

No. 620,233.

Patented Feb. 28, 1899.

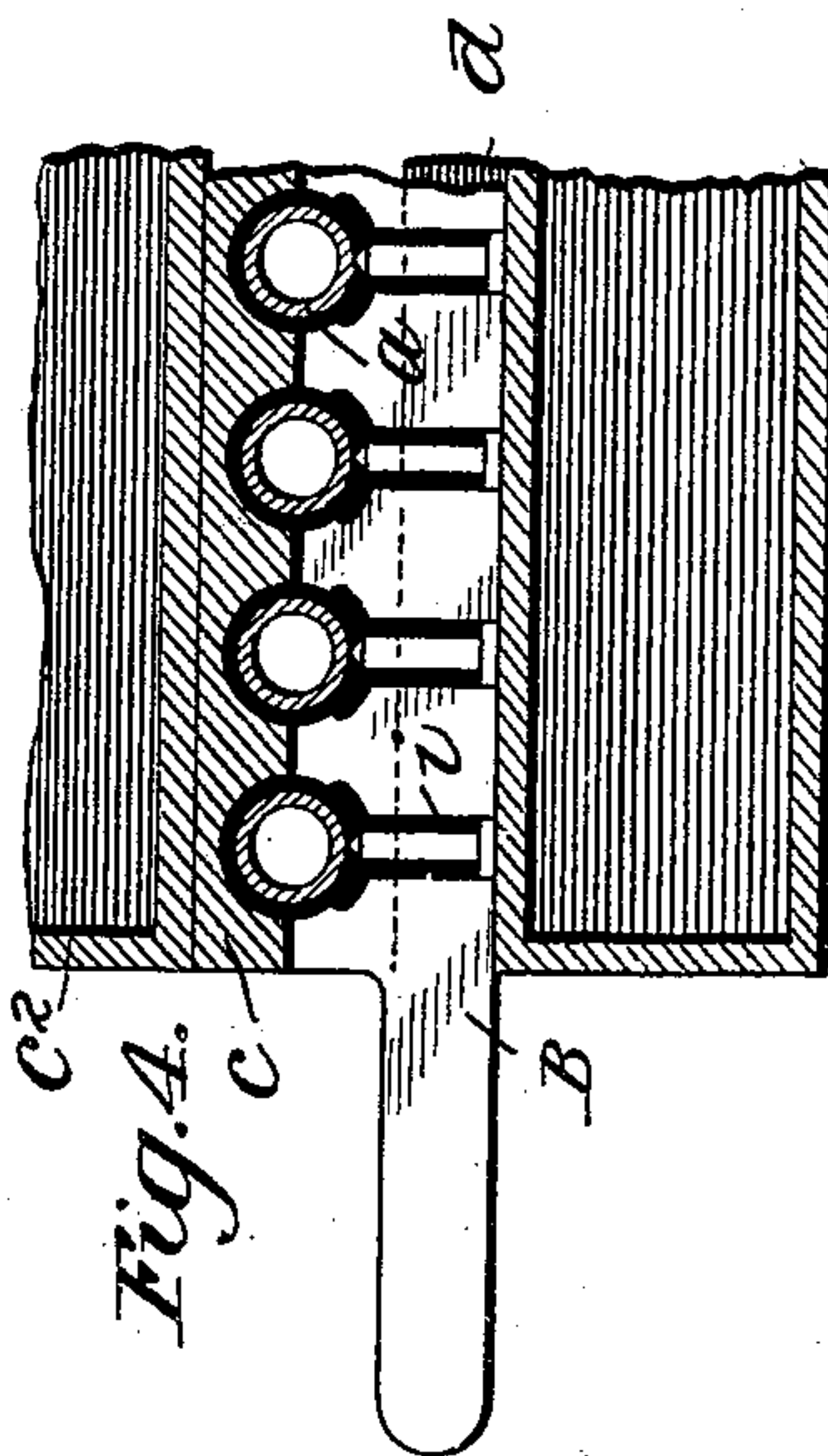
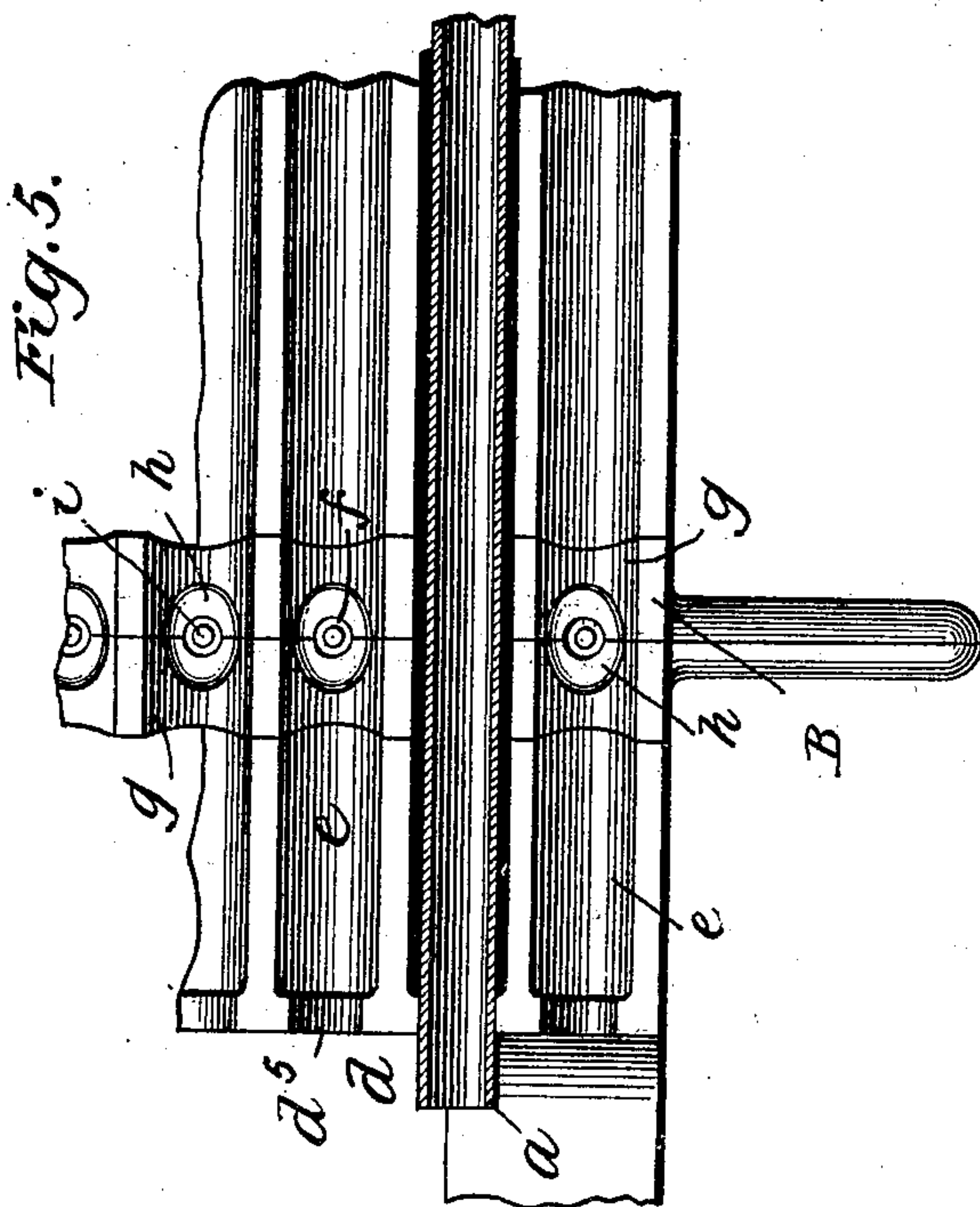
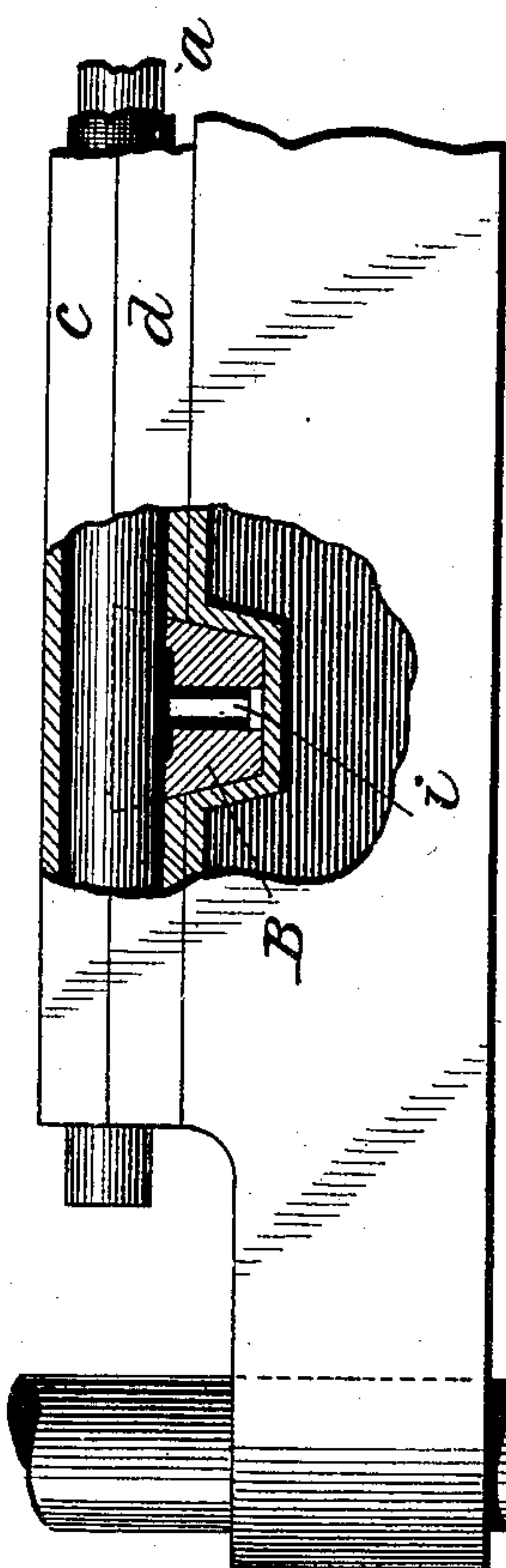
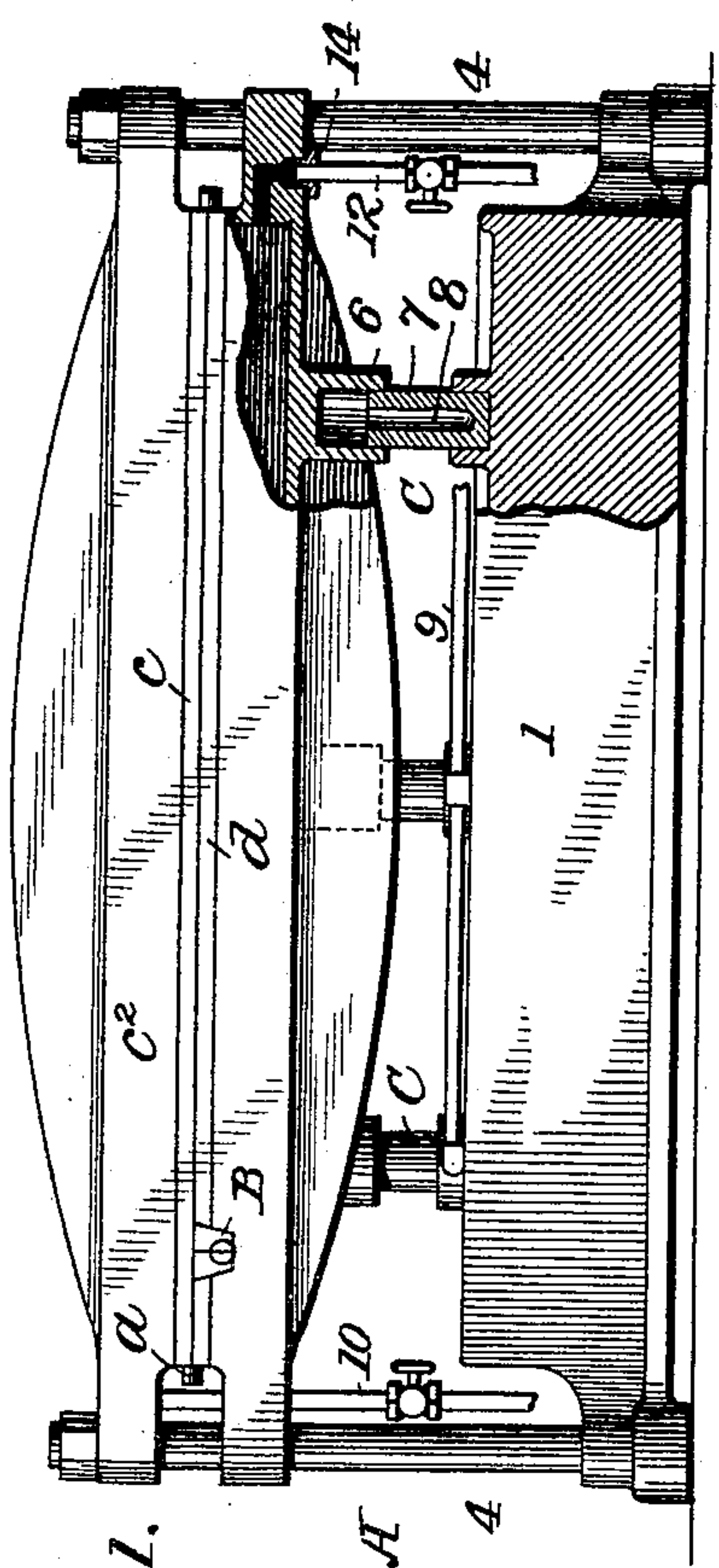
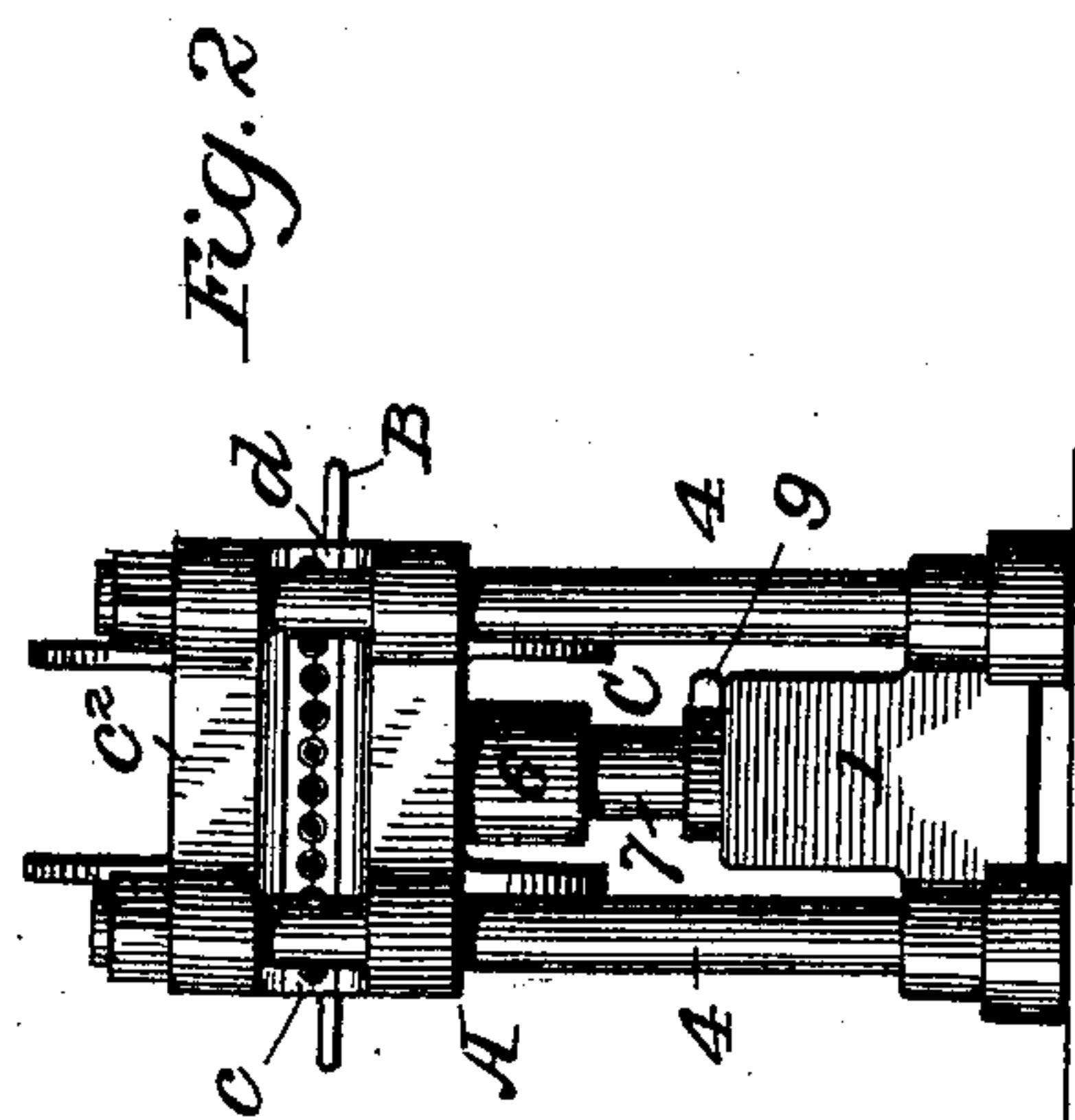
H. J. DOUGHTY.

MOLDING AND VULCANIZING APPARATUS.

(Application filed Feb. 5, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses

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2 Sheets—Sheet 2.

Fig. 6.

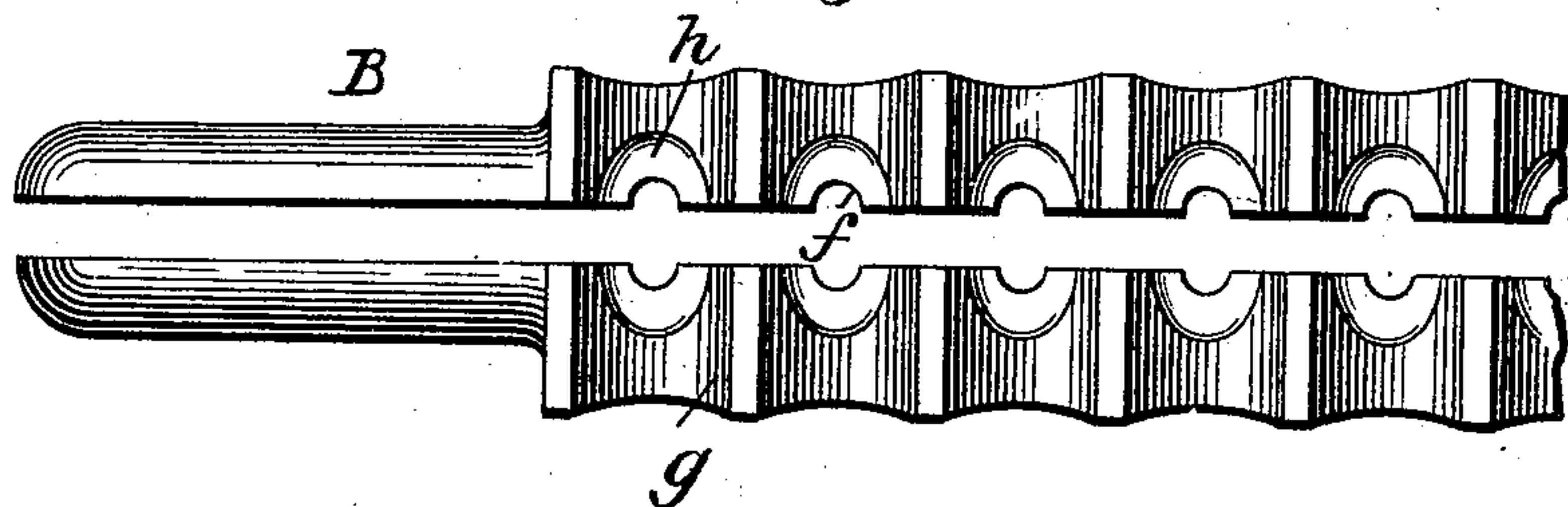


Fig. 7.

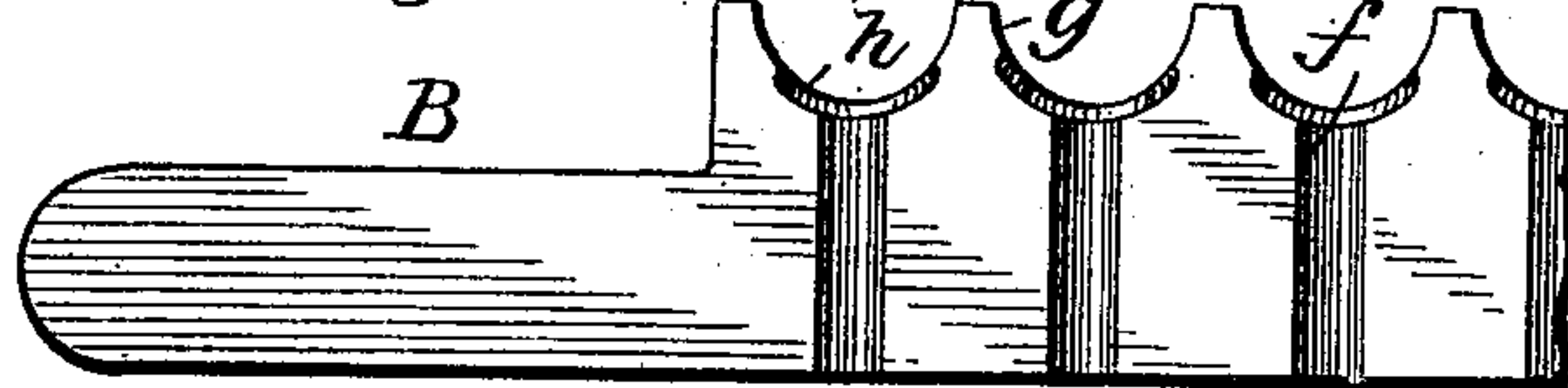


Fig. 8.



Fig. 9.



Fig. 10.

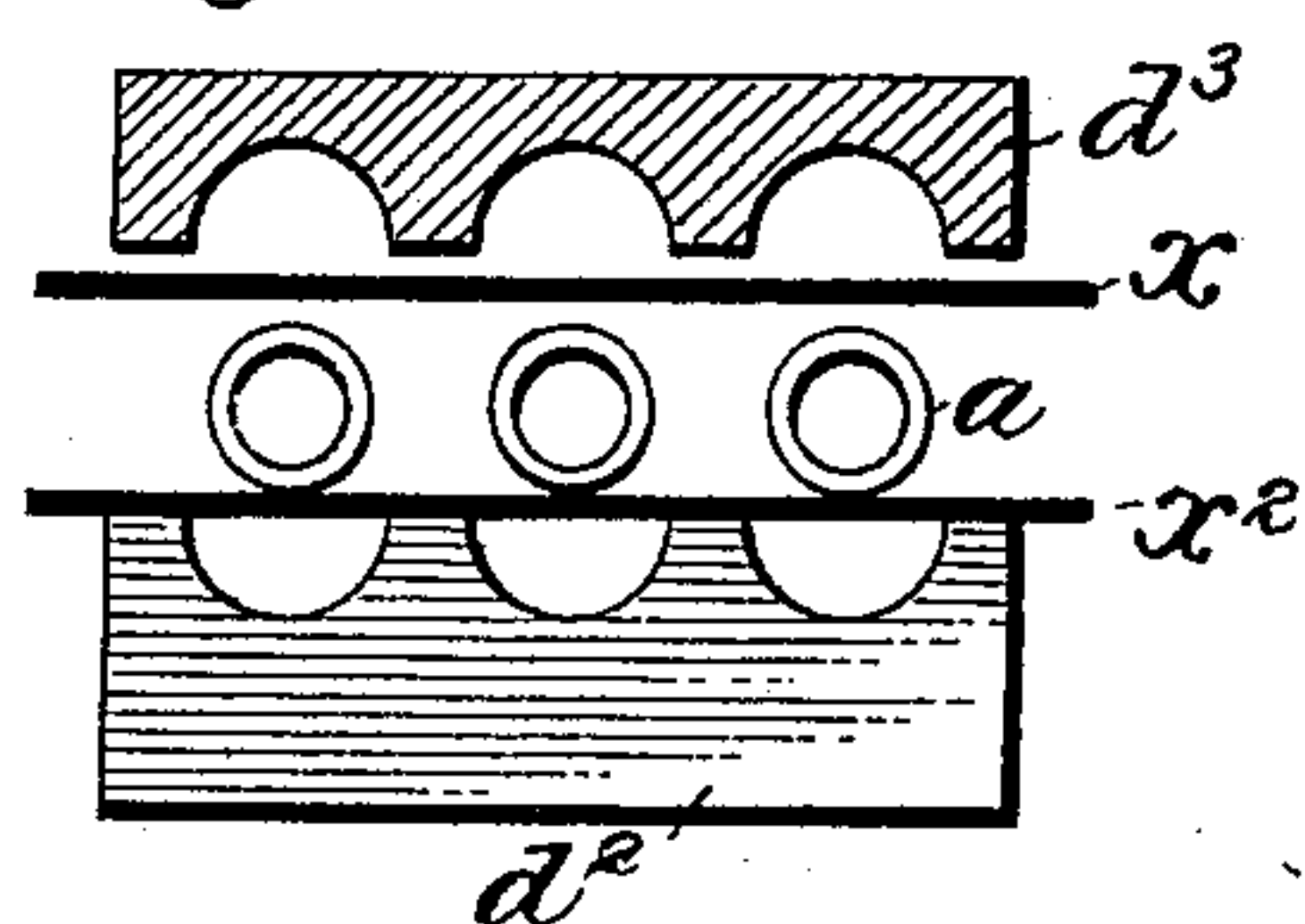


Fig. 11.

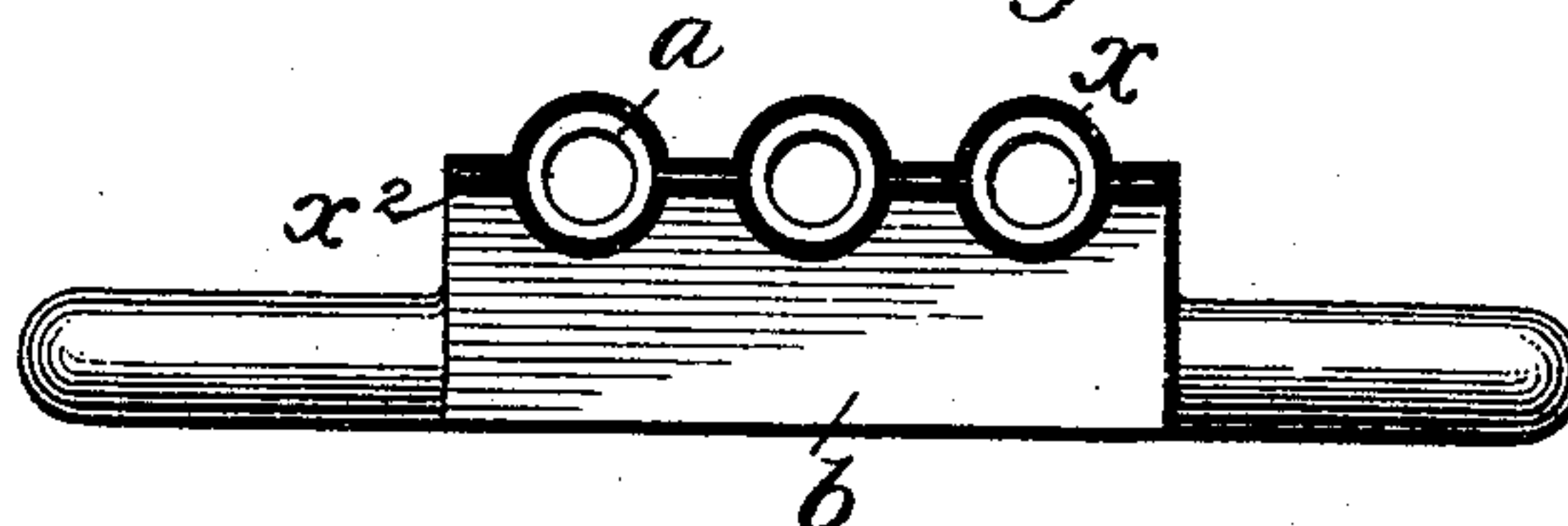


Fig. 12.

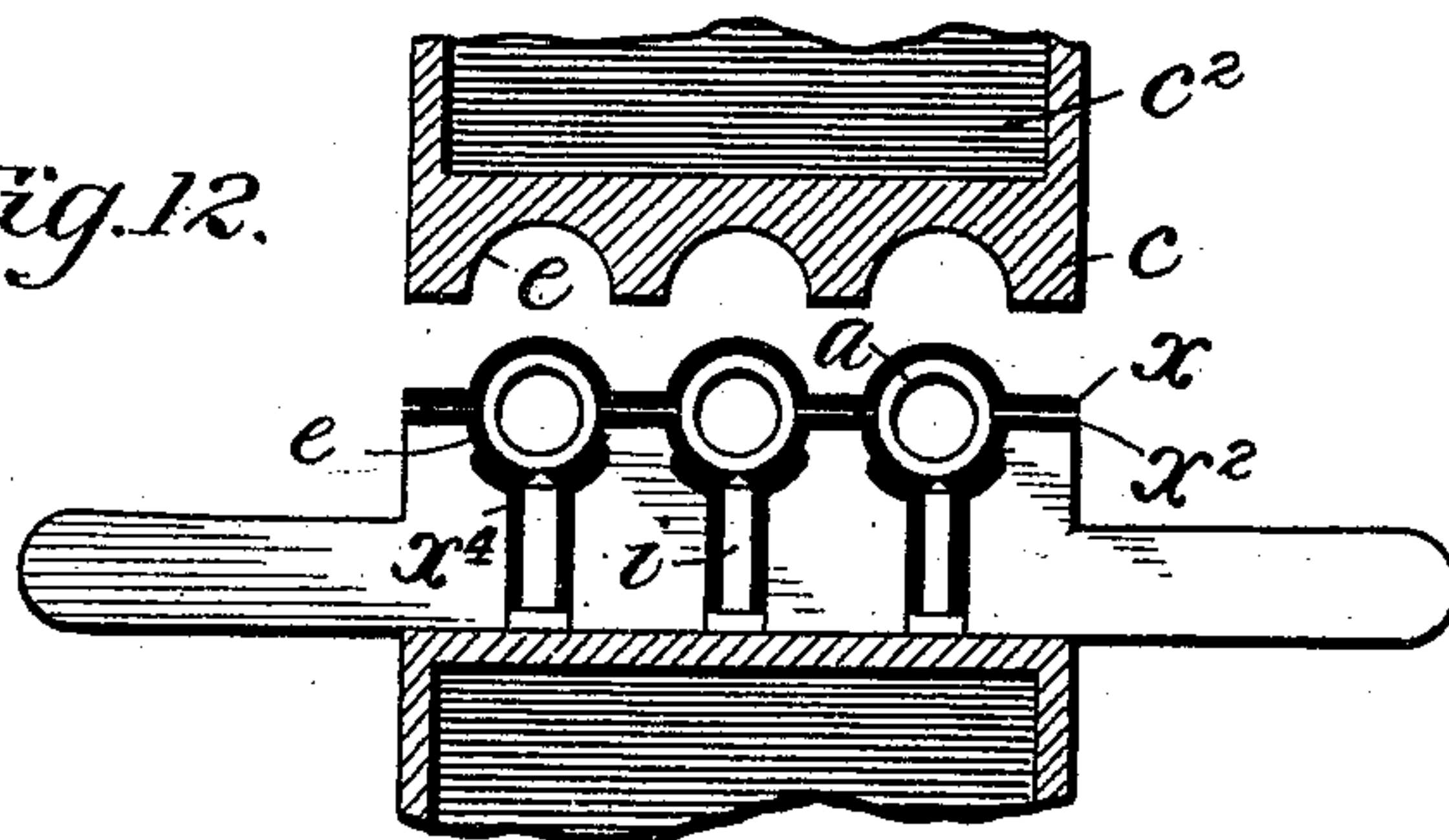


Fig. 13.

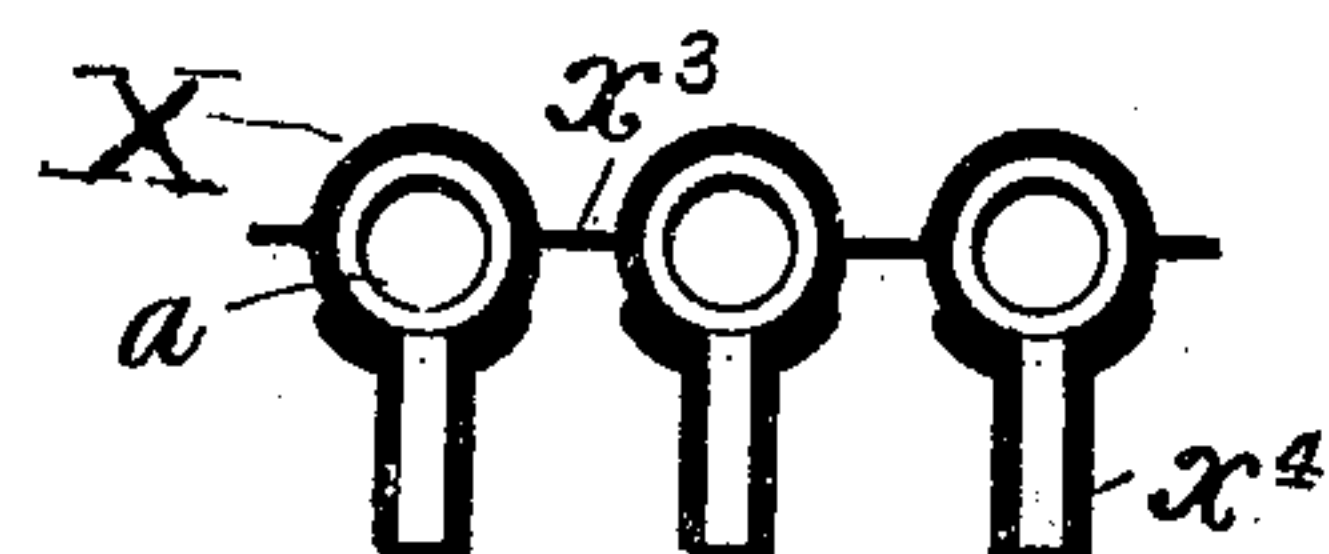
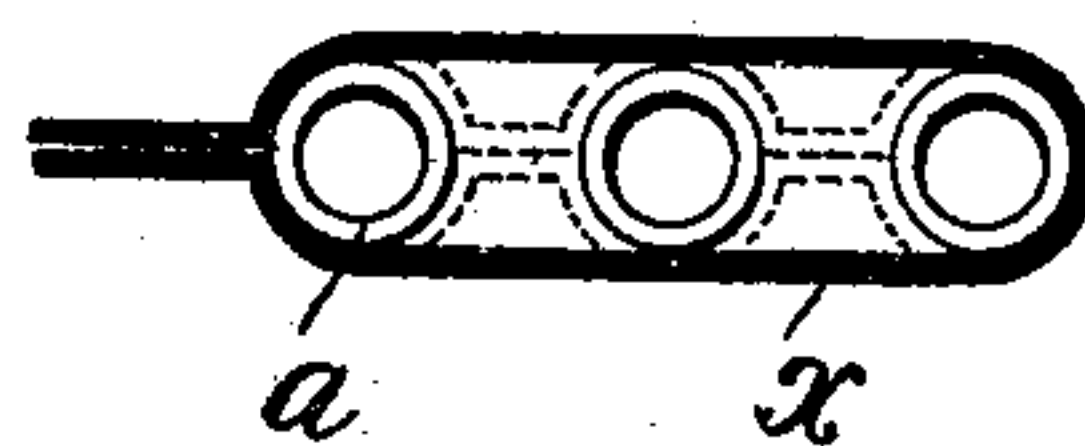


Fig. 14.



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UNITED STATES PATENT OFFICE.

HENRY J. DOUGHTY, OF PROVIDENCE, RHODE ISLAND.

MOLDING AND VULCANIZING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 620,233, dated February 23, 1899.

Application filed February 5, 1898. Serial No. 669,258. (No model.)

To all whom it may concern:

Be it known that I, HENRY JAMES DOUGHTY, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Molding and Vulcanizing Apparatus, of which the following is a specification.

This invention relates to certain new and useful improvements in apparatus for the manufacture of air-cushion tubes adapted for use in connection with bicycle-tires and other articles; and it is the object of the invention to provide means whereby such tubes may be rapidly, economically, and effectually formed.

With this object in view the invention consists in the improved apparatus hereinafter more particularly described.

In the accompanying drawings, forming a part of this specification, and in which like letters and numerals of reference indicate corresponding parts, Figure 1 is a side elevation of the vulcanizing-press with the tube-mold therein. Fig. 2 is an end view of the same. Fig. 3 is an enlarged detail side elevation of one end of the tube-mold. Fig. 4 is a transverse sectional view of the same. Fig. 5 is a similar plan view of the lower half thereof. Fig. 6 is a detail plan view of the auxiliary mold, the sections thereof being separated and broken away. Fig. 7 is a side view of one of the auxiliary-mold sections. Fig. 8 is a detail view of one of the inflation-tube mandrels. Fig. 9 is a similar view of the same with an inflation-tube thereon, and Figs. 10 to 14 are diagrammatic views illustrating the operation and features of the improved method and apparatus.

Referring to the drawings, and more particularly to Figs. 1 to 8 thereof, A designates a vulcanizing-press and mold comprising a base 1, an upper mold-section c , provided with a heating-chamber c^2 and supported upon uprights 4 extending from the base 1. A lower mold-section d is guided to move upon the uprights 4 toward and from the upper section, and while different means may be employed for moving the lower mold-sections it is preferred to employ one or more engines C, each comprising a cylinder 6, connected to the under face of the mold-section d and in which is a suitably-packed piston 7, provided with a

passage 8, extending through it to the upper face thereof and communicating with a supply-pipe 9, through which water or other fluid under pressure is introduced into the passage 8 and from thence into the cylinder. The lower mold-section d like the upper one is also provided with a heating-chamber, and pipes 10 12 communicate with the chambers of the upper and lower sections, respectively, through which steam, hot water, or other heating fluid is supplied to the said chambers. In order, however, to compensate for the movement of the lower mold-section, a sliding joint is provided at 14, which permits the section to move upon the pipe as it is raised and lowered.

The mold and press A, as hereinbefore stated, are preferably formed in two sections c and d , the opposing faces of which are flat and are each provided with longitudinal semi-circular or substantially semicircular channels e , which register when the sections of the mold are brought together to form circular chambers which at their opposite ends are slightly less in diameter than at intermediate points, and these contracted portions constitute bearings d^5 , the purpose of which will presently appear.

In carrying out the invention two or more mandrels are arranged parallel to each other between two sheets of vulcanizable material, which sheets are brought together intermediate and at the sides of the mandrels, so as to be carried with the mandrels to the vulcanizing press and mold. These operations may be performed in different ways and with different devices, and instead of using two sheets of material a single sheet may be laid flat and the sheet then turned over the mandrels and pressed together at the edges, forming upper and lower inclosing layers, as shown in Fig. 14; or instead of this the lower layer x^2 of the material is placed upon a channeled tray d^2 , Fig. 10. The mandrels $a a$ are placed upon the sheet and press the same into the channels of the tray. Another layer or sheet x is then laid upon the mandrels, and another channeled tray d^3 is placed on the first, pressing the sheets closely around the mandrels and together at the sides and between the mandrels. Whatever may be the means adopted of assembling the mandrels and the vulcanizable sheets it is requisite to main-

tain them in position in transferring them to the vulcanizing-press. This may be accomplished by means of two socket-bars *b*, Fig. 11, one of which is placed beneath the ends 5 of the mandrels projecting beyond the trays d^2 d^3 or beyond the sheets at each end of the mandrels, and the latter, with the adhering sheets, are then lifted from the lower tray after first removing the upper one by means 10 of the socket-bars and carried to and placed in the lower mold-section d , as indicated in Fig. 12, the mandrels entering the longitudinal recesses *e* of said mold-section with their ends fitting closely the contracted ends or 15 bearings of the recesses. When this has been accomplished, the socket-bars *b* are removed and the upper and lower mold-sections *c* d are brought together and maintained in contact until the material has been sufficiently 20 vulcanized upon the mandrels. The mandrels, with the tubes thereon connected by narrow thin webs or films x^3 , are then removed from the press and the said webs are severed, the tubes then being stripped from the 25 mandrels ready for use.

The tubes used in bicycle-tires are provided each with a short air-tube x^4 of small diameter protruding from the side of and communicating with the interior of the main tube, 30 through which air is forced into the main tube to inflate the same. When the tubes are to be employed for this purpose, it is desirable that the air-tubes be joined to the main tubes simultaneously with the formation and vul- 35 canization thereof. Accordingly the lower mold-section d has in its face a transverse recess into which is received an auxiliary mold B, having two parts provided in their oppos- 40 ing faces with a series of semicircular recesses *f*, which coincide and conform to the shape of the air-tubes when the two parts of the mold are brought together. At their opposite ends the parts of the mold B are provided with handles by means of which the mold may 45 be lifted into and out of the recess of the lower mold-section d , and in its upper face the mold B is provided with semicircular channels *g*, which register with the longitudinal recesses of the said mold-section d . The openings of 50 the mold B lead from the channels *g*, and formed in said channels and surrounding the openings are shallow recesses *h*. Prior to placing the mandrels *a* and the strips x x^2 in the mold-section d inflation-tubes x^4 , of green 55 rubber and fabric, provided at one end with

an annular flange, are slipped upon short mandrels *i* and inserted into the openings of the mold B with their flanges within the recesses *h*. The mold B is then placed within 60 the transverse recess of the lower mold-section d , after which the mandrels and strips x x^2 are placed upon the mold-section d , as above described, and the flanges of the inflation-tubes are vulcanized to the main tubes X simultaneously with the formation and 65 vulcanization thereof.

Without limiting myself to the precise construction and arrangement of the parts shown and described, since it will be apparent that 70 various changes in such construction and arrangement may be made without departing from the spirit or scope of the invention,

What I claim is—

1. In an apparatus for the purpose described, the combination of a sectional mold 75 having chambers with contracted ends, and mandrels adapted to be received in said ends, and to project beyond the same to present engaging portions to a lifter, said mandrels extending centrally through the said chambers, 80 substantially as described.

2. In an apparatus for the purpose described, the combination with a main sectional mold, of an auxiliary mold adapted to be attached to and detached from one of the 85 sections of the main mold and to communicate with the chamber thereof, substantially as described.

3. In an apparatus for the purpose described, the combination with a vulcanizing- 90 mold, of an auxiliary mold adapted to be attached to and detached from the said mold and having an opening communicating with the chamber thereof, substantially as described. 95

4. In an apparatus for the purpose described, the combination with a vulcanizing- 100 mold having a transverse recess intersecting the chamber thereof, and an auxiliary two-part mold adapted to be received in said recess and having openings communicating with the chamber of the vulcanizing-mold, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of 105 two subscribing witnesses.

HENRY J. DOUGHTY.

Witnesses:

ROBERT L. WALKER,
AMASA SPRAGUE.