

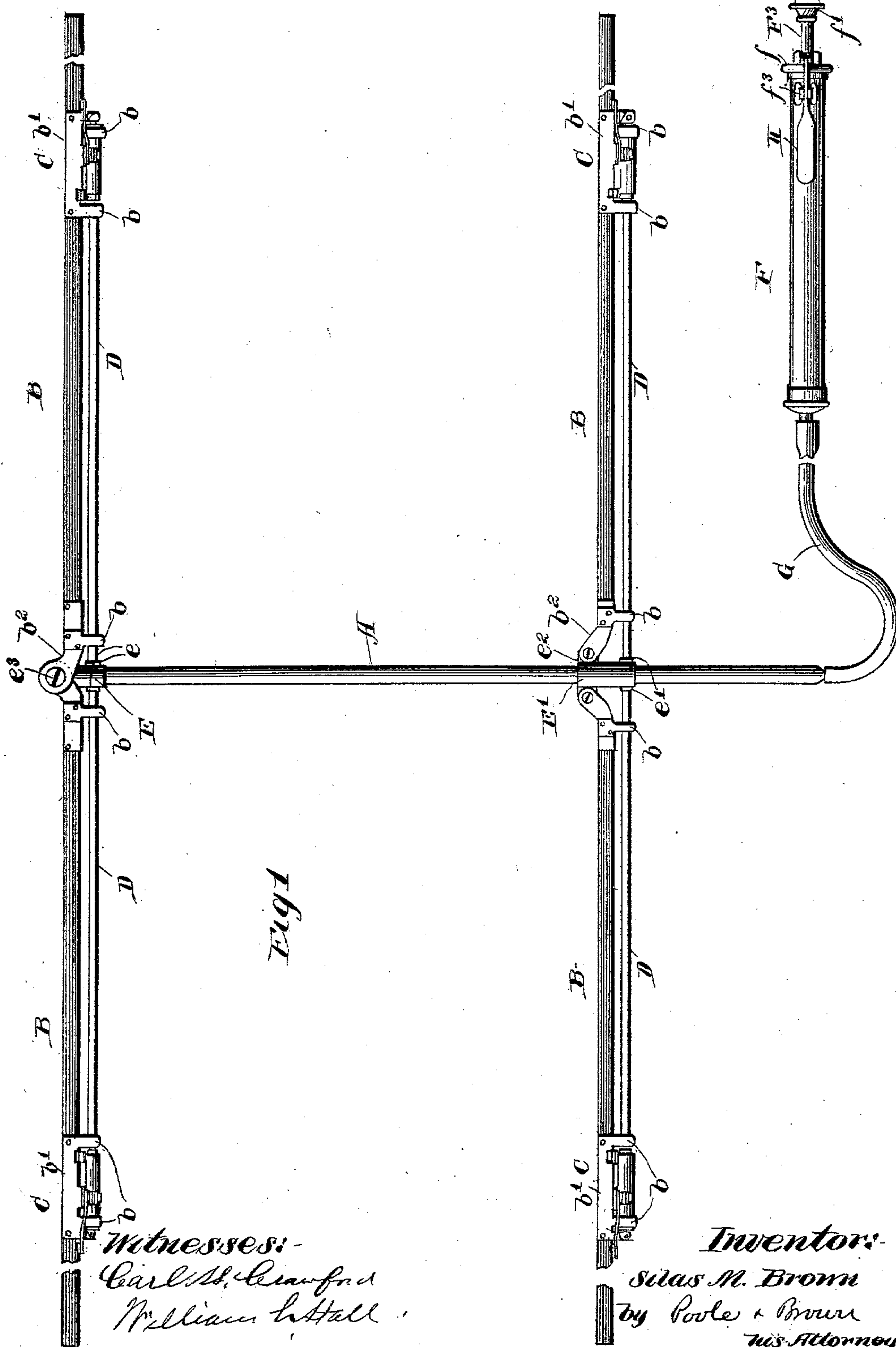
No. 720,881.

