

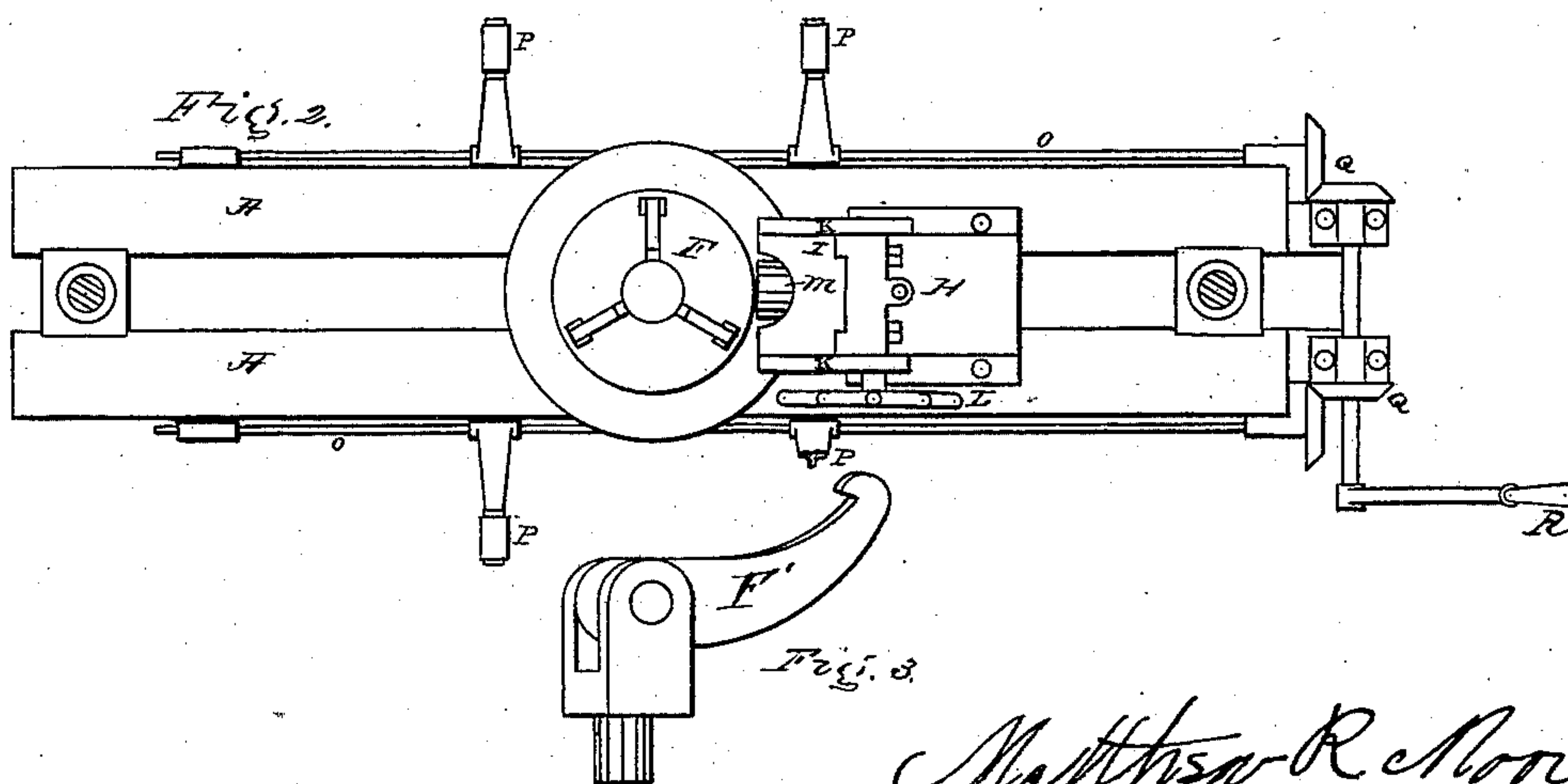
