

(No Model.)

2 Sheets—Sheet 1.

W. H. WRIGHT.

MACHINE FOR MAKING STEEL BALLS.

No. 400,990.

Patented Apr. 9, 1889.

Fig. 2.

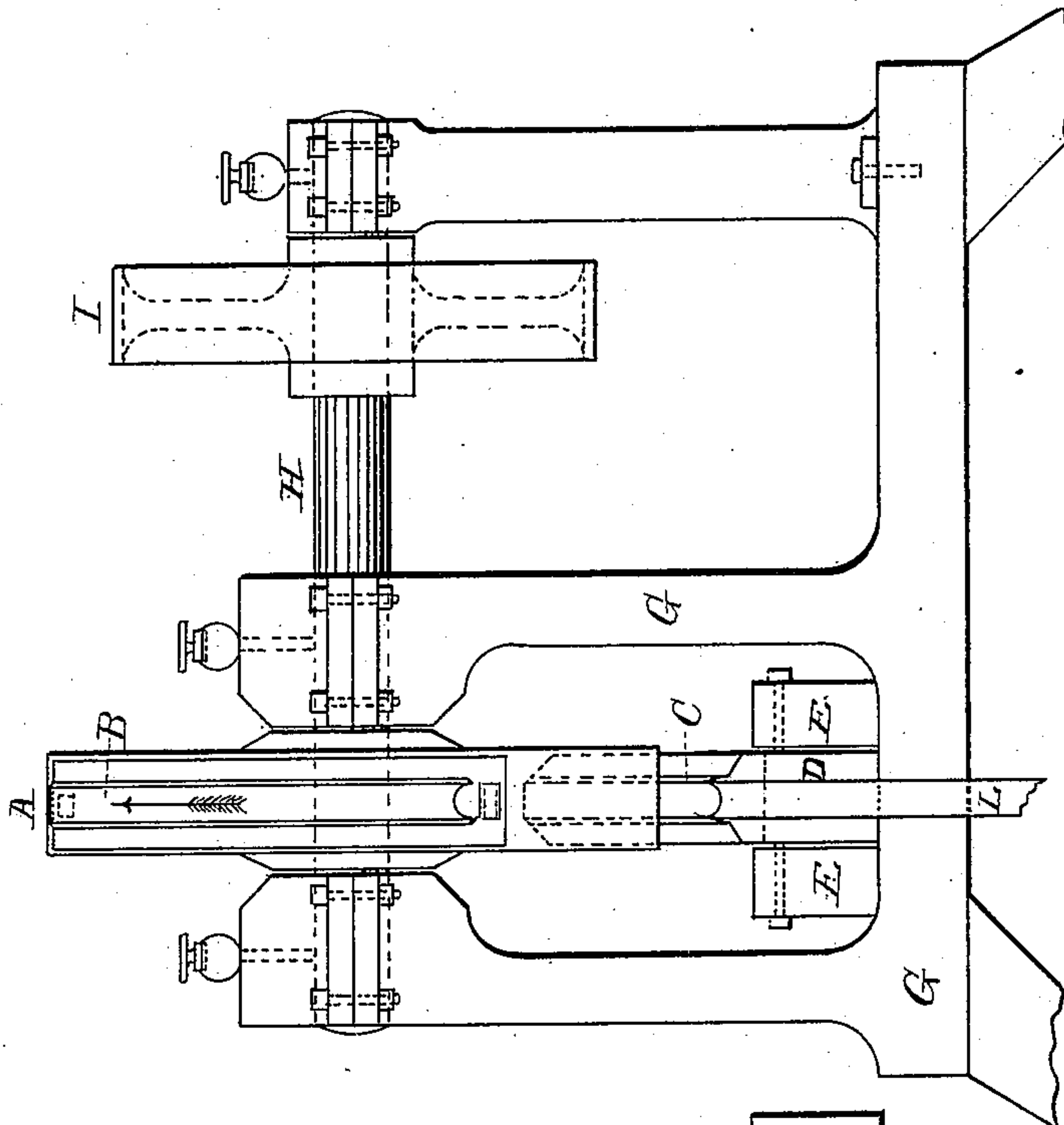
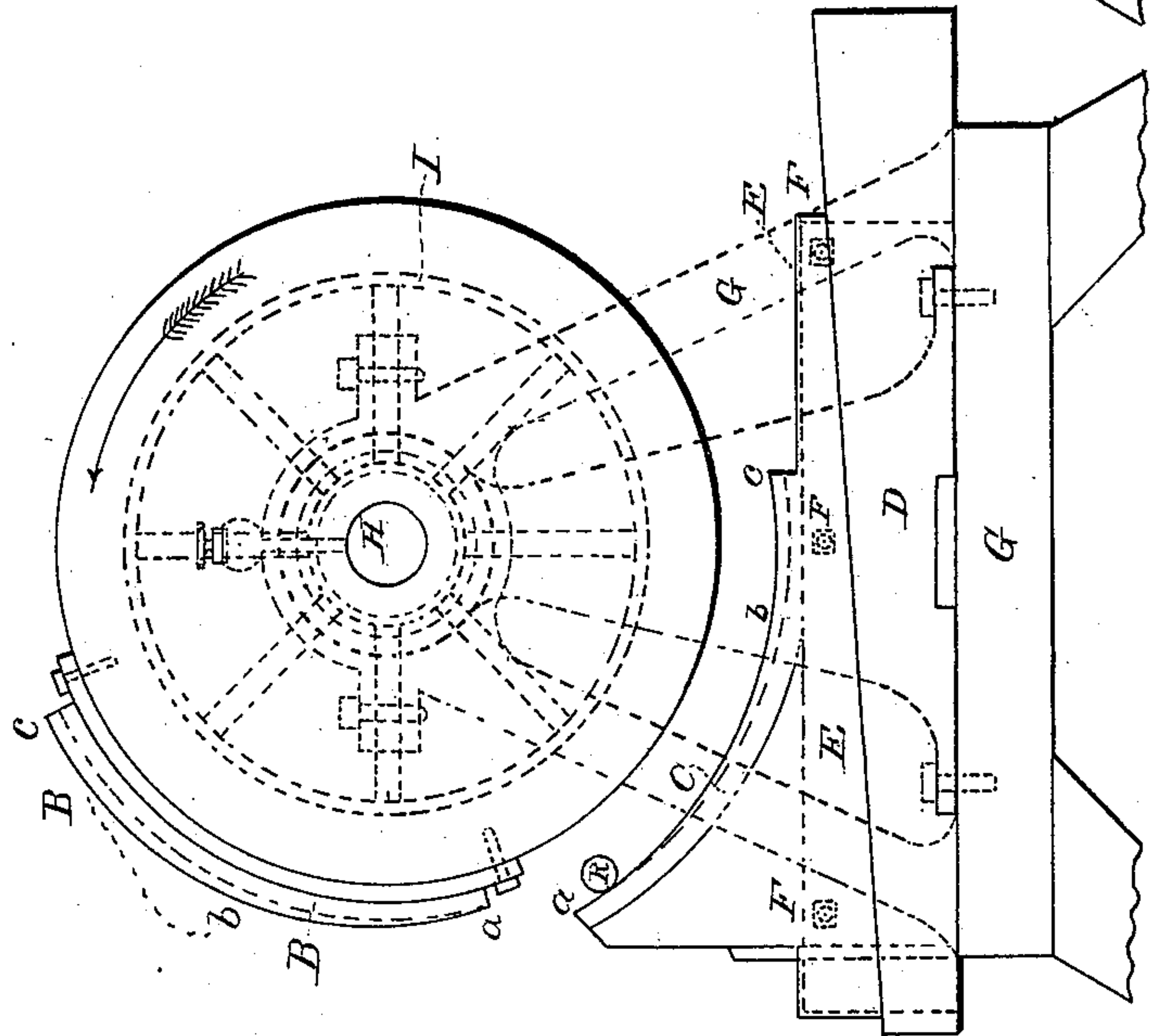


