

J. H. CHAMP.
 BOTTLE FILLING DEVICE.
 APPLICATION FILED APR. 7, 1909.

1,154,746.

Patented Sept. 28, 1915.
 4 SHEETS—SHEET 1.

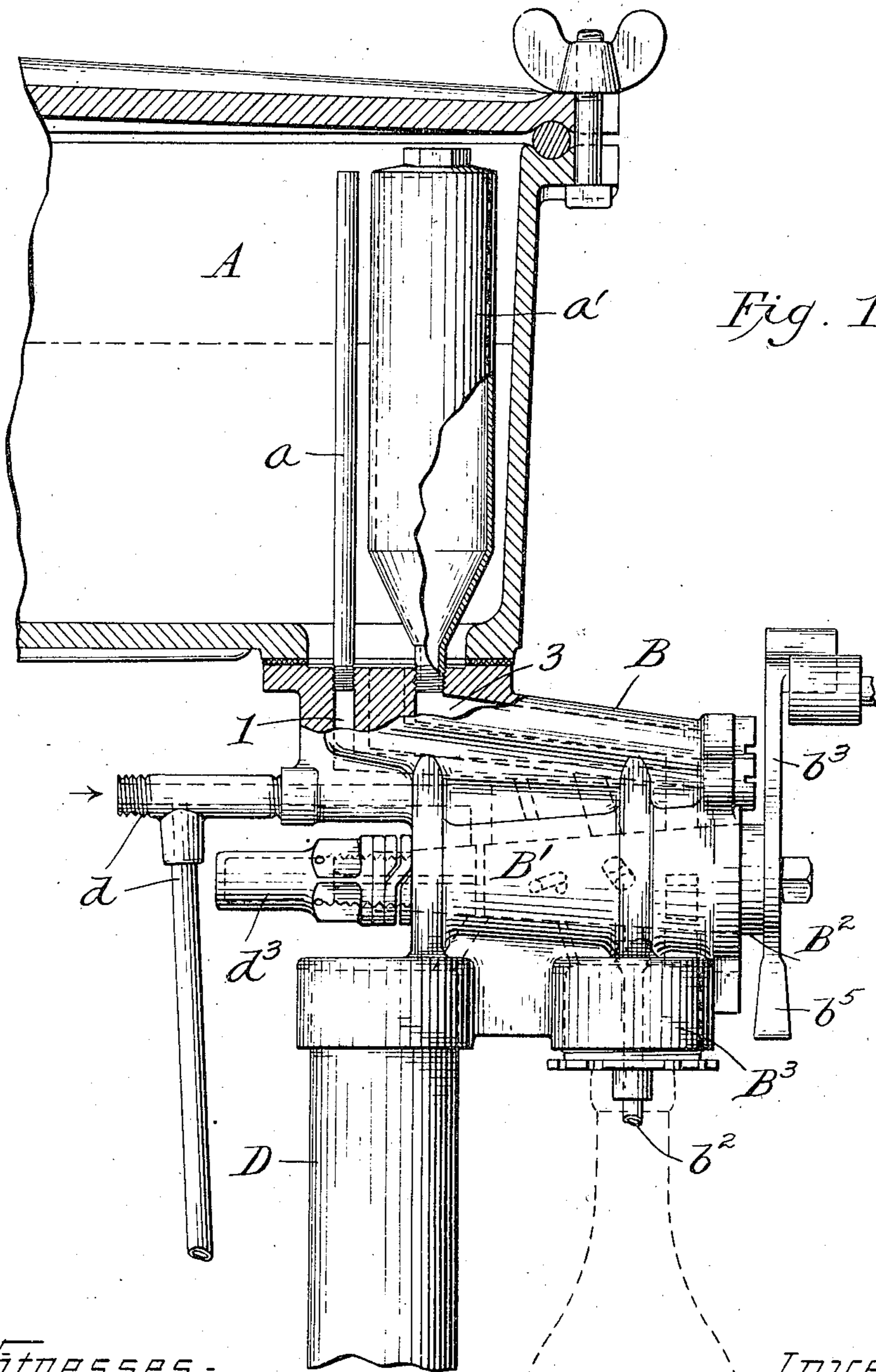


Fig. 1.