PATENTED FEB. 17, 1903.

S. M. BROWN.
FLASH LIGHT APPARATUS.
APPLICATION FILED NOV. 11, 1901.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses: -

Carl St. Crawford
William Hall

Inventor:

Silas M. Brown
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2 SHEETS—SHEET 2.

Fig 2

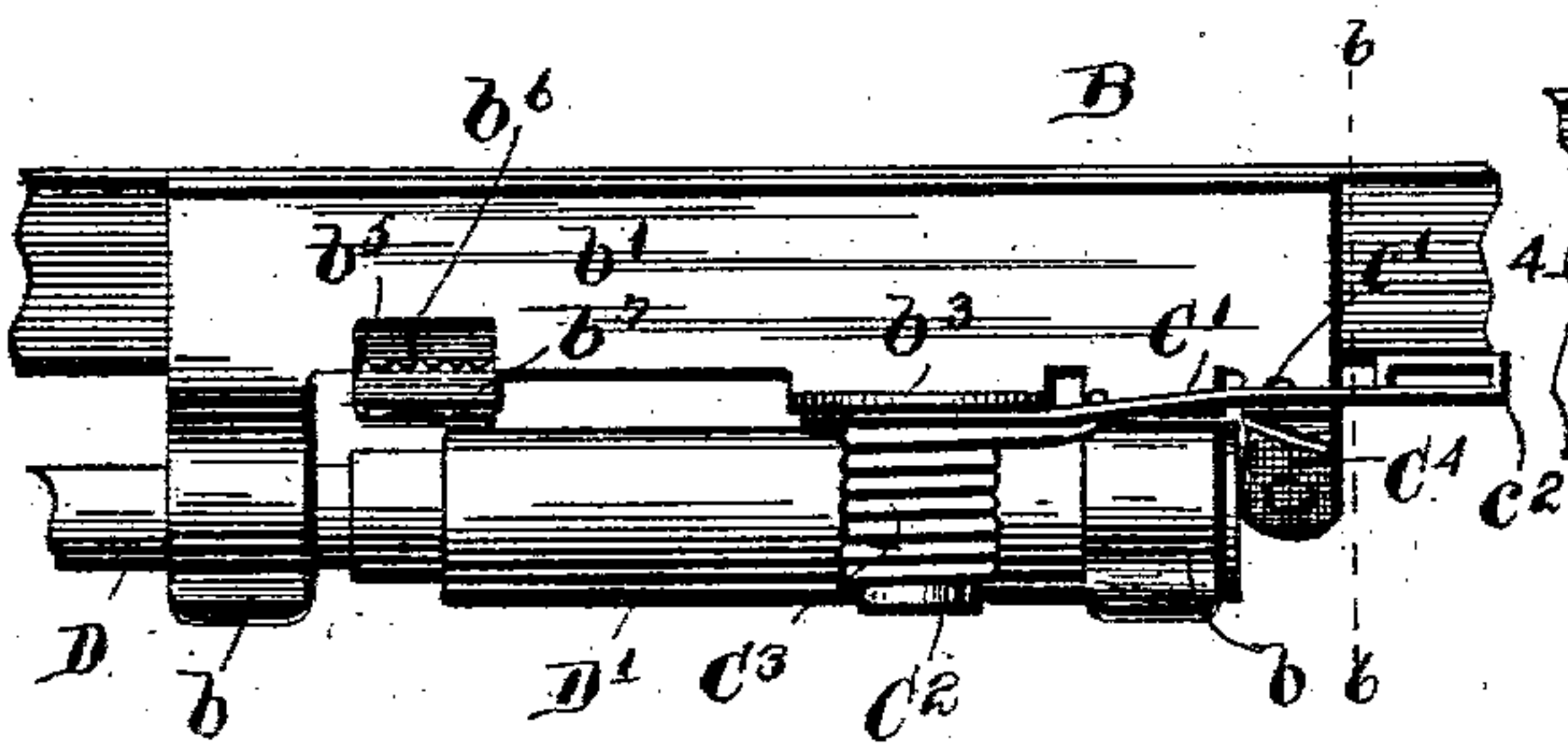


Fig 3

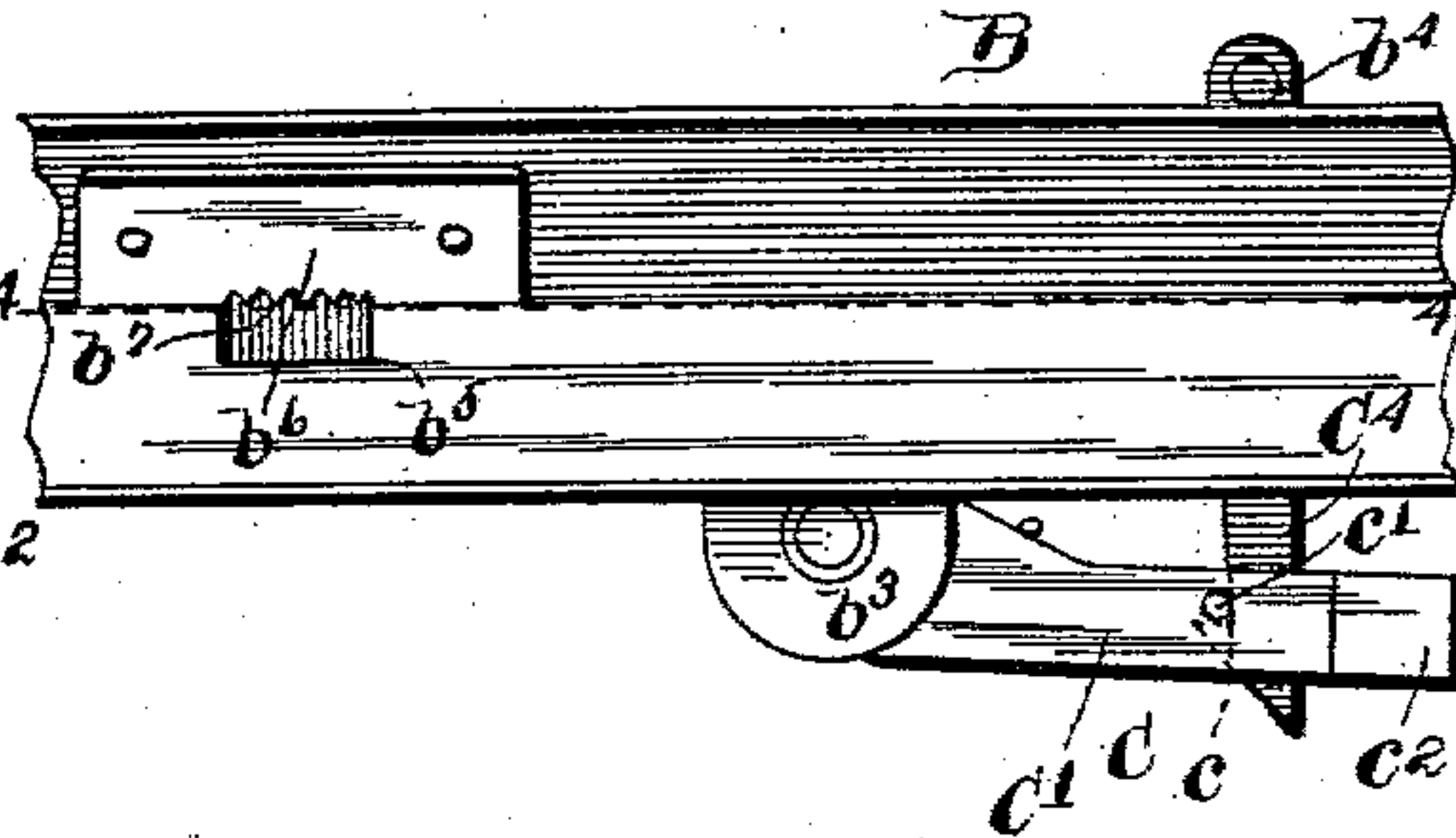


Fig 4

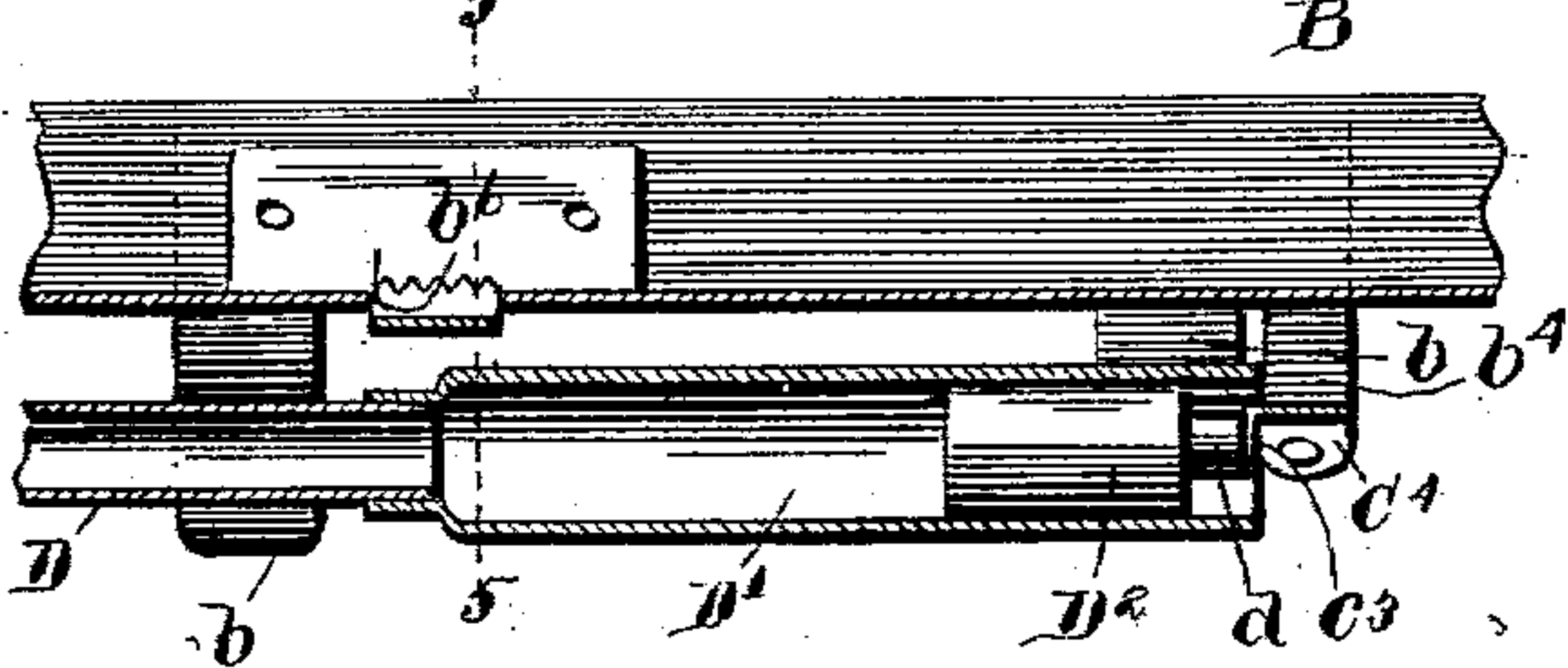


Fig 5

