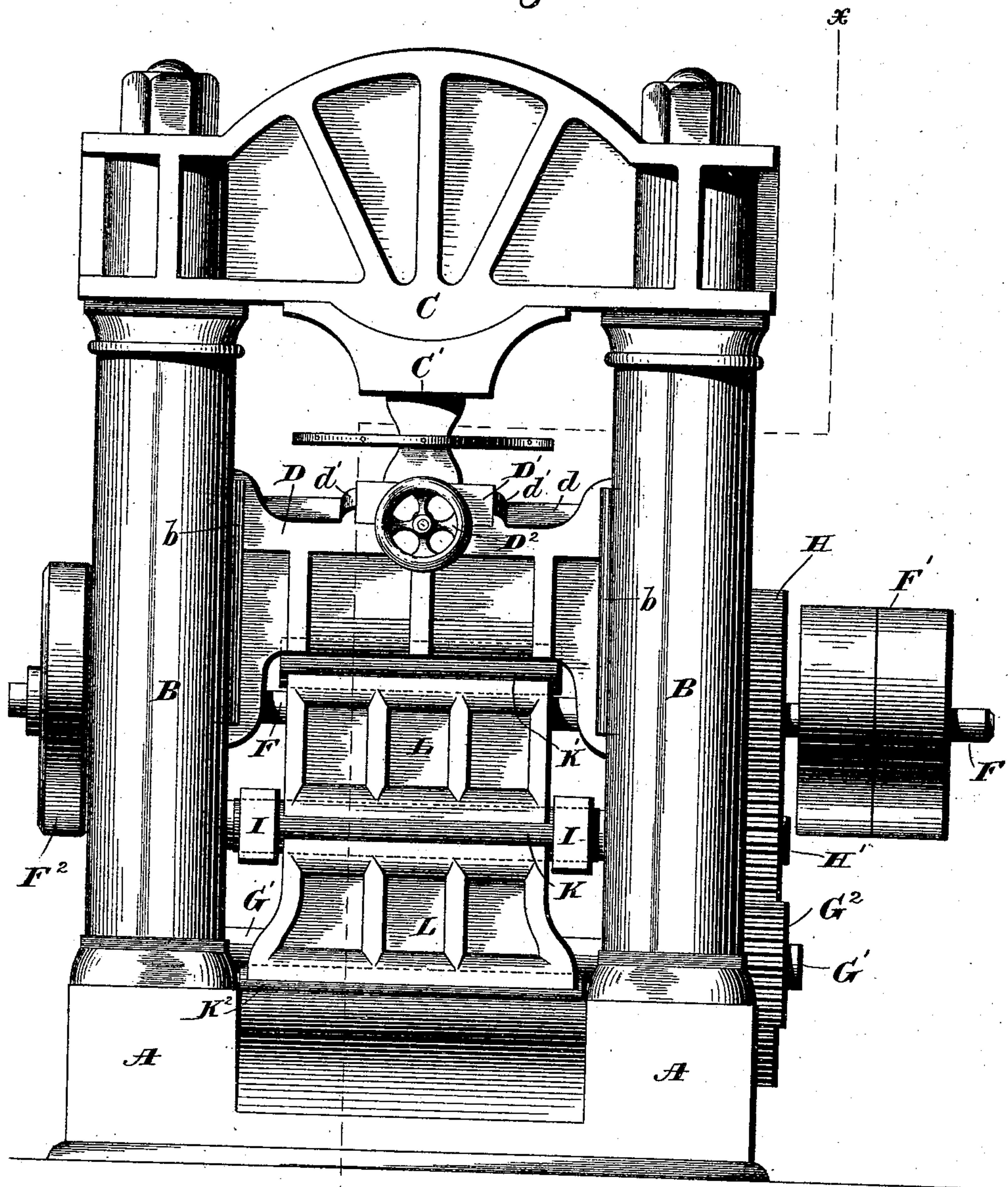
3 Sheets—Sheet 1.