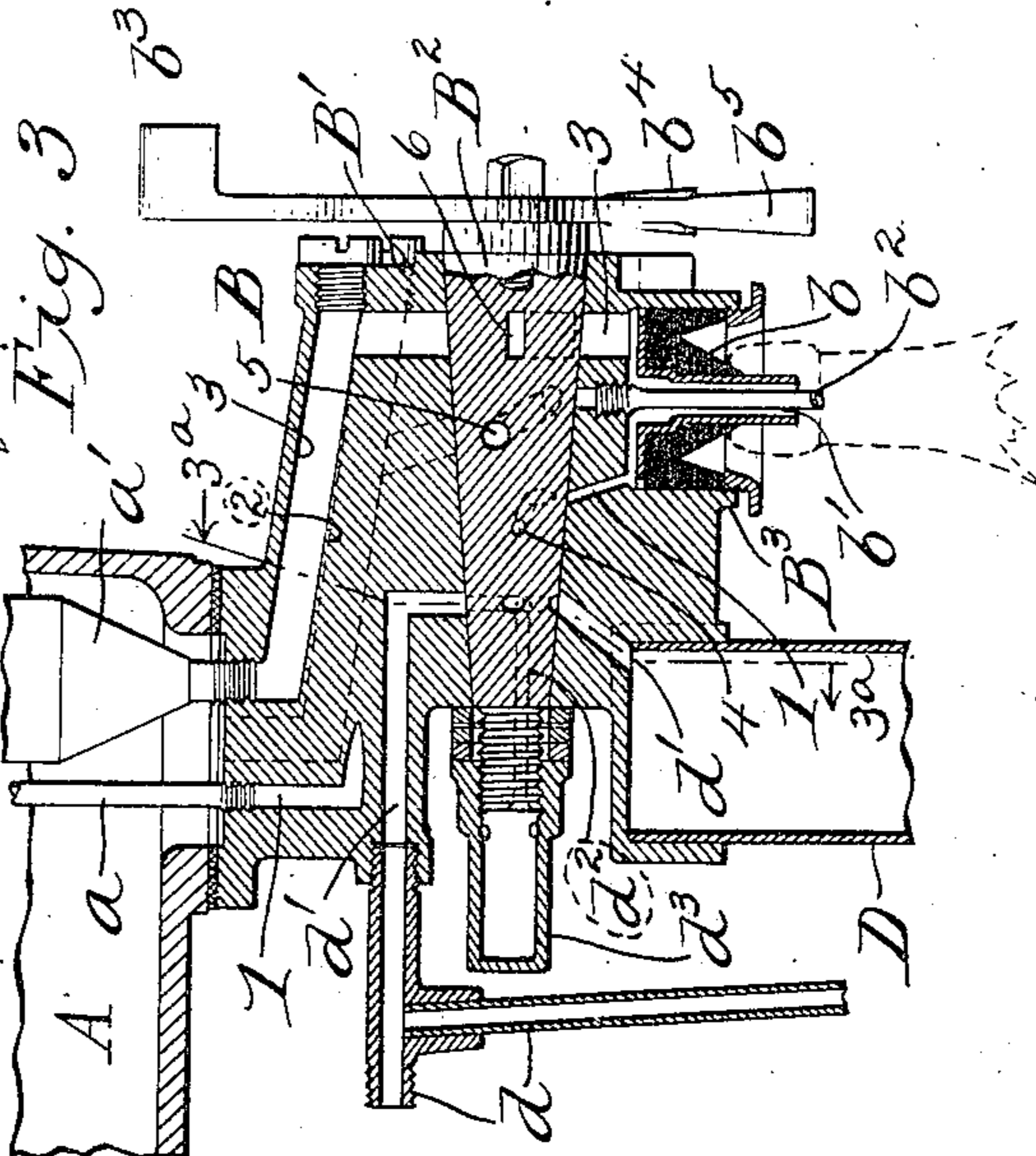
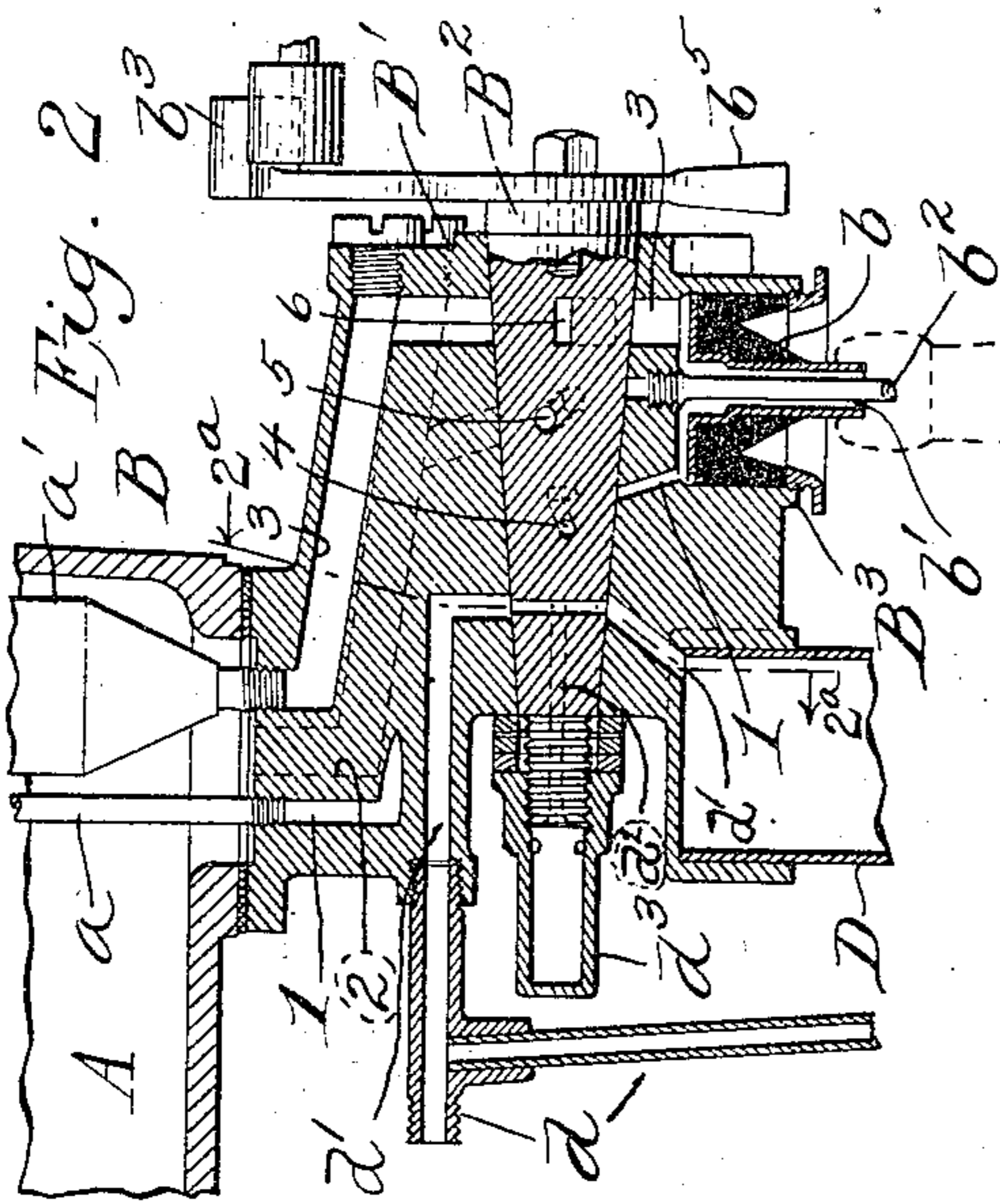
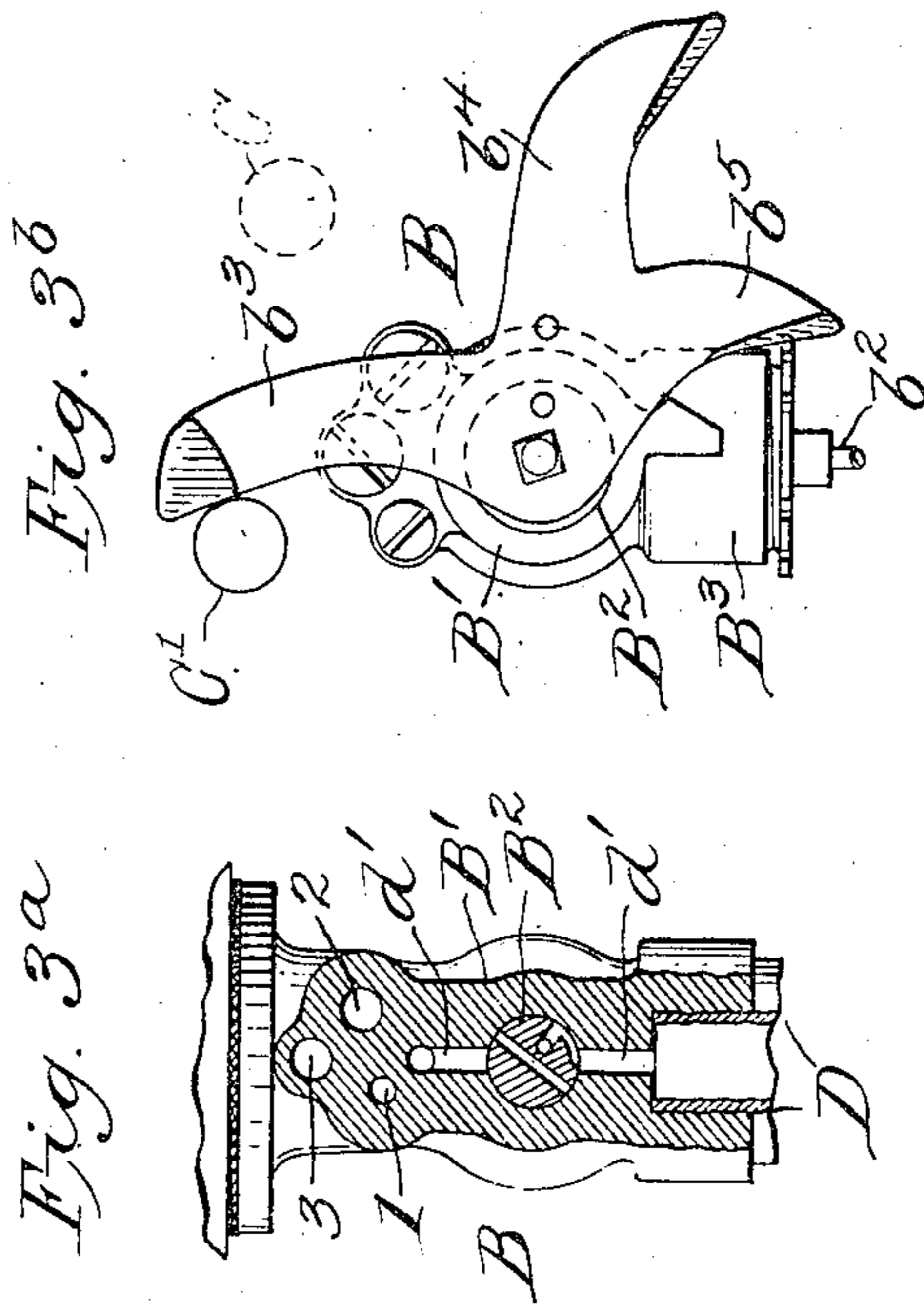
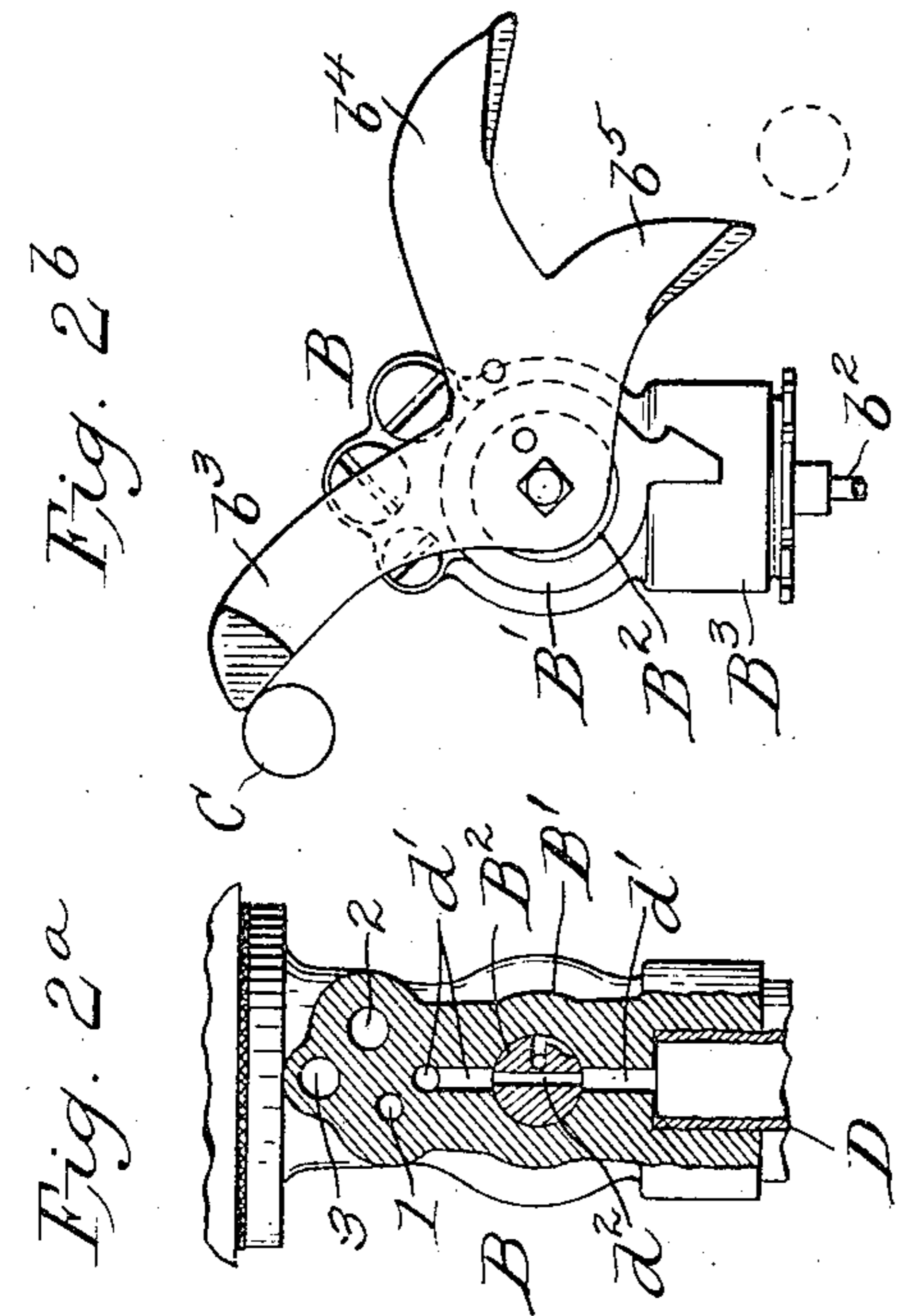
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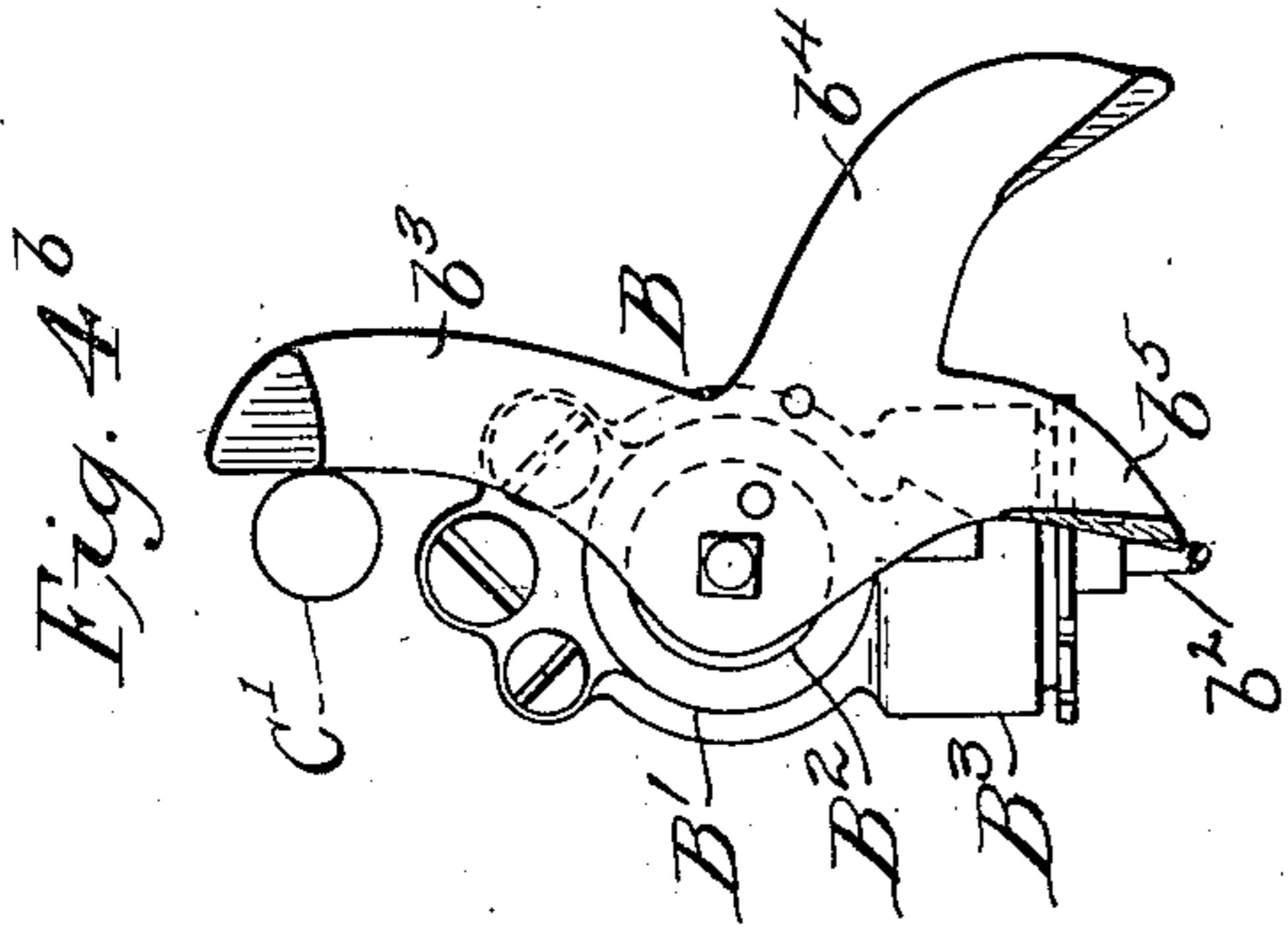


Fig. 4b

Fig. 5b

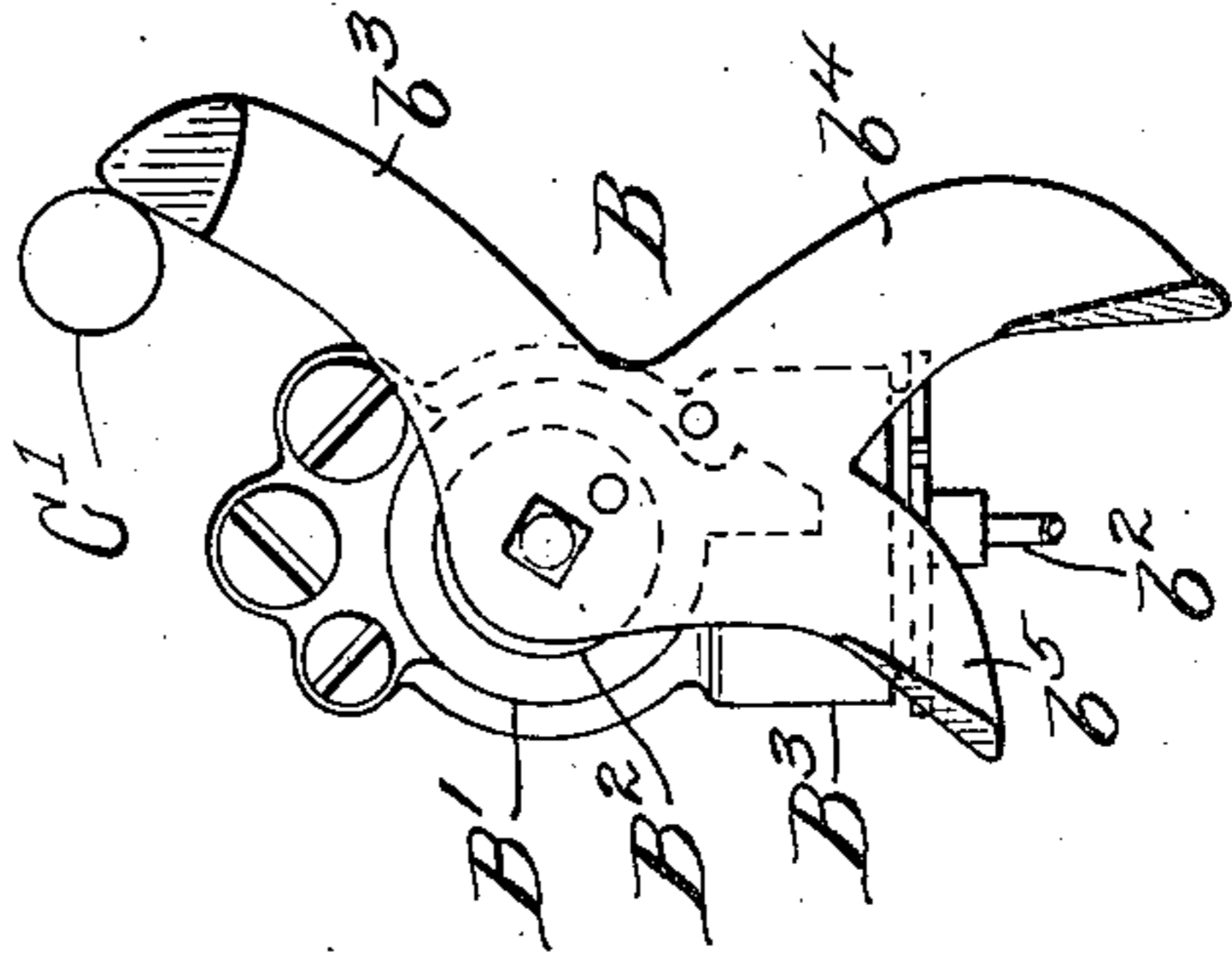


Fig. 4a

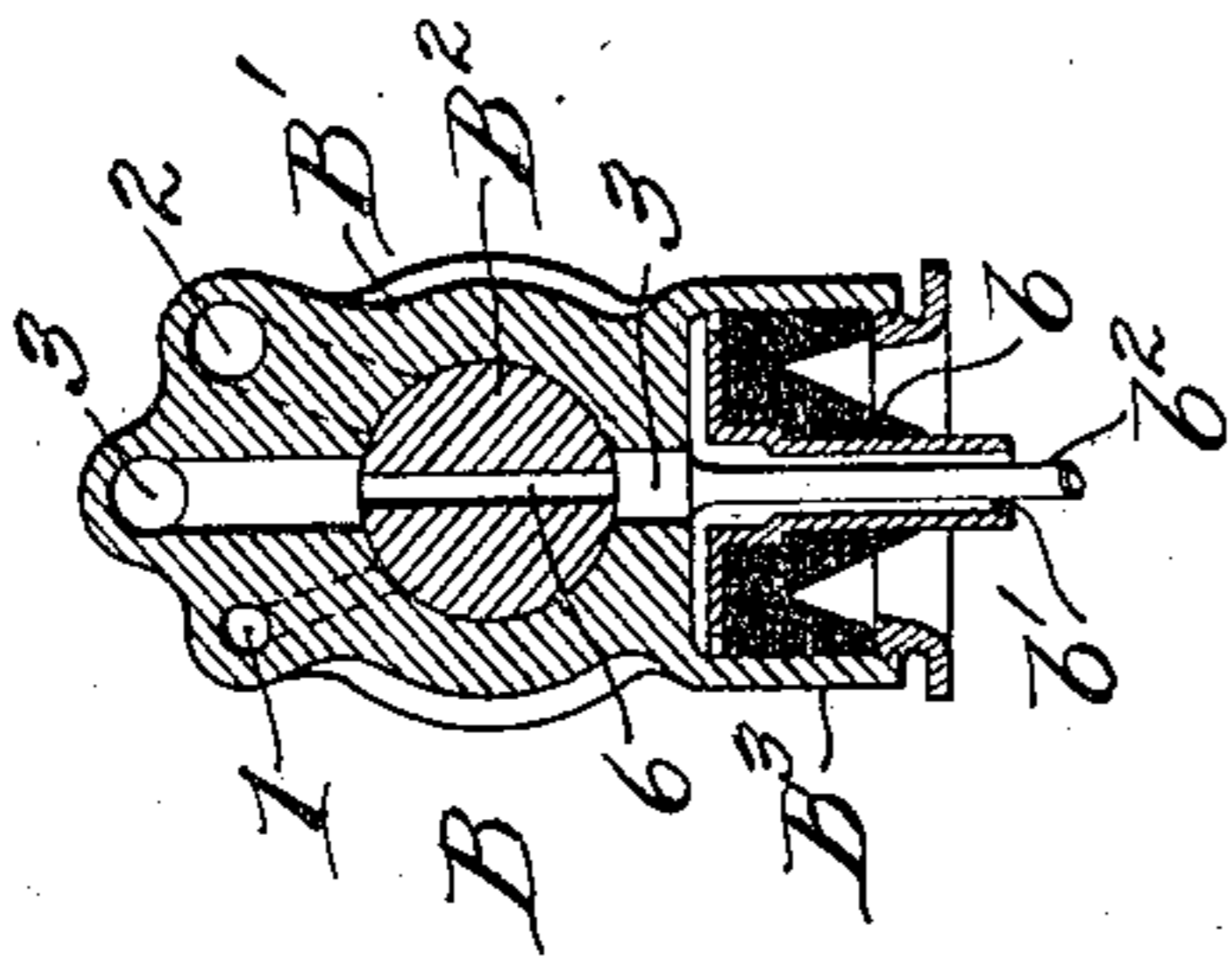


Fig. 5a

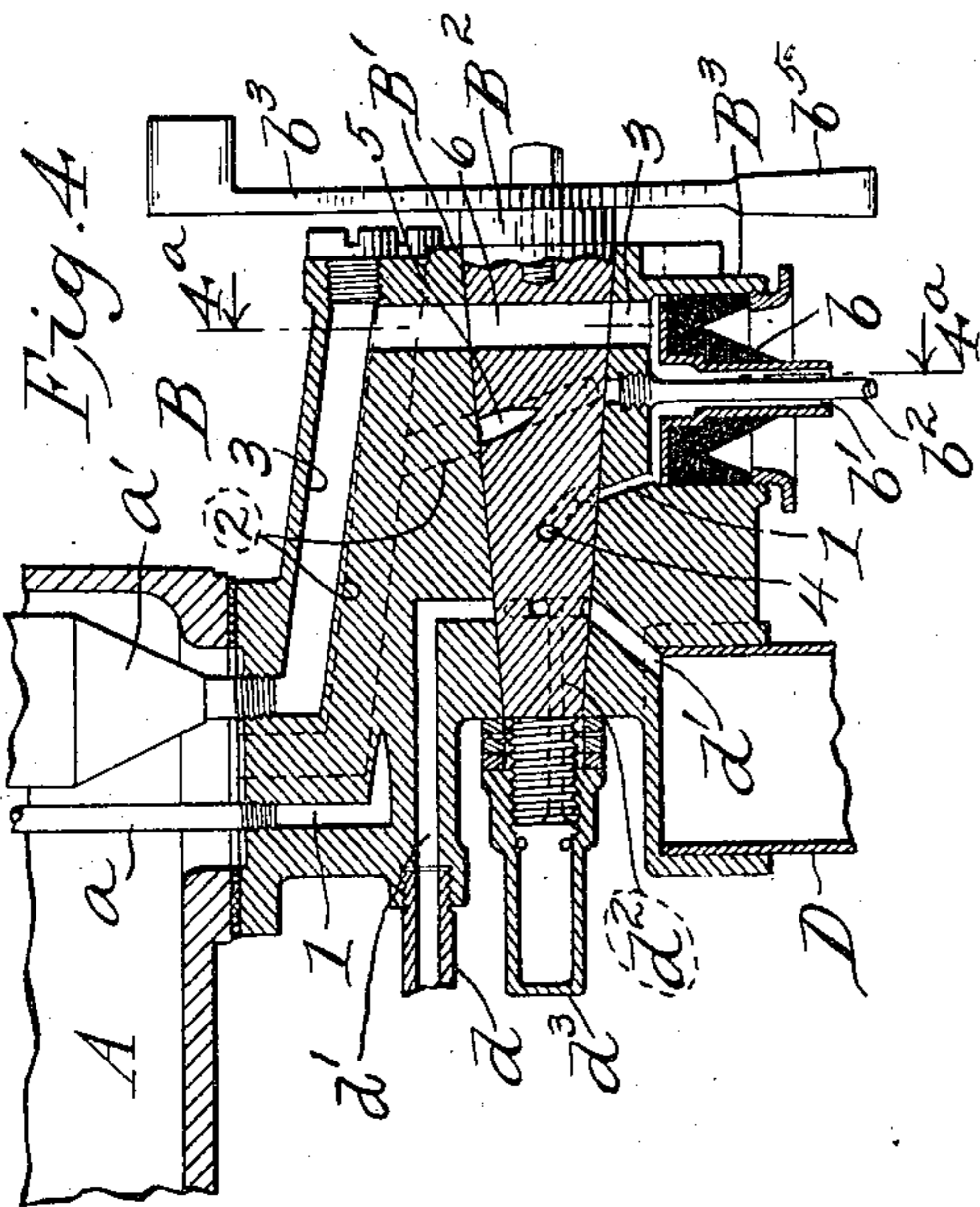
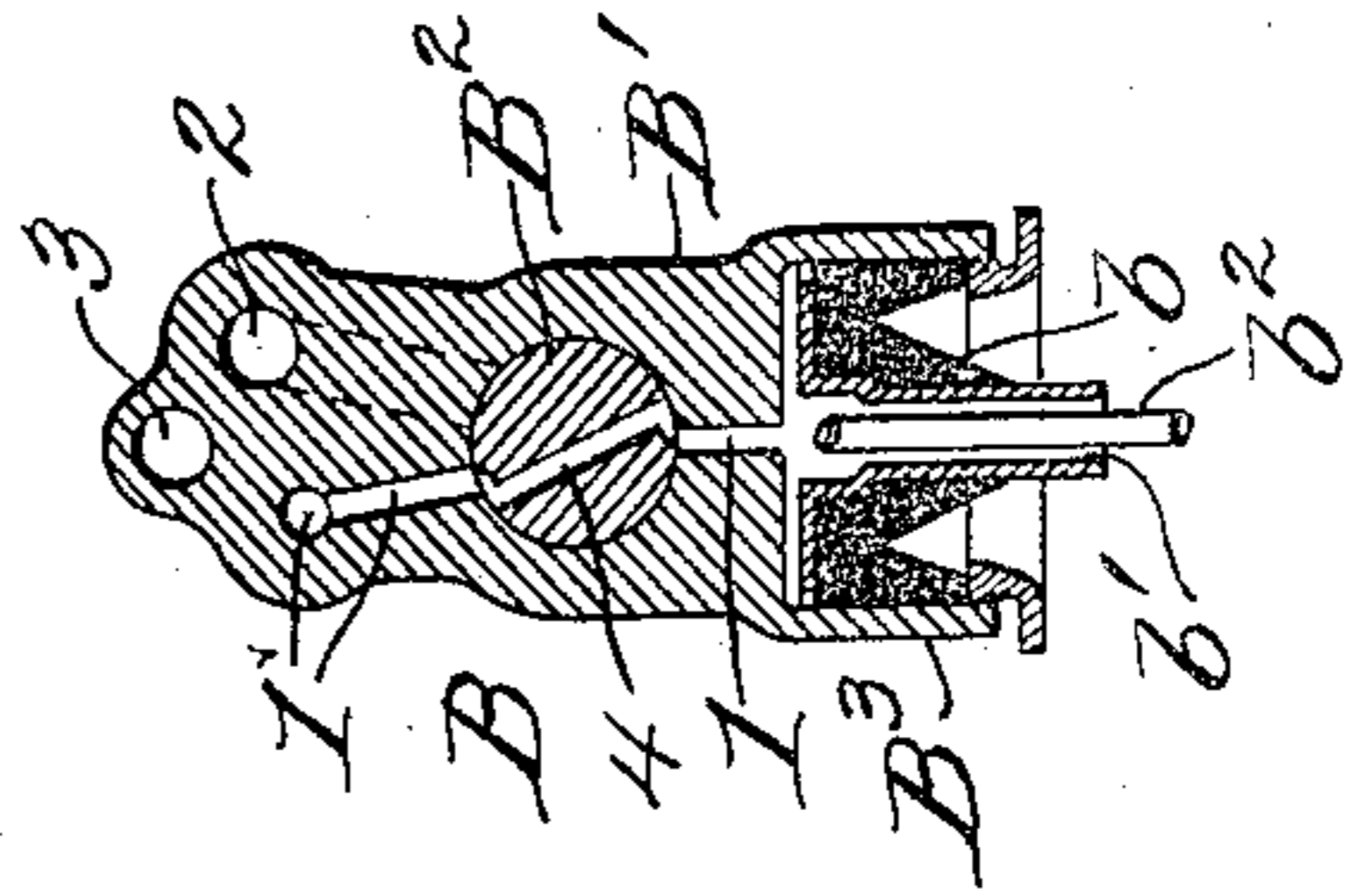


Fig. 4

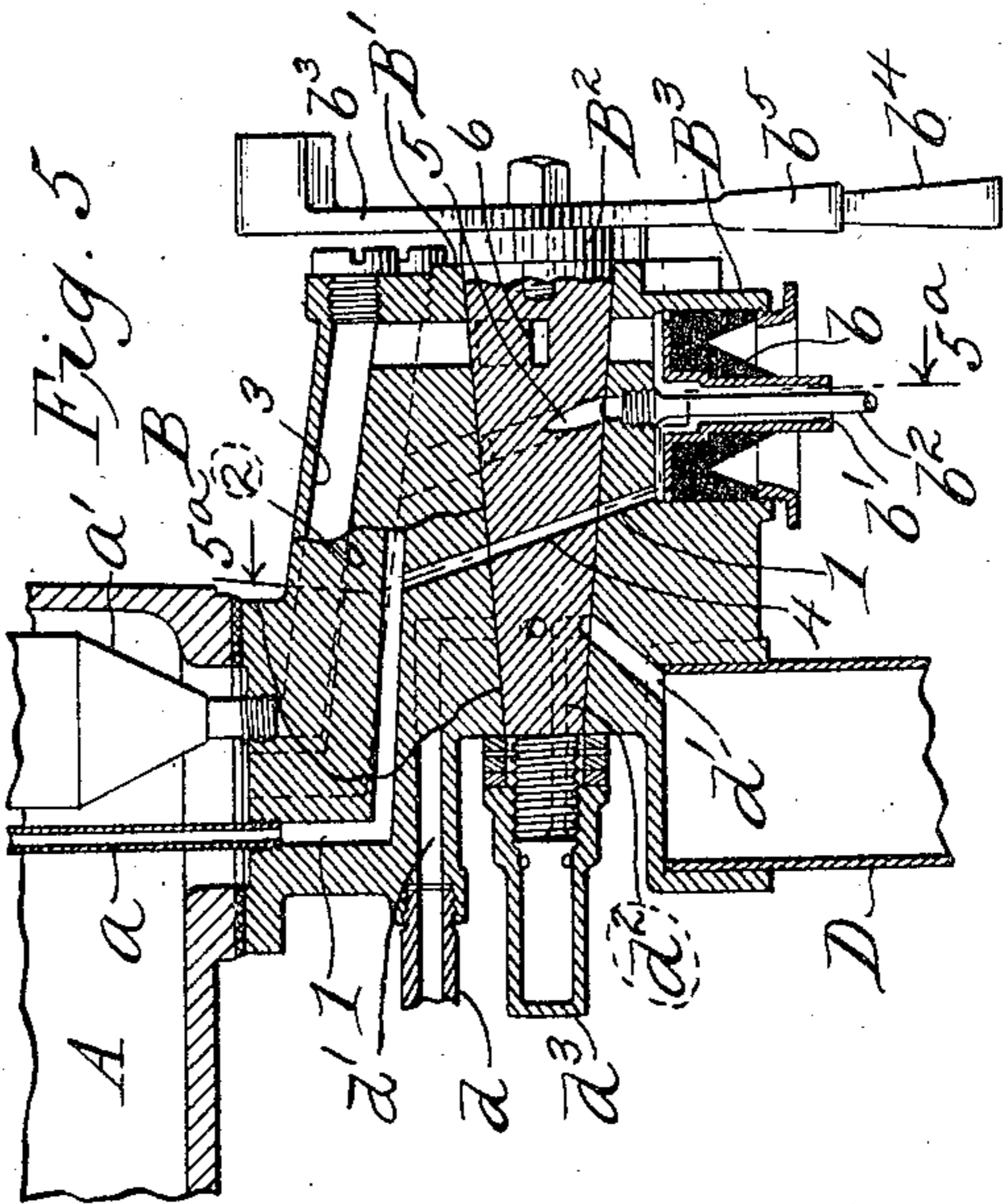


Fig. 5

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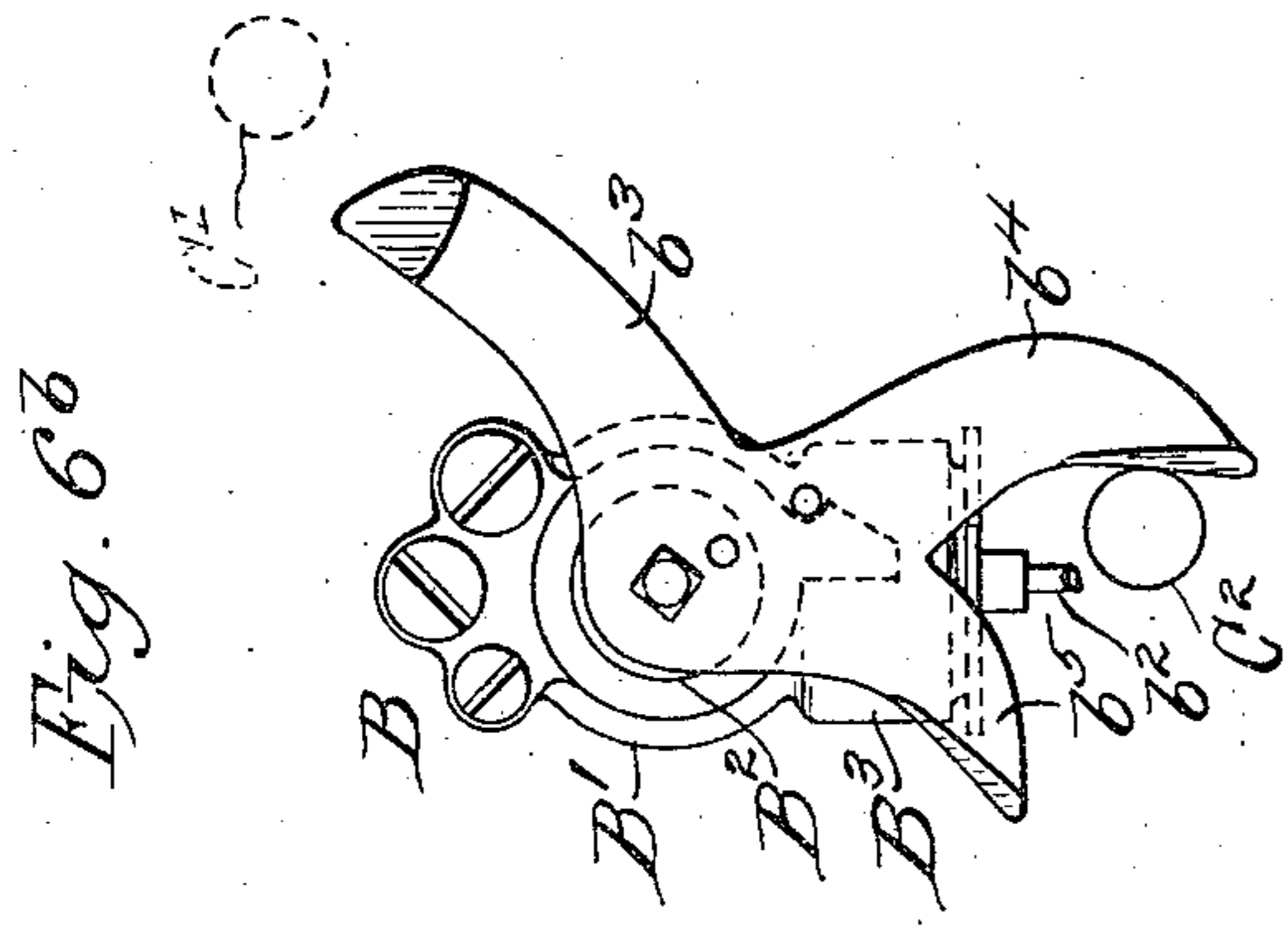


Fig. 6b

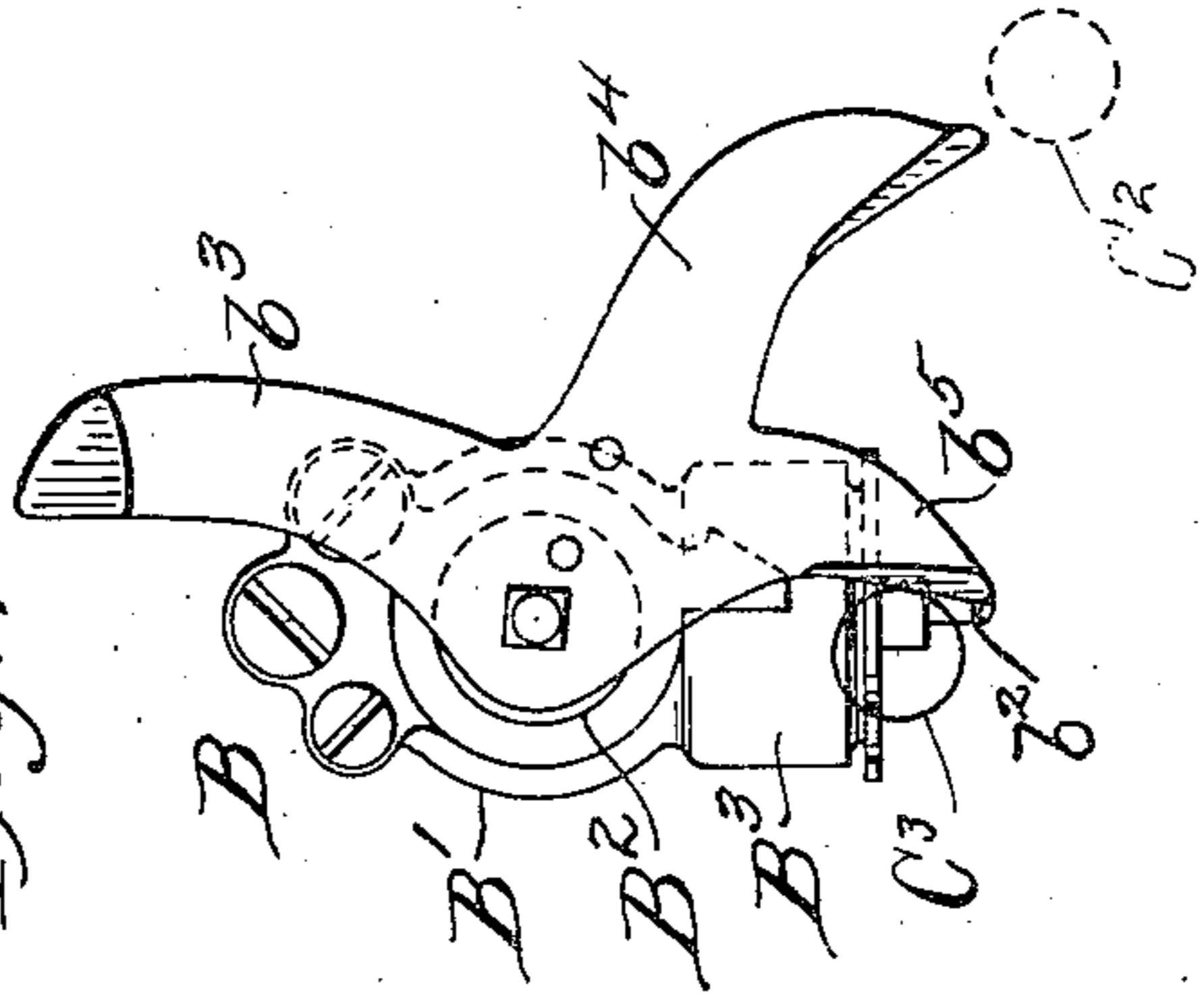


Fig. 7b

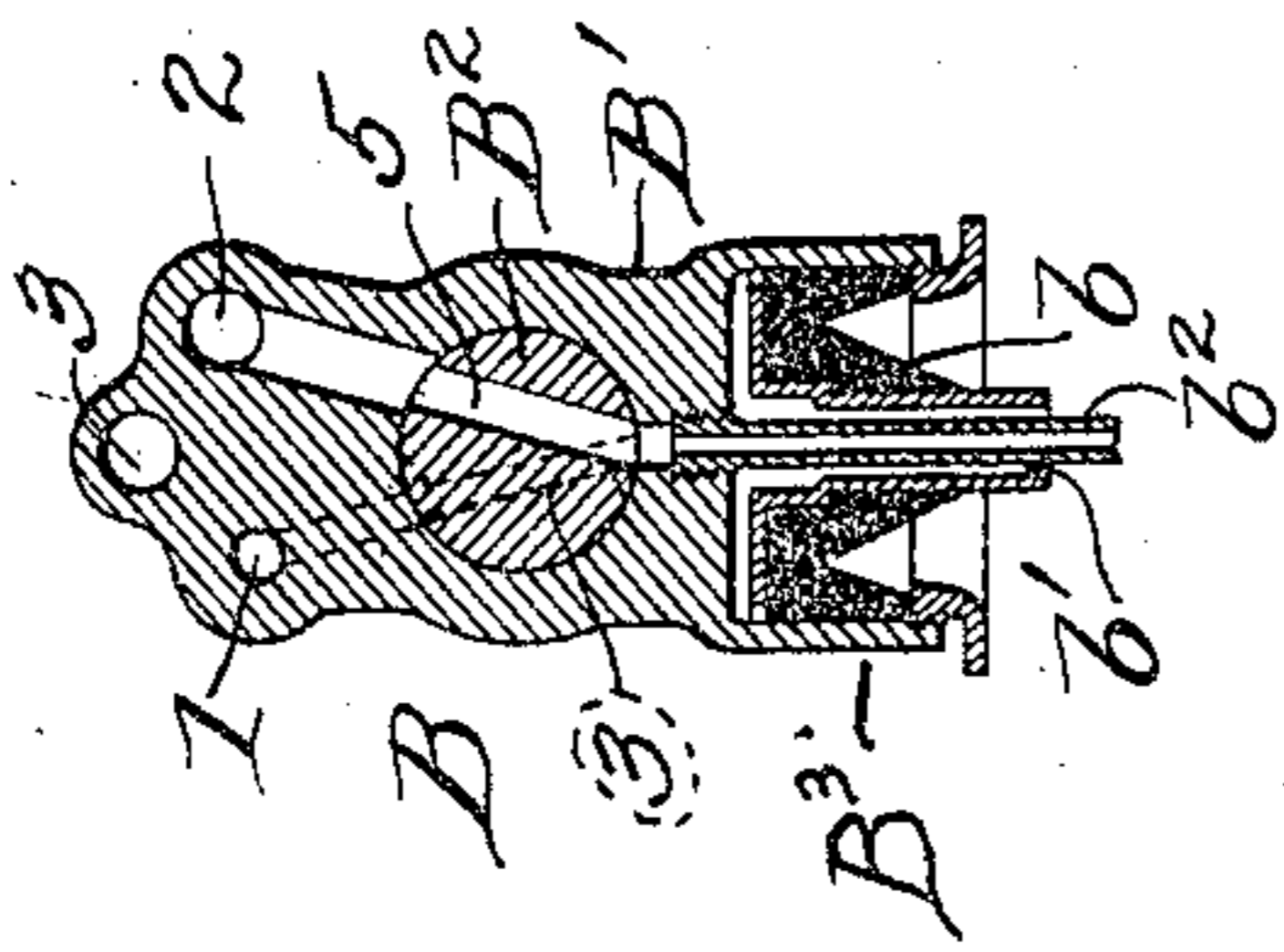


Fig. 6a

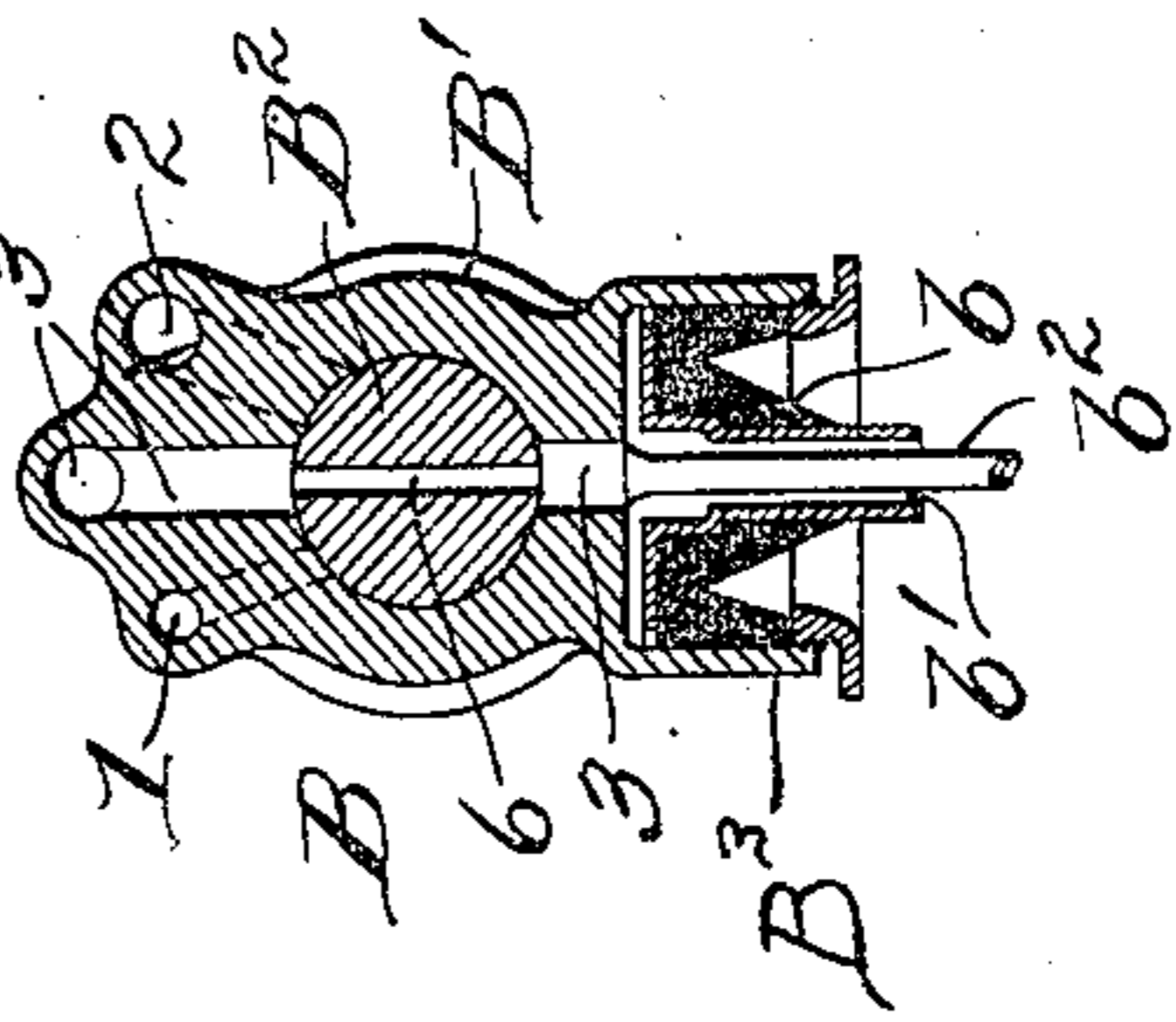


Fig. 7a

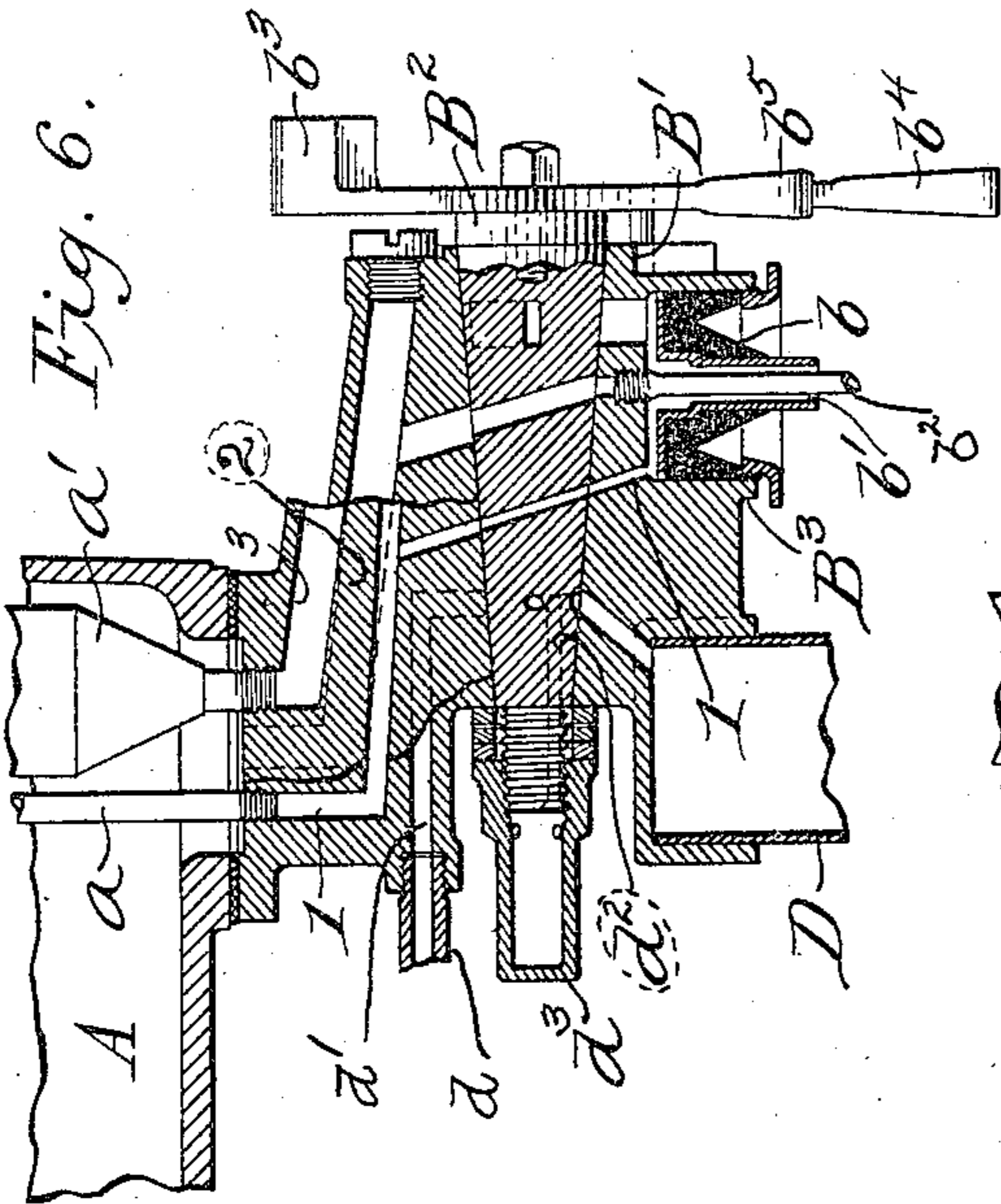


Fig. 6

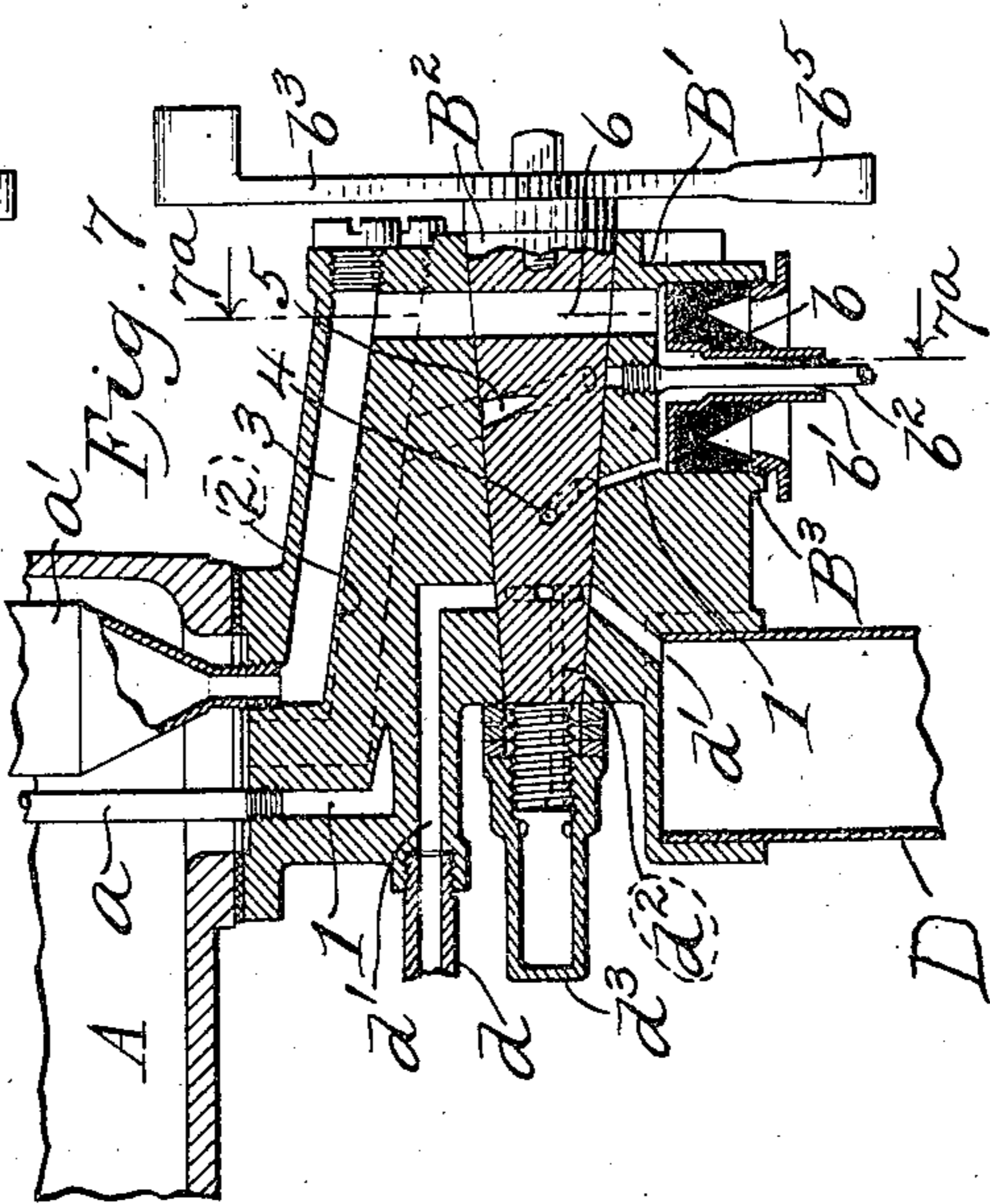


Fig. 7

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UNITED STATES PATENT OFFICE.

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BOTTLE-FILLING DEVICE.

1,154,746.

Specification of Letters Patent. Patented Sept. 28, 1915.

Application filed April 7, 1909. Serial No. 488,494.

To all whom it may concern:

Be it known that I, JOSEPH H. CHAMP, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Bottle-Filling Devices, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

The present invention, relating in general to bottling machines, is designed more particularly to provide a machine for bottling liquids under high pressures such as certain classes of carbonated beverages, for instance, Apollinaris water, which is desirably maintained under a pressure of about 35 lbs. It is of course, appreciated that in filling bottles with any kind of liquid, it is desirable that the bottle be filled well up in the neck, since otherwise it has the appearance of being only partly filled, irrespective of whether a full measure is held by the bottle or not. With these highly charged liquids, however, it has been found that even though they be filled under counter-pressure which prevents effervescence during the filling operation proper, the sudden fall in pressure incident to the disconnection of the bottle from the apparatus, and the consequent sudden expansion of the small quantity of gas left resting in the top of the bottle neck, forces more or less of the liquid therefrom likewise, with the untoward result already noted.

The object of the present invention, is the provision, then, of bottling apparatus that will overcome this difficulty. Obviously there is no intention of implying any restriction of its use to the single field referred to, by way of illustration, since there may be various other occasions to employ the principle of the invention in connection with varied bottling operations.

To the accomplishment of the foregoing ends, said invention consists of the means hereinafter fully described, and particularly pointed out in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings: Figure 1 is partly a sectional and partly a side eleva-

tional view of a filling apparatus wherein have been embodied my present improvements; Figs. 2, 2^a and 2^b are respectively a longitudinal central section, a transverse section, and an end view of the valve controlling the bottling operation, such valve being shown in its normal inoperative position; Figs. 3, 3^a, and 3^b similarly illustrate said valve in its first operative position, wherein a fluid pressure bottle lift is actuated to raise the bottle into contact with the bottle mouth-piece; Figs. 4, 4^a and 4^b similarly illustrate said valve in its second operative position, wherein the pressure in the bottle is preliminarily raised to a point intermediate between atmospheric and that in the filling tank; Figs. 5, 5^a, and 5^b similarly illustrate said valve in its third operative position, wherein the pressure in the bottle is fully equalized with that in the filling tank; Figs. 6, 6^a and 6^b similarly illustrate said valve in its fourth operative position, wherein the liquid enters the bottle; and Figs. 7, 7^a, and 7^b similarly illustrate said valve in its fifth operative position in which the excess pressure in the upper portion of the bottle necks is reduced in the fashion presently to be described.

The bottling filling device illustrated in Fig. 1 forms part only of the general machine to which it appertains, but inasmuch as it embodies all the features of present interest, it is not deemed necessary to show such machine in its entirety. It may be stated that the machine is of the rotary type, wherein, in other words, the filling tank is mounted so as to be rotatable around a vertical axis and bears about its periphery a plurality of filling devices, of which that illustrated, forms but one. As said tank rotates, the filling devices are successively supplied with bottles, then actuated to fill the bottles, and the latter thereupon removed, all of said operations being accomplished in more or less automatic fashion, depending upon the character of the machine and the use to which it is to be put. The particular type of rotary machine, moreover, to which the present apparatus belongs involves the utilization of a pressure fluid actuated lift, for the raising of the bottle against the bottle mouth-piece of the filling device. Such lift, likewise forming no part of the present invention, is illustrated only in part, and its operation need not be further referred to than to state that the supply of the pressure fluid to the motor and the exhaust of the

same therefrom is controlled by the same valve that controls the filling operation proper. Attention will now be directed to the latter, first describing the mechanism involved.

5 The tank A, of which a section only appears in Fig. 1, is provided as usual with suitable means (not shown) whereby the liquid to be filled into the bottles is maintained therein at a substantially constant level, and under a pressure suited to the character of the liquid. Assuming, for purposes of illustration that such liquid is Apollinaris water, this pressure, as has been already indicated, would be approximately 35 lbs. The distributing, or bottle filling, device B, proper, is attached to the under side of the tank and has communication with the tank's interior by various passages, whereby both the pressure fluid resting above the liquid in the tank, and such liquid may be admitted to a bottle supported in operative relation to the device. Such distributing device comprises a fixed valve member B' and a movable valve member B², said fixed valve member in the present instance bearing the bottle mouth-piece B³ wherewith the bottle is brought into contact in order to effect a seal therewith when it is raised by the bottle lift. Details of the construction of such mouth-piece need not be further noted than to remark (see Figs. 2 *et seq.*) that it includes a rubber gasket *b* having an annular groove of V-cross section on its under side, and formed with a central opening *b'*. A passage 1 in the fixed member of the device leads from such opening *b'* to a tube *a* that extends upwardly within a tank above the level of the liquid therein, so as to afford communication between such upper tank portion and the bottle when the movable valve member is properly disposed. Fitted in the opening in the bottle-mouth-piece and projecting downwardly there-through for a short distance, is a filling tube *b*² that communicates with another passage 2 in the fixed member of the device, opening directly into the bottom of the tank, such passage and tube serving to conduct liquid from the tank to the bottle when the movable member of the device is properly adjusted for this purpose. In addition to the passage just described, as communicating between the bottle and the upper portion of the tank, another passage 3 is provided in the fixed member of the device that has connection with the central opening in the bottle mouth-piece through which the filling liquid tube projects. This passage is connected at its upper end with a closed chamber or compartment *a'* conveniently located within the tank, and preferably in the form of a cylindrical tube sealed at its upper end.

65 The movable member B² of the filling de-

vice in the present construction is in the form of a plug that is rotatably held in a suitable seat in the fixed member, such seat intersecting the several passages 1, 2 and 3, that have just been described as leading from the bottle mouth-piece to the filling tank. Formed in the plug, as will be evident from an inspection of Figs. 2 to 7 inclusive, are transverse passages, 4, 5 and 6, adapted, when said plug is properly adjusted, to register with those portions of the passages in the fixed valve member that are intersected by the plug's seat. Since these passages in the plug can be most conveniently described by reference to their operative effect, description thereof will be deferred for the present.

Rotation of the valve in the present instance is designed to be effected automatically as the tank A of the machine rotates, or otherwise moves, in the manner already referred to, and to this end the plug B² provided at its outer end with an operating lever having three arms *b*³ *b*⁴ and *b*⁵ respectively adapted pending such translatory movement of the device to be engaged by suitably disposed lugs C, C' C² and C³ as diagrammatically represented in Figs. 2 to 7; respectively, so as to successively position said valve in six different positions, which I have denominated the normal or inoperative position, and the first, second, third, fourth and fifth operative positions.

In the normal or inoperative position of the device which is illustrated in Figs. 2, 2^a, and 2^b, all of the passages concerned in the filling operation proper are closed; and this condition still obtains in the first operative position, the movement of the valve to such position serving merely to effect a proper connection between a fluid pressure motor D operating the bottle lift, and the source of pressure supply therefor, whereby said lift may be elevated and the bottle raised, as previously described, into contact with the bottle mouth-piece of the filling device. A duct *d* and a passage *d'*, the latter being controlled by the valve plug B², are provided for supplying such fluid to opposite sides of the motor. The exhaust I preferably discharge through a longitudinal passage *d*² in the end of the valve plug and to muffle the noise incident to such discharge a perforated cap *d*³ is secured to such valve end.

In the second operative position illustrated in Figs. 4, 4^a, and 4^b, the rotative position of the valve is such as to bring passage 6 therein into register with passage 3 in the fixed valve member, so that communication is established between the bottle interior and the closed chamber *a'*. As will presently appear, the latter is normally under a pressure higher than atmospheric but not so high as that in the main tank A, so that a degree of counter pressure will be

built up in the bottle preliminarily to the admission of the full counter pressure characterizing the third operative position.

In such third operative position illustrated in Figs. 5, 5^a and 5^b, a further rotation of the plug serves to connect the main air supply and vent passage 1, through plug passage 4, with the central opening *b'* in the bottle mouth-piece, so that the pressure fluid resting above the liquid in the filling tank may be admitted into the bottle, and a full counter pressure there built up before the liquid is admitted. Admission of the liquid, however, follows immediately in the fourth operative position of the device shown in Figs. 6, 6^a, 6^b, where the filling tube *b*² depending through the mouth-piece into the bottle is connected with the lower portion of the tank A, through passages 2 and 5. It will be understood that the connection just described as having been made with the passage 1 still continues through this stage of the operation, as shown in dotted lines in Fig. 6^a.

To reach the position of parts characterizing the final operative position of Figs. 7, 7^a, and 7^b a reversal in the direction of rotation takes place cutting off in succession, the liquid supply passage 2, and the normal counter pressure supply-and-vent passage 1. Just before, however, the parts are returned to the normal inoperative position of Figs. 2, 2^a and 2^b, connection is effected between the bottle and the cylindrical closed chamber *a'* within the tank A as in the second operative position. The effect of this connection is to allow the layer of gas resting upon the liquid in the bottle neck under the high pressure of the filling tank to expand into such chamber *a'*, such expansion being sufficient to reduce the pressure of the fluid in question down to several pounds above atmospheric pressure. Upon the bottle being now brought finally to its normal position in which the lift is depressed and the bottle allowed to sink, the separation of the bottle from the mouth-piece B³ is unaccompanied by any violent expansion of gases therein and attendant spurting forth of its contents. Such contents, in fact, remain entirely quiescent, since the slight fall in pressure from several pounds above to atmospheric pressure is not accompanied by this phenomenon. The small closed chamber *a'* within the tank A will be filled from the exhaust gas taken from the bottle necks during the first few filling operations. As soon as this pressure, which will not exceed a few pounds above atmospheric, is obtained, it will be kept practically constant by partial exhausting of the same into the bottles as they are placed in the filling position. In the operation

shown in Figs. 4, 4^a and 4^b the bottles which are filled with air at atmospheric pressure are connected to the small chamber *a'*, thus allowing the pressure in the chamber to drop sufficiently to keep the same at a practically constant point.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. In a device of the character described, the combination of a bottle mouth-piece; a duct connected with said mouth piece for supplying a counter-pressure to a bottle to be filled; a duct for supplying liquid to said bottle; a closed chamber supplied with a fluid under a pressure lower than said counter-pressure and higher than atmospheric pressure; a duct connecting said chamber with said mouth-piece; and a valve arranged and constructed to close said last-named duct during the filling of liquid into said bottle and to open said duct after such filling has ceased substantially as set forth.

2. In a device of the character described, the combination of a bottle mouth piece; a liquid reservoir; a duct connected with said mouth piece for supplying a counter-pressure to a bottle to be filled; a chamber supplied with fluid under a pressure less than said counter-pressure and higher than atmospheric pressure; ducts respectively connecting said liquid reservoir and said chamber with said mouth piece; and a valve controlling said ducts, said valve being adapted to close the duct to said chamber, while the duct to said reservoir is open and, upon closing said reservoir duct, to open said chamber duct, substantially as set forth.

3. In a device of the character described, the combination of a bottle mouth-piece; a liquid reservoir; a duct connected with said mouth-piece for supplying a counter-pressure to a bottle to be filled; a closed chamber disposed at a higher level than said bottle; a duct connecting said chamber with said mouth piece; and a valve closing said last-named duct during the filling of liquid into said bottle and adapted to open said duct after filling has ceased, substantially as described.

Signed by me this 5th day of April, 1909.

JOSEPH H. CHAMP.

Attested by—

D. T. DAVIES,
MARY GLADWELL.