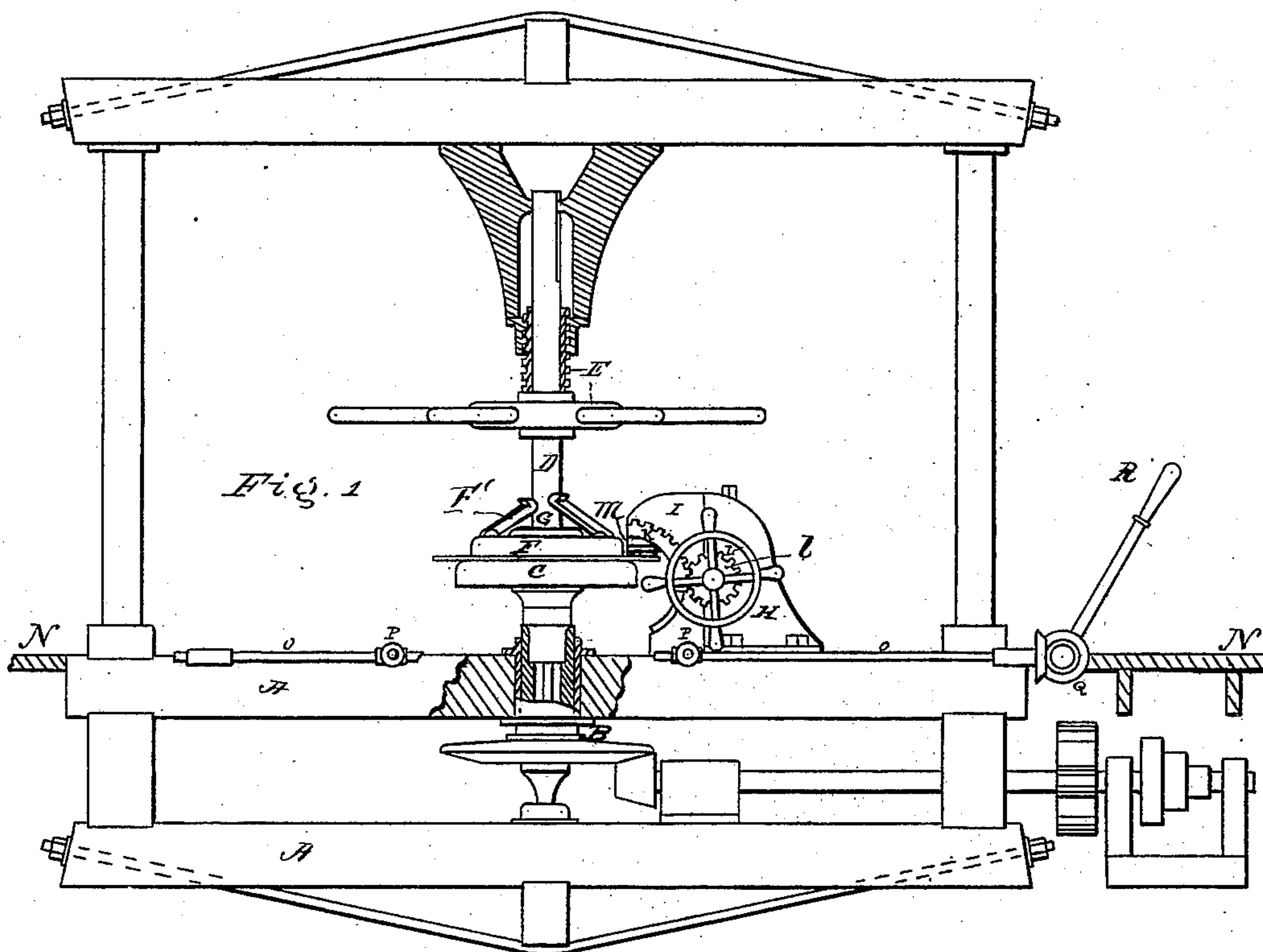
(No Model.)

4 Sheets—Sheet 1.

M. R. MOORE.
FLANGING MACHINE.

No. 299,997.

Patented June 10, 1884.



Attest.
A. M. Morse
Rollin DeFur

Matthew R. Moore
Inventor.

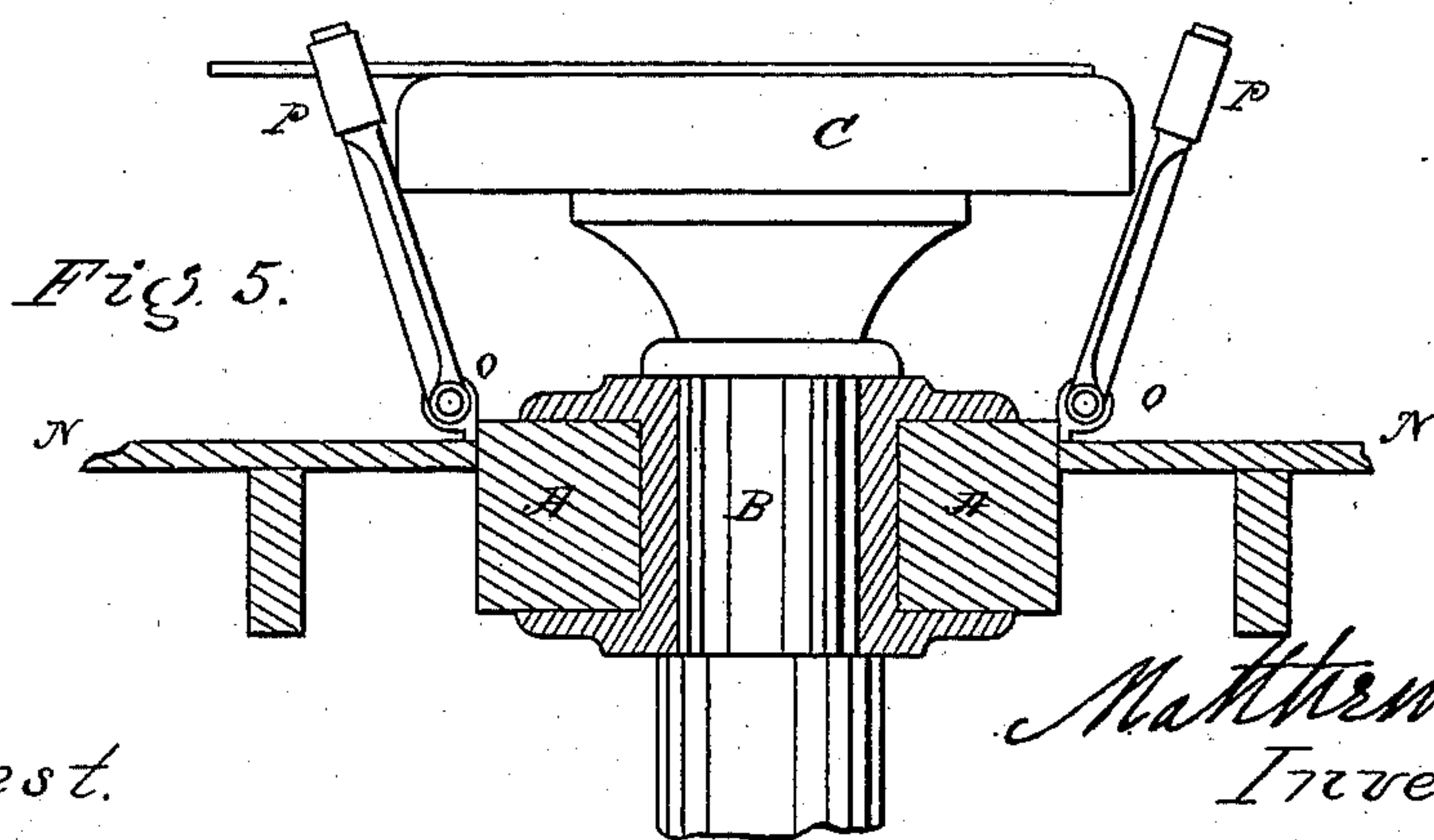
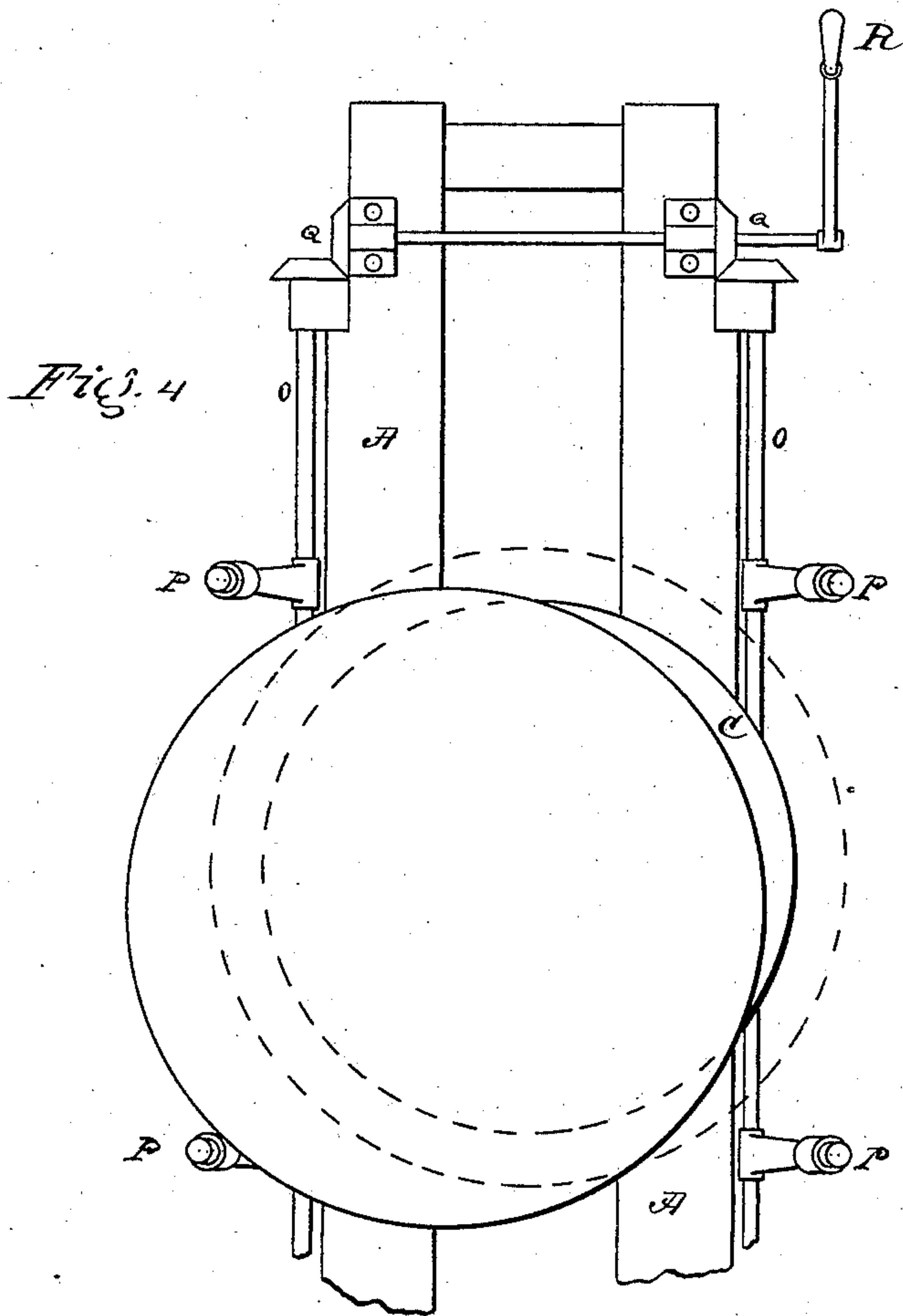
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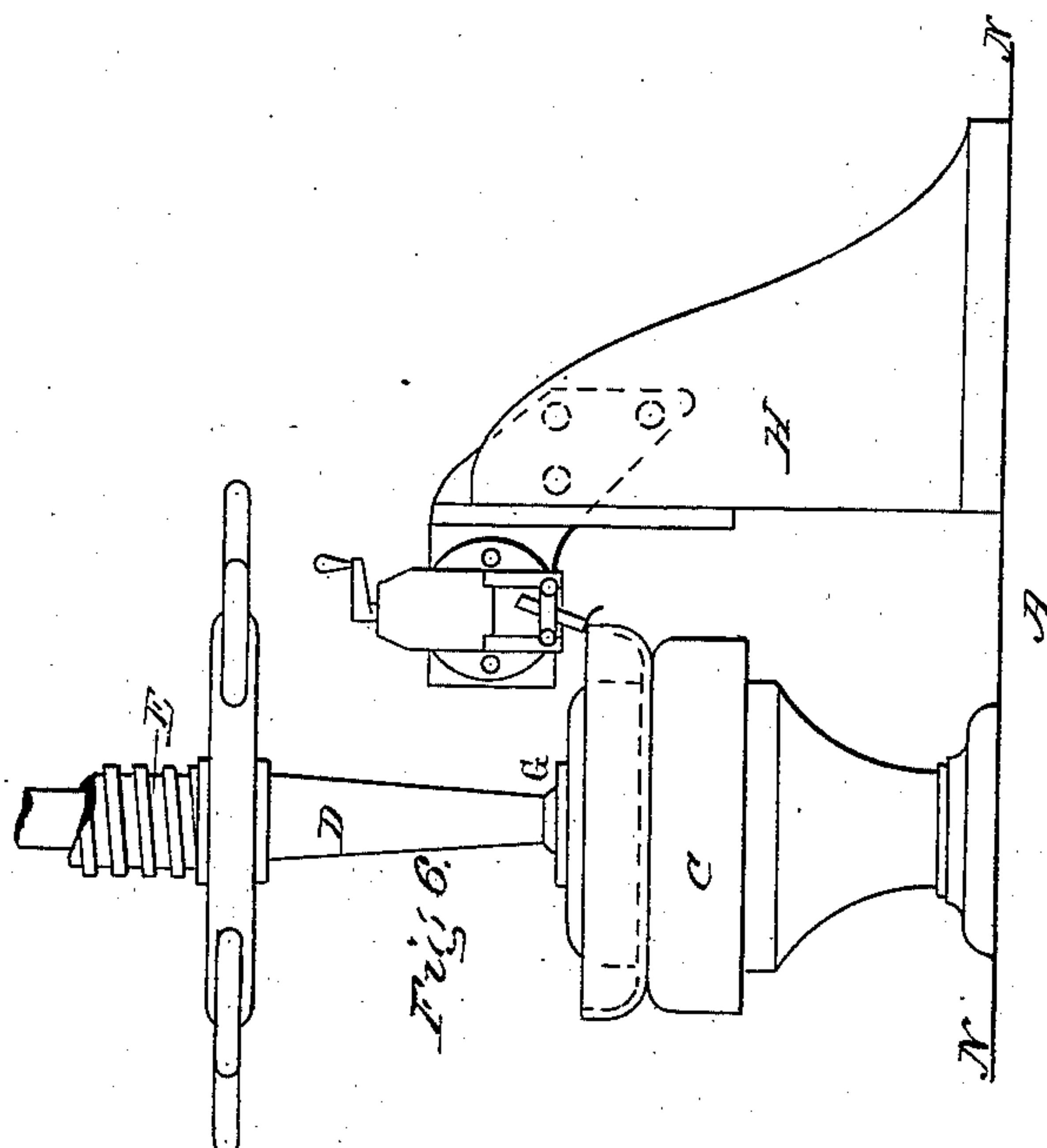
(No Model.)

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Rolling Engineer

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(No Model.)

4 Sheets—Sheet 4.

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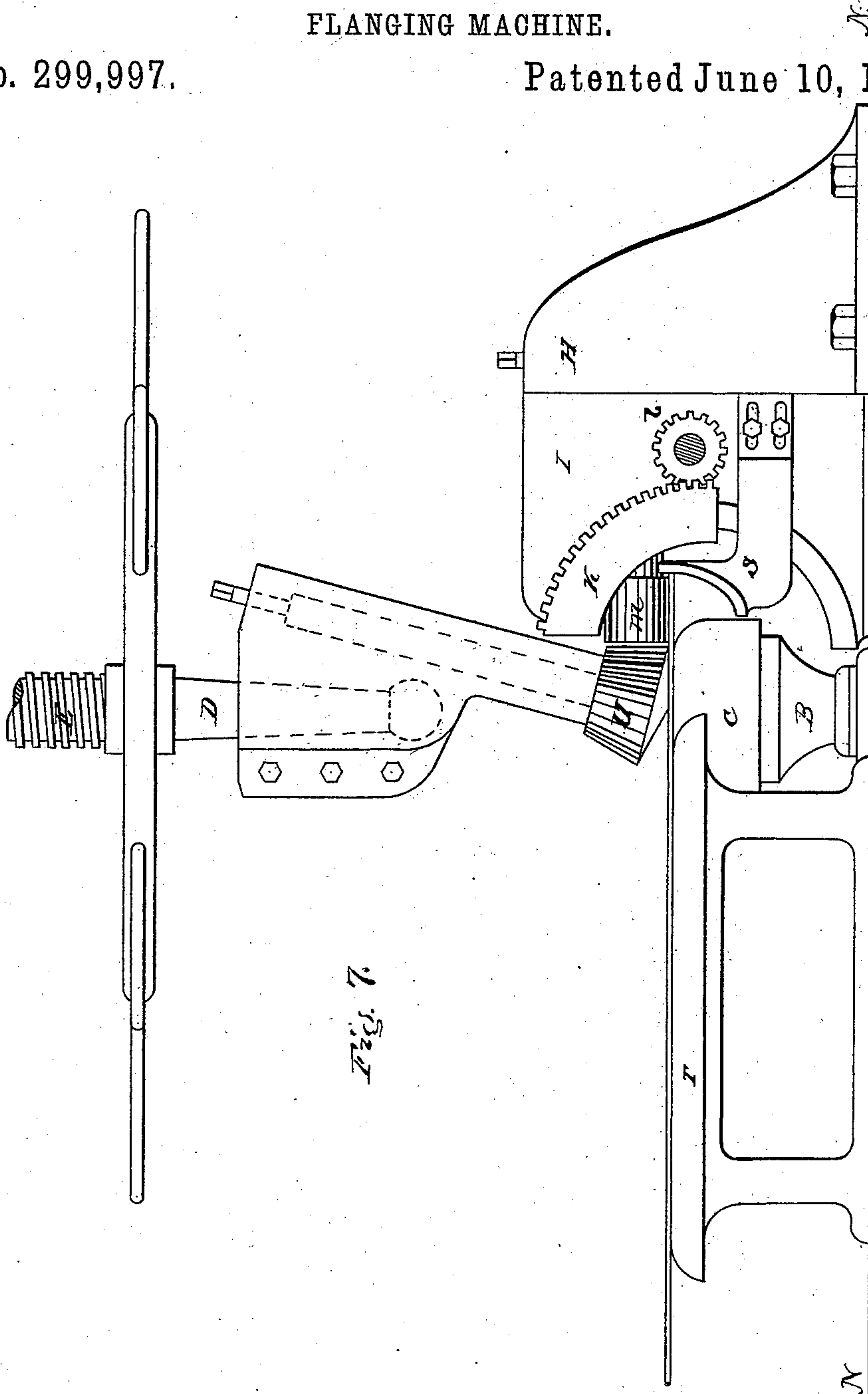


Fig. 7.

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UNITED STATES PATENT OFFICE.

MATTHEW R. MOORE, OF INDIANAPOLIS, INDIANA.

FLANGING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 299,997, dated June 10, 1884.

Application filed November 17, 1882. (No model.)

To all whom it may concern:

Be it known that I, MATTHEW R. MOORE, of the city of Indianapolis, in the county of Marion and State of Indiana, have invented a new and useful Machine for Flanging Heads for Steam-Boilers; and I do hereby declare that the following specification, together with the accompanying drawings, which are attached to and made part thereof, is such a full, clear, and exact description of said machine and its mode of operation, as will enable any other person skilled in the art to understand, construct, and operate the same.

The object of my invention is to provide a machine by means of which, motive power being applied, sheets of iron, steel, or other material suitable for the heads of steam-boilers may have their edges so bent and turned up at right angles as to form the flanges to which the sheets which compose the shells of the boilers are riveted. This operation, as usually performed by hand, involves the expenditure of much time and severe manual labor, and many attempts have been made to adapt machinery to the work so as to diminish such expense, but hitherto without entire success. To accomplish the object sought and avoid the difficulties hitherto encountered, I have devised the machine whose construction and operation will be made plain by the following description.

Figure 1 is an elevation, partly in section. Fig. 2 is a top plan view. Fig. 3 is a detail perspective of one of the hooks. Fig. 4 is a plan view showing particularly the operation of the centering devices. Fig. 5 is a vertical section of the same, with portions in elevation and Fig. 6 is a modification showing a means for beveling. Fig. 7 is an enlarged elevation, showing particularly the arrangement of the locking-piece and its flanging-roller in their relation to the former and to the operating means.

Referring to the drawings, A designates a strong framing, carrying in suitable bearings an upright shaft or arbor, B, to which rotary motion may be imparted through gearing, as shown, or by other proper means. The upper end of this arbor is fitted to receive a circular former, C, which is so arranged as to be readily removable and others of different sizes substituted, as the dimensions of the work may

require. Directly over the center of arbor B is supported in a substantial manner another arbor, D, which does not revolve, but may be raised and lowered by means of the screw and hand-wheel E. A platen or follower, F, similar to the former C, but smaller, is attached to the bottom of arbor D in a readily-detachable way, so that other sizes may be substituted, as required. Between this follower F and the former C the sheet to be flanged is gripped by the action of the screw E, and receives rotary motion through arbor B. As the follower F must revolve, while D is stationary, a joint, G, is provided to enable it to do so, and as the sheet operated upon may not be straight or true, joint G is made universal or of ball-and-socket form, so that F may accommodate itself to such irregularities and hold firmly. Arbor D is prevented from revolving by a feather in the supporting-bracket, so that the revolution of F may not operate the screw E. Three hooks, F', one of which is shown in detail, Fig. 3, are pivoted to the follower F. When not in use, they are folded back upon the top of the follower, but may be turned down so as to catch the edge of the flange when formed.

Attached to the frame A in such a way as to be adjustable toward and from arbor B is a strong post or stanchion, H, which bears the vertically-sliding part I, which is adjustable upward and downward by means of the set-screws shown. In the face of I are formed circular bearings which support the rocking piece K, which is capable of making therein a little more than one-quarter of a revolution. Upon each end of this rocking piece are toothed segments, which gear with pinions l on the shaft of hand-wheel L, whereby the motion of the rocking piece K is produced.

Upon a strong stud in the rocking piece is carried a cylindrical roller, m, which, as its duty is to bend over the edge of the head into a flange, is called the "flanging roll." The arrangement is such that while the flanging-roll is capable of revolving freely upon its stud it may be borne round by the rocking piece from a horizontal position at right angles with the arbor B through a circular path about a point corresponding to the center of the bend or corner of the flange produced, to a vertical position parallel with arbor B. The machine is to be so set that the greater part of arbor

B and the gearing which gives it motion is out of the way beneath the floor, the floor-line corresponding with N N, the plane whereon the post H is adjustably fixed.

5 The description thus far includes all the parts which are essential for flanging circular boiler and steam dome heads, and may be used without any further additions; but the machine is made more convenient to operate and its usefulness increased by the several appliances hereinafter described. A means of quickly centering the head to be flanged upon the former C is very desirable. A device for this purpose is shown in the drawings, Figs. 1 and 15 2, and more clearly in detail, Figs. 4 and 5. It consists of two shafts, O O, carrying two toes each, P P P P, which are adjustable lengthwise on the shafts and have rollers on their ends. The shafts are connected together by 20 means of the shaft and bevel-gears Q Q, and operated by lever R. The toes, except when in use, lie flat upon the floor, out of the way; but as the shafts are turned by the lever toward the center of the machine the toes rise, 25 and will carry a head before them until it is held between their ends over the center of the former C, where it is secured, and they are turned back out of the way again.

The operation of flanging a boiler-head may now be described as follows: A former of suitable size for the head to be flanged is placed upon arbor B, and a follower about two inches less in diameter is secured to arbor D. The former and follower are precisely alike, except in size, so that the former for one sized 35 head may be used as the follower for the next larger size. The flanging-roll *m* is brought, by means of the adjustments of post H and slide I, to such a position that its lower side 40 when horizontal will be a little more than the thickness of the metal to be flanged above the surface of the former C, and the same distance away from the edge of the former when vertical. Allowance is made for the thickening of 45 the edge of the head through upsetting the flange. The flanging-roll being in its horizontal position, and the follower raised a sufficient distance above the former C, a head to be flanged is heated in a furnace constructed for 50 the purpose to a bright-red heat, then laid upon former C, centered by operating-lever R, and firmly secured by bringing the follower F down upon it by means of the screw and hand-wheel E. Power is then applied, and the 55 operative, by turning the hand-wheel L, causes the flanging-roll to bear upon the projecting edge of the revolving sheet and carry it downward until it is shaped into a flange between the flanging-roll and the edge of the former, 60 and stands at a right angle with the rest of the sheet. The motion is then stopped, the follower-hooks turned down to catch under the edge of the flange, and the follower backed off by operating the screw E, pulling from the 65 former the flanged head, which may be carried away to cool, while the machine is made ready for the next one.

It is often desirable to bevel the edge of a flanged head to facilitate calking down after riveting it into the boiler. For this purpose 70 a tool-post is substituted for the flanging-roll, and the head centered and clamped in the machine with its flange uppermost, when the edge of the flange may be beveled in a manner so clearly shown in Fig. 6 as to need no further description. 75

To adapt this machine to the flanging of heads of other than circular shapes—as for locomotive fire-boxes—the arrangement shown in Fig. 7 is used. A former of less radius 80 than the smallest curve in the contour of the proposed head is placed upon the arbor B. A guide-piece, S, is fastened to I a distance equal to the height of the proposed flange from the edge of the former, and the angular attachment and beveled roller U substituted for joint 85 G and follower F. The beveled roller must be so placed that when lowered upon C their line of contact will be exactly opposite the center of the flanging-roll. A table, T, is provided to support the heated sheet to be flanged, 90 which being placed thereon and its edge pressed against the guide-piece S and gripped between roller U and former C, and the machine put in motion, the flanging-roll turns 95 the flange in a similar way, as in the process before described. The tendency to rotate about the axis of B imparted to the sheet keeps its edge always in contact with the guide-piece, which prevents it going any farther than sufficient to form the flange, so that 100 the sheet is carried along by the former and rolls, and its whole edge, whether curved or straight, is turned down into a flange whose depth is governed by the distance of the guide-piece from the former. It is necessary, in this 105 process, that the edge of the sheet be smoothly trimmed to the proper size, as it forms the guide in flanging, and any irregularities in it will affect the finished head. If this precaution be taken, it is practicable to flange by 110 this process circular heads of various sizes without change of formers. When it is desired to form flanges which do not go completely round the sheet, as in half-heads and 115 throat-sheets, a reversing motion must be provided for arbor B by means of open and crossed belts or other convenient appliance, so that the sheet may be traversed forward and back until flanged. This means for flanging 120 heads not circular will be made the subject of a separate application, the figure in this application being designed to show the arrangement of the roller *m*, the rocking piece K, the sliding frame I, &c., in their relation to 125 the former C.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a flanging-machine, substantially as described, a revolving former mounted on an 130 arbor, as B, a clamping-follower having a universal joint to accommodate inequalities in the sheet to be acted upon, and a flanging-roller, *m*, with means, as the devices indi-

5 cated by K I L, for changing it from a horizontal to a vertical position in proximity to the edge of the former, all combined and operating substantially as and for the purposes set forth.

10 2. In combination with the arbors B and D and with interchangeable formers C, the follower F, having a universal joint with D, to accommodate inequalities in the sheet to be acted upon, the hand-wheel E, toothed rocking piece K, carrying roller *m* and pinion *l*, and hand-wheel L, as and for the purposes set forth.

15 3. In combination with the arbor B, carrying a former, C, a centering device composed of adjustable arms, and suitable mechanical connections controlled by a lever for operating inward simultaneously to bring the said arms against the blank to be centered upon the former, as set forth.

20 4. The arms P, having anti-friction rollers, in combination with means, as the devices in-

25 dicated by O Q R, for operating said arms simultaneously and equally, and with the arbor B, having power connections and interchangeable formers, as C, of different sizes, all arranged and operating as and for the purposes set forth.

5. In combination with the former C, post H, sliding piece I, and toothed rocking piece K, the flanging-roller *m*, hung upon a stud 30 rigid with said piece K, and means, as pinions *l* and hand-wheel L, for moving said roller at will, as set forth.

6. In combination with the follower F, as described, the pivoted hooks F', adapted by 35 their gravity to lie back upon the follower, or to fall under the flange of the finished head to remove the same from the former, as specified.

MATTHEW R. MOORE.

Witnesses:

ROLLIN DEFREES,
A. M. MORSE.