J. R. LITTLE.
MACHINE FOR MAKING METAL WHEELS.

No. 488,124.

Patented Dec. 13, 1892.

Fig. 1.



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James B. Little
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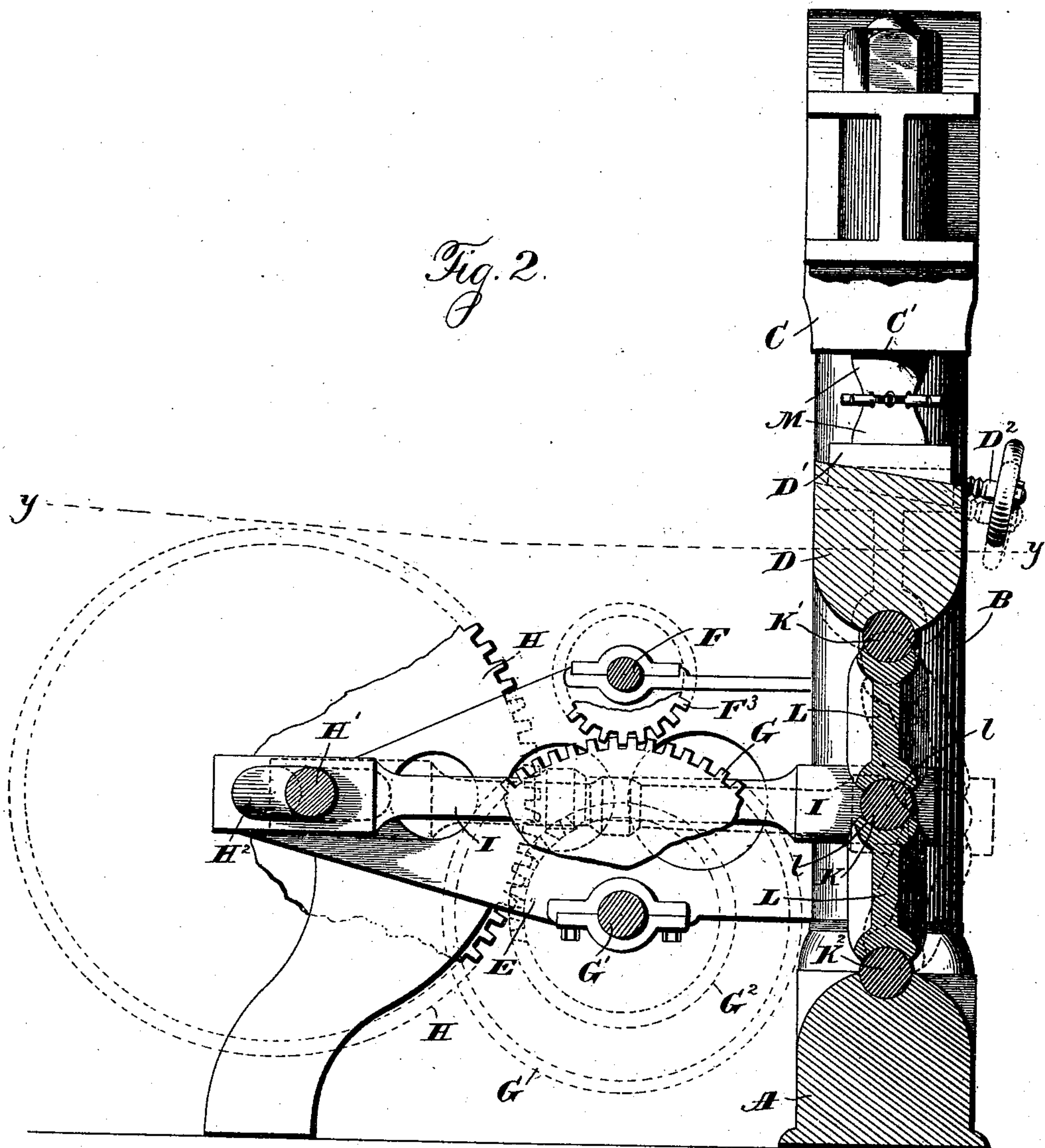
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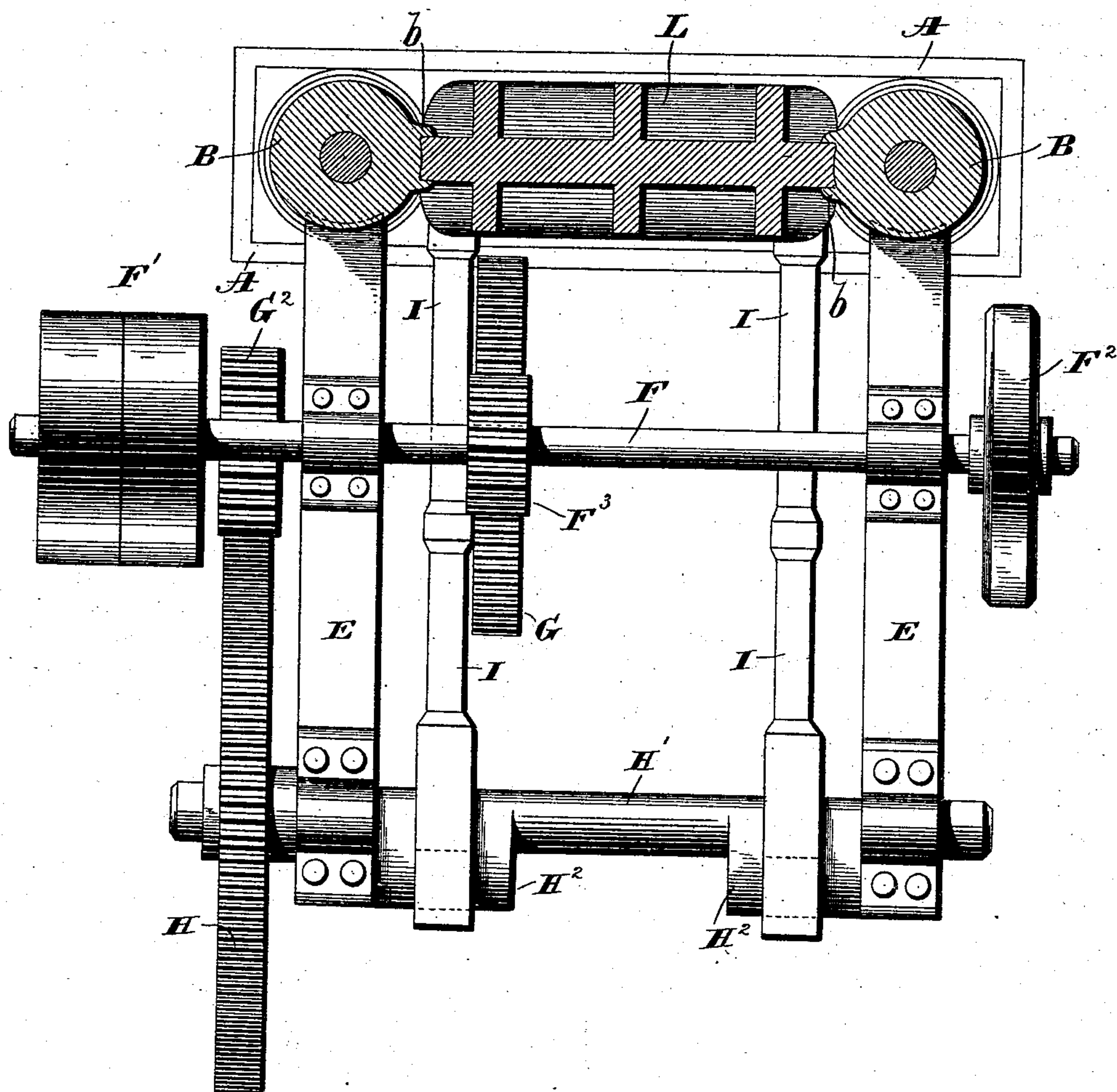
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Fig. 3.



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UNITED STATES PATENT OFFICE.

JAMES R. LITTLE, OF QUINCY, ILLINOIS.

MACHINE FOR MAKING METAL WHEELS.

SPECIFICATION forming part of Letters Patent No. 488,124, dated December 13, 1892.

Application filed February 24, 1892. Serial No. 422,704. (No model.)

To all whom it may concern:

Be it known that I, JAMES R. LITTLE, a citizen of the United States, residing at Quincy, in the county of Adams, and in the State of Illinois, have invented certain new and useful Improvements in Mechanism for Manufacturing Metal Wheels; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 shows a view in front elevation of my machine with the parts in position as when the wheel-hub is being compressed to secure the wheel-spokes; Fig. 2, a view of a section on line *xx* of Fig. 1; Fig. 3, a view of a horizontal section on line *yy* of Fig. 2.

Letters of like name and kind refer to like parts in each of the figures.

The object of my invention has been to provide improved mechanism for the manufacture of metal wheels; and to this end my invention consists in the mechanism and in the parts thereof arranged, constructed, and combined as hereinafter specified.

The apparatus, as shown in the drawings and set forth in the specification of the present case, is especially intended as an improvement upon that covered by my pending United States application, Serial No. 403,207. In that mechanism or apparatus one of the two corresponding compression-dies was fixed to a rising and falling head, while the other was held in a certain position on a stationary table by means of suitable guide devices, while the present machine is so arranged that the two dies can be and are made movable on or independent of both the moving and stationary parts of the mechanism used to force them together. The design is to have them capable of being most readily inserted in place after the hub and spokes have been properly placed between them, and then removed for the reception of a new hub and spokes after the compressed hub has been taken from them. In the machine, as shown and described hereinafter, it will be found that this special design has been carried out and that the die engaging and forcing devices differ materially from those set forth in my said pending application, the difference being in the line of securing not only the ready removal and insertion of the dies in the man-

ner above indicated, but also greater compressing power and greater strength and durability of the operative parts.

In the drawings, A designates the base of the machine, and B B designate two upright posts on such bed, having their upper ends connected by the stationary cross-head C. The form and manner of securing these parts together can be varied, as desired, without departure from my invention. On the under side of cross-head C is the plane horizontal surface C', up against which the upper of the two hub-compressing dies is to be forced, as hereinafter described. Between upright posts B B and guided therefrom by portions engaging suitable guideways *b b* therein is the vertically-moving bed D, having the inclined face *d*, upon which the table D', with its under side inclined to correspond with and engage said face, is made adjustable longitudinally by means of screw D², just as is the adjustable table in my apparatus set forth in my other application. It will be understood that the object of this construction is the same, whether the bed is a rising and falling one, as in the present machine, or a stationary one, as in my former apparatus—viz., the raising or lowering of the horizontal upper face of the movable table with reference to the bed, so that the amount of compression of the hub by the dies will be made greater or less with a constant length of throw of the moving part of the pressure devices. The guides *d' d'* on the rising and falling bed, by engaging the sides of table D', serve to guide it as it is adjusted by screw D² and to hold it against sidewise or rotary movement when it has been adjusted.

In the frame E, whose sides extend rearward from posts B B, is journaled the driving-shaft F, carrying on one end a band-pulley F', by which it can be driven from any suitable source of power, and on its other end a fly-wheel F². Instead of the band-wheel, any suitable gearing can of course be used to connect the shaft with any motor or driver. On said shaft is a pinion F³, which meshes with and drives the gear-wheel G on the second shaft G', also journaled in frame E and carrying a pinion G², which in turn meshes with and drives the gear-wheel H on the crank-shaft H'. The latter is provided with the two

similarly-arranged cranks $H^2 H^2$, arranged close to the inner sides of frame E and engaged by the rear ends of the two connecting-rods I I, which at or near their forward ends
 5 are pivotally connected with the respective ends of the cylindrical bar K, which is engaged by the partly-inclosing sockets $l l$ on the upper and lower edges, respectively, of the broad links L L. Similar sockets on the upper
 10 edge of the upper link and lower edge of the lower one engage, respectively, the cylindrical bar K' on the under side of the movable bed D and the bar K^2 on the upper side of base A.

Obviously instead of bars K' and K^2 , cylindrical or semicylindrical bosses on bed D and the base could be used; but I prefer the bars, which can be made of hard wear-resisting metal set, as indicated, in receiving-grooves on the bed and base. The length of
 20 the connecting-rods is such that when the cranks are at the extreme point of their rearward throw the axis of bar K will be in a plane between the axes of bars K' and K^2 , against which the outer ends of the links thrust, as
 25 indicated in Fig. 2. The bed, with its supported table D' , will then be raised to the highest limit of its movement and the dies M M, holding between them the wheel-hub and the spokes to be fastened therein, will be
 30 pressed together with great power between the table and the surface C' on the stationary head or abutment C. These dies, as shown, are like those fully illustrated and described in my said pending application and need not
 35 be described herein, as, so far as the present machine is concerned, they might have any other shape or configuration without departure from my invention. It will be observed, however, that they are independent of the
 40 table and abutment or head C, not being fixed or attached thereto in any way which would interfere with their removal when the table is lowered or make it necessary that either one or both of the dies should be accurately placed
 45 at any particular point on the table, as in my former apparatus. The bar-engaging sockets on the links L L, being made to fit the cylindrical bars closely, are sufficiently less than semicylinders to allow all the change of angle of the links which is caused by the rearward throw of the connecting-rods without bringing the link edges in contact with each other, the base A, or bed D. To prevent any such contact, said edges and the parts of the
 50 base and bed adjoining the bar-receiving sockets can be rounded off, as indicated in Fig. 2.

While I have called the parts L L "links," it will be seen by the drawings that they are
 60 formed not of mere bars, but of strong plates, extending across much of the space below the bed D, so as to give a good firm support for the same throughout nearly its whole width. This construction insures the greatest possible
 55 strength and evenness and steadiness of movement of the bed as it is being raised to cause

the dies to compress the wheel-hub on the spokes.

The operation of and manner of working my mechanism are briefly as follows: With
 70 the crank-shaft turned to throw the connecting-rods forward the bar K will be carried to the front into the position shown in dotted lines in Fig. 2, the links will stand at an angle to each other, and the bed D will be lowered
 75 away from the head C, so that there will be sufficient space between the table D' and surface C' to allow the two dies, with a wheel-hub and spokes properly placed in them, to be readily put upon table D' in position for
 80 a pressing operation. With the table-top and surface C' both plane and horizontal, the dies having both their upper and lower ends plane to squarely engage said surface and table-top, respectively, there is no necessity for accurately putting the dies in any one position
 85 every time. As placed without care or attempt at accuracy upon any part of the table, they will be acted upon and caused to compress the wheel-hub properly. The filled
 90 dies having been placed, as indicated, upon table D' , the crank-shaft is rotated, so that its cranks draw the connecting-rods, and consequently the bar K, rearward, until the latter is brought directly between bars K' and
 95 K^2 and the links L L, being moved into line with each other, have forced the bed D and table D' thereon to the highest point of their travel toward the stationary head C. This raising of the bed and table causing the dies to
 100 be pressed together between the table D' and surface C' , so that the wheel-hub will be compressed to fasten the spokes therein, is because of the construction of the bed-raising mechanism, a very forcible one, the greatest
 105 power being applied to move the bed as the latter approaches the limit of its travel, and consequently when the greatest amount of compression of the contents of the dies is taking place. A continued rotation of the crank-shaft now forces the connecting-rods forward, carrying the bar K, forming the pivotal center of the toggle, to the front, so as to swing the adjacent ends of the links until the latter take the position indicated by dotted lines in Fig. 2, lowering the bed D and table thereon supporting the dies, so that the latter can be readily removed for the taking out of the compressed hub and the insertion of a new uncompressed one with spokes to be fastened therein. With
 120 the dies thus filled placed upon the table D' the compressing operation just described can be quickly repeated.

It is possible with my apparatus, in which there is no die fixed to a movable part of the
 125 machine, to have one or more extra sets of dies, which can be filled or provided with a new hub and spokes while one already placed on the table is being acted upon by the machine. This fact and the absence of any
 130 necessity of care or precision in placing the dies make it possible for me to operate the

machine to turn out the desired finished product much more rapidly and with less trouble and expense of time and labor than where, as in my former machine, one of the dies is fixed to the machine and the other has consequently to be placed in a certain relation thereto each time that the machine is to be operated to secure a compression.

It will be seen from the drawings and description that my machine is most simple and substantial in construction and contains no parts which are complicated or liable to get out of order during long-continued use. With the links provided with the bar-sockets in their upper and lower ends and the separate cylindrical bars engaging such sockets and forming the abutments upon which the links swing and against which they press as the links are forcibly swung into line during a compressing operation and the two connecting-rods connected with the ends of the center bar K close to the sides of the links there is obviously no part subjected to strain in such manner that it is liable to be broken. What strain is brought to bear upon the links or bars is mainly a crushing one, which said parts are best able to stand. For this purpose both the bars and parts containing the bar-receiving sockets can of course be hardened, though with the long bearings which I obtain between the edges of the broad plates forming the links and the bars I do not find in practice that such hardening is at all necessary.

Having thus described my invention, what I claim is—

1. In combination with a stationary head, a movable bed having an inclined surface, a table having the inclined under face to engage the inclined surface on the bed and its upper side made flat, means for adjusting the table longitudinally on the bed, mechanism for forcing the bed toward the head, and the two dies made independent of head and table, with the under one provided with a flat surface to rest upon the table, substantially as and for the purpose described.

2. In combination with a suitable base and a movable bed, the two links between the same, having their outer ends pivotally connected with the base and bed, respectively, and their inner ends provided with sockets in

the form of open grooves, the bar engaging such sockets, the two connecting-rods pivotally connected with the ends of the bar, and means for actuating such rods, substantially as and for the purpose set forth.

3. In combination with the base and movable bed, both provided with sockets in the shape of open rounded grooves, the bars in such sockets, the two links having on their outer ends sockets in the shape of open rounded grooves to engage the bars in the sockets on the bed and base, respectively, and the pivotal bar between the inner ends of the links engaging sockets on such ends, substantially as and for the purpose described.

4. In combination with the base and the movable bed provided with sockets in the shape of open grooves on their inner opposing sides, the two links having sockets on their opposite ends, also in the shape of open grooves, the two bars engaged by the sockets in the base and bed and the adjacent outer ends of the links, the bar engaged by the sockets on the inner ends of the links, and one or more connecting-rods pivotally connected with such bar and means for actuating them, substantially as and for the purpose specified.

5. In combination with the base and movable bed provided with long rounded grooves or sockets on their inner opposing sides, the plates forming broad swinging links between the base and bed, provided with the rounded grooves extending along the outer and inner edges, the cylindrical pivotal bars resting in the sockets on the base and bed and engaged by the sockets in the outer edges of the respective plates forming the links, the cylindrical pivotal bar engaged by the sockets on the inner edges of such plates, the two connecting-rods pivotally connected with the ends of such bar, the crank-shaft for actuating the rods, and means for driving the shaft, substantially as and for the purpose shown.

In testimony that I claim the foregoing I have hereunto set my hand this 2d day of February, 1892.

JAMES R. LITTLE.

Witnesses:

P. B. WILLIAMS,
S. M. WALLACE.