Fig. 1.



WITNESSES:

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BY

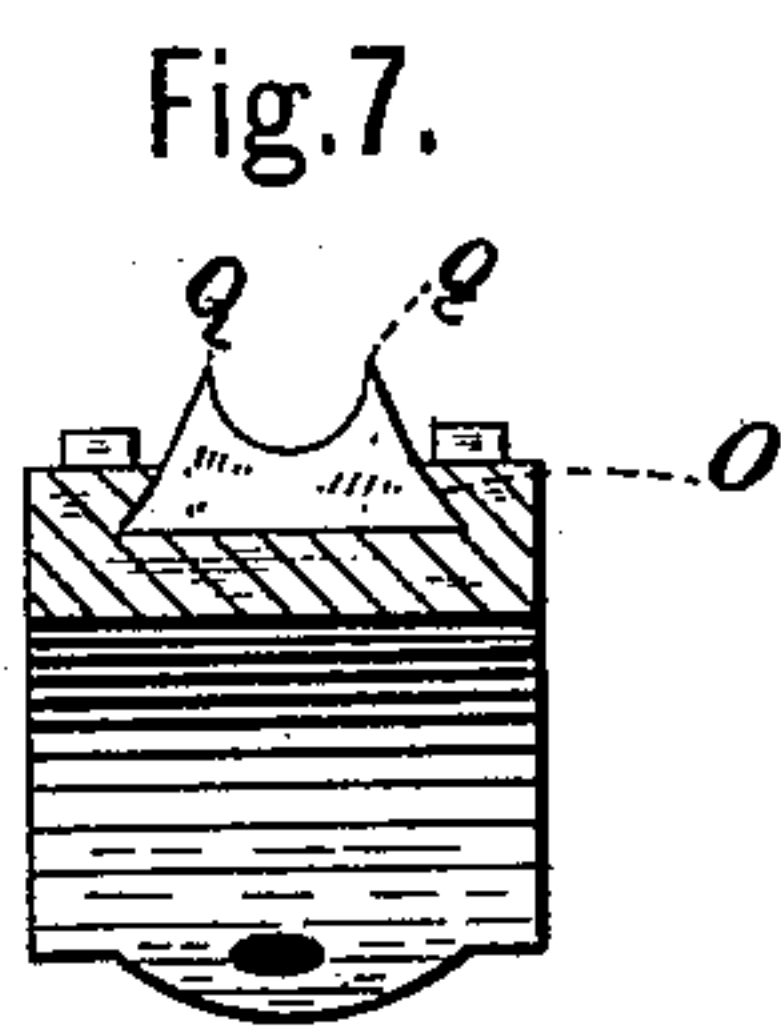
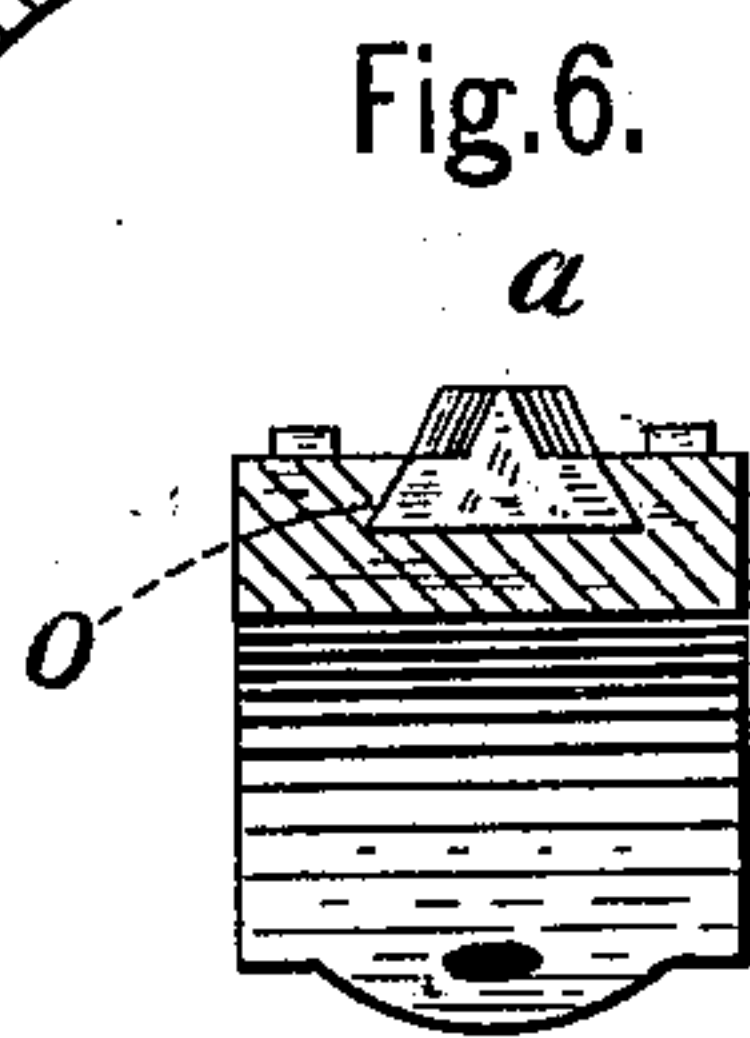
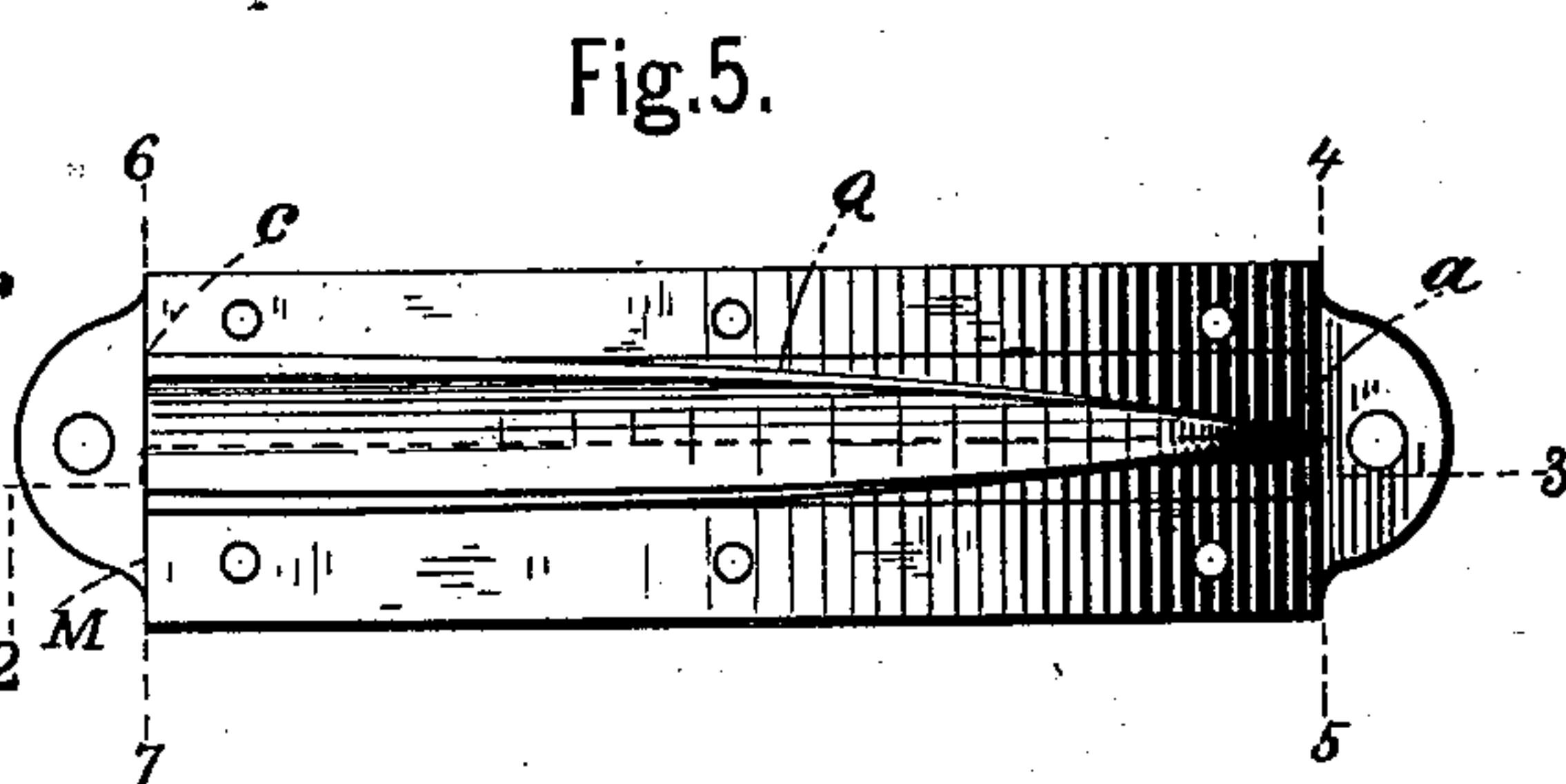
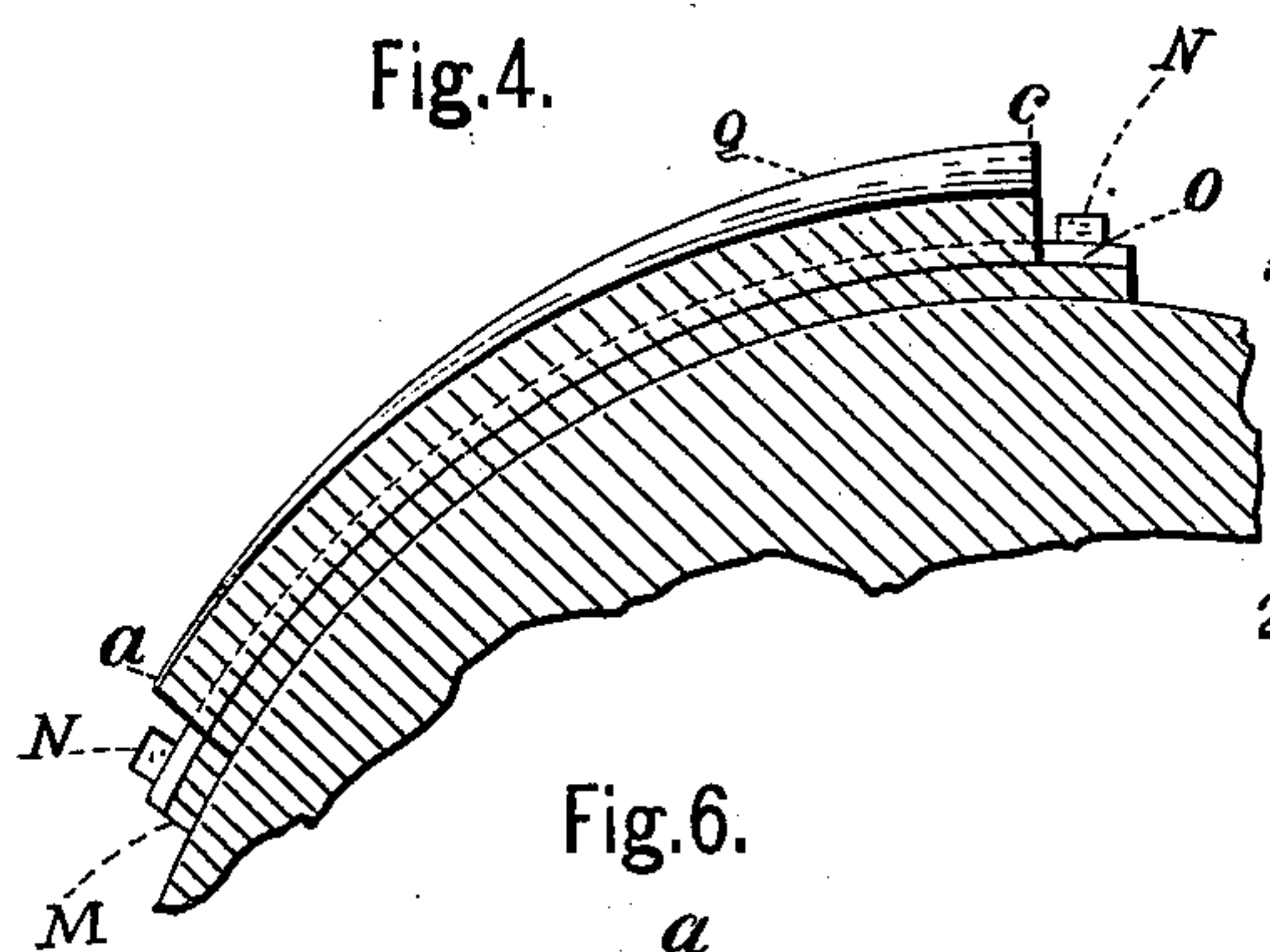
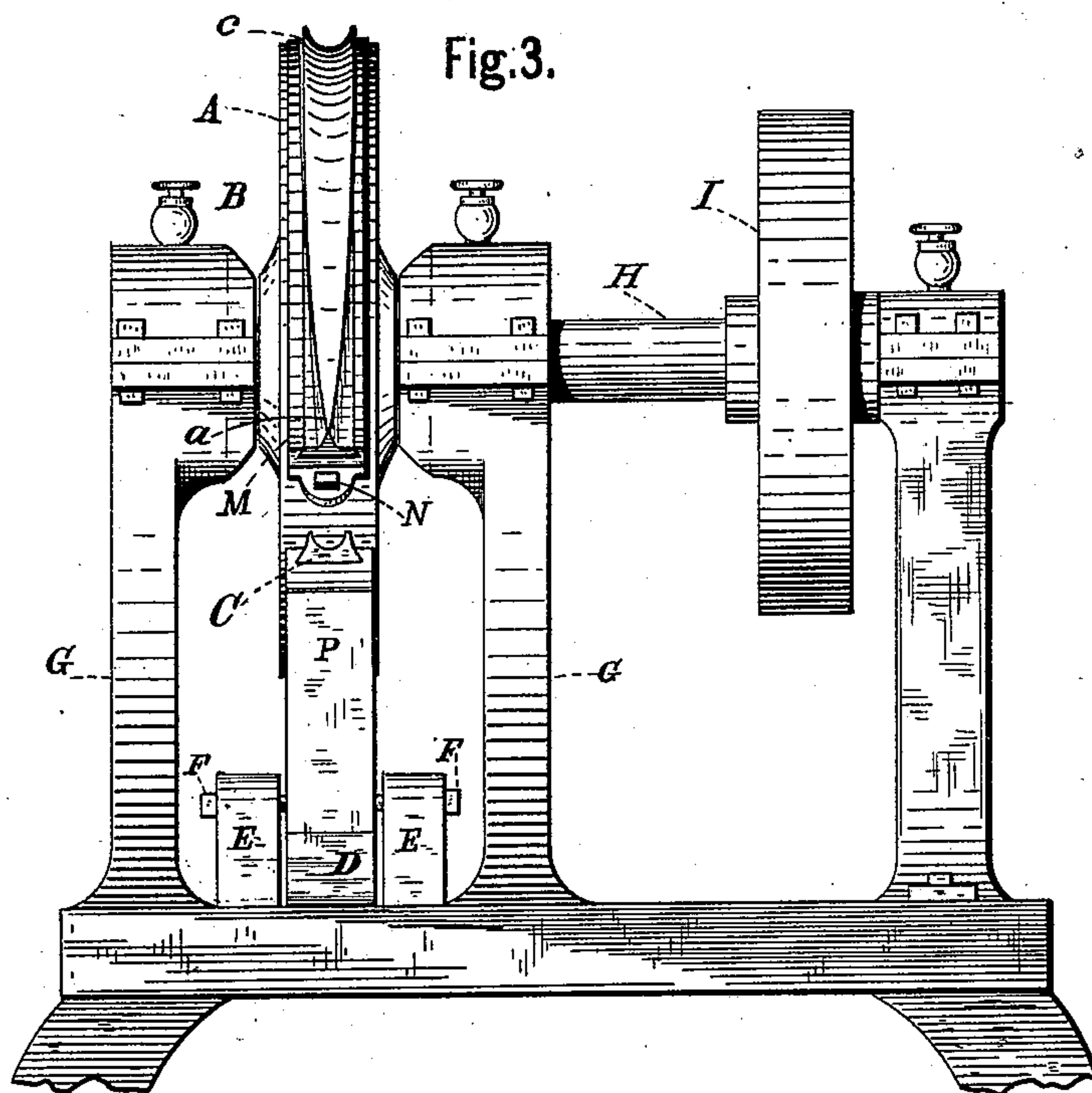
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Witnesses.

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UNITED STATES PATENT OFFICE.

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MACHINE FOR MAKING STEEL BALLS.

SPECIFICATION forming part of Letters Patent No. 400,990, dated April 9, 1889.

Application filed August 3, 1886. Serial No. 209,927. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. WRIGHT, a citizen of the United States, residing in Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Machines for Making Steel Balls or other Similar Articles, of which the following is a specification.

The object of my invention is to produce a machine for forming steel balls by means of combined movable and stationary curved dies of peculiar shape, and to certain details of construction, all of which will be fully and clearly hereinafter described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of the machine complete, the frame being indicated by dotted lines, so as to show the stationary die and the means for securing it. Fig. 2 is a rear elevation showing a slightly-different form of die. Fig. 3 is a front elevation of the machine. Fig. 4 represents a section in line 2 3, Fig. 5, through the curved movable die and a portion of the wheel or disk to which it is attached. Fig. 5 is a detached face view of the movable die. Fig. 6 is an end view of the small end of the movable die, showing the shape of that end of the die, a portion of the holding-piece being cut off through line 4 5, Fig. 5. Fig. 7 represents a rear elevation of the movable die, a portion of the holding-piece being cut off through line 6 7, Fig. 5.

In said drawings, G represents the supporting-frame of the machine, which is preferably made of cast-iron, as being the best and cheapest material. Mounted on the supporting-frame in suitable bearings of well-known construction is a shaft, H, carrying the driving-pulley I. On the shaft H, also rigidly secured by a key or other well-known means, is a revolving disk or bed, A, upon which is mounted a curved block, M, secured thereto by bolts N. (See Figs. 3 and 4.) In this block M is a longitudinal dovetail slot, O, into which the movable die B is slipped and secured in any well-known way.

On the bed of the machine is secured the stationary die C, being the same shape exactly as the die B, with the exception that it is longitudinally concave instead of convex. The

two dies are mounted with respect to each other so that when the points *a* are opposite each other there will be room enough between them to receive the end of a round bar of steel, R. The dies gradually become thicker from the ends *a* to the ends *c*, and when the ends *c* are opposite each other they come close together, for purposes which will more clearly hereinafter appear. The lower or stationary die, C, is secured in position between the two vertical supporting-pieces E by means of the bolts F, the die resting upon the wedge D, which may be driven in or out to regulate its height. The supporting-pieces E are cast in one piece with the bed of the machine, so as to be strong and rigid, and the points of the bolts are formed against the sides of the stationary die-holder P, a front view of which is shown in Fig. 3. From this construction it will be seen that the die C may be adjusted either vertically or sidewise, so that it may be brought exactly in a line with the movable die B.

Both dies B and C are grooved from the point *a* to the rear end, *c*, the groove deepening as it advances to the end *c*, terminating in a semicircular groove, so that when these ends are opposite each other and their edges meet a perfect circle is formed between them. The edges Q of the dies (see Figs. 4, 5, and 7) are in the form of a curve, preferably a parabolic curve, starting from the point to the heel. The reason of this is, if the edges run in a straight line from the heel until they meet at the point, they would not gradually inclose or draw in sufficient metal when compacted and compressed to make a ball of the full diameter of the groove; but by such curvature a slightly additional quantity of metal is gradually severed and compressed upon the interior mass just sufficient to form a complete spherical ball. Otherwise the ball would be imperfect.

The operation of the machine will be understood by reference to Fig. 1. The end of a bar of steel, round, preferably, as shown in said Fig. 1 at R, is put in transversely, and as the die B moves in the direction of the arrow the two dies catch the bar and roll it between them as the disk A turns, gradually compressing more and more of the metal until the edges

of the dies meet at or about the points *b* and *c*, when a perfectly spherical ball is completed and cut off from the bar, only sufficient metal being cut off to form the ball. Furthermore,
5 if the lines of the edges are made straight, as above mentioned, they not only do not inclose metal enough to form a perfect ball, but they do not inclose sufficient metal to cause them to take hold enough to carry the metal through
10 without corrugating the metal of the die at least a portion of its length, which is objectionable, as it renders the ball imperfect. By my construction the metal is carried through a smooth die without corrugations.
15 I claim as my invention—

In a machine for making balls or other similar articles, the combination of a longitudinally outwardly-curved grooved die having curved edges *Q*, and mounted on a disk secured to the shaft of the machine, with a 20 longitudinally inwardly-curved grooved die having similar curved edges *Q* and mounted on the bed of the machine, substantially as described, each die having its longitudinal groove gradually enlarging and its edges 25 curved, for the purposes set forth.

WILLIAM H. WRIGHT.

Witnesses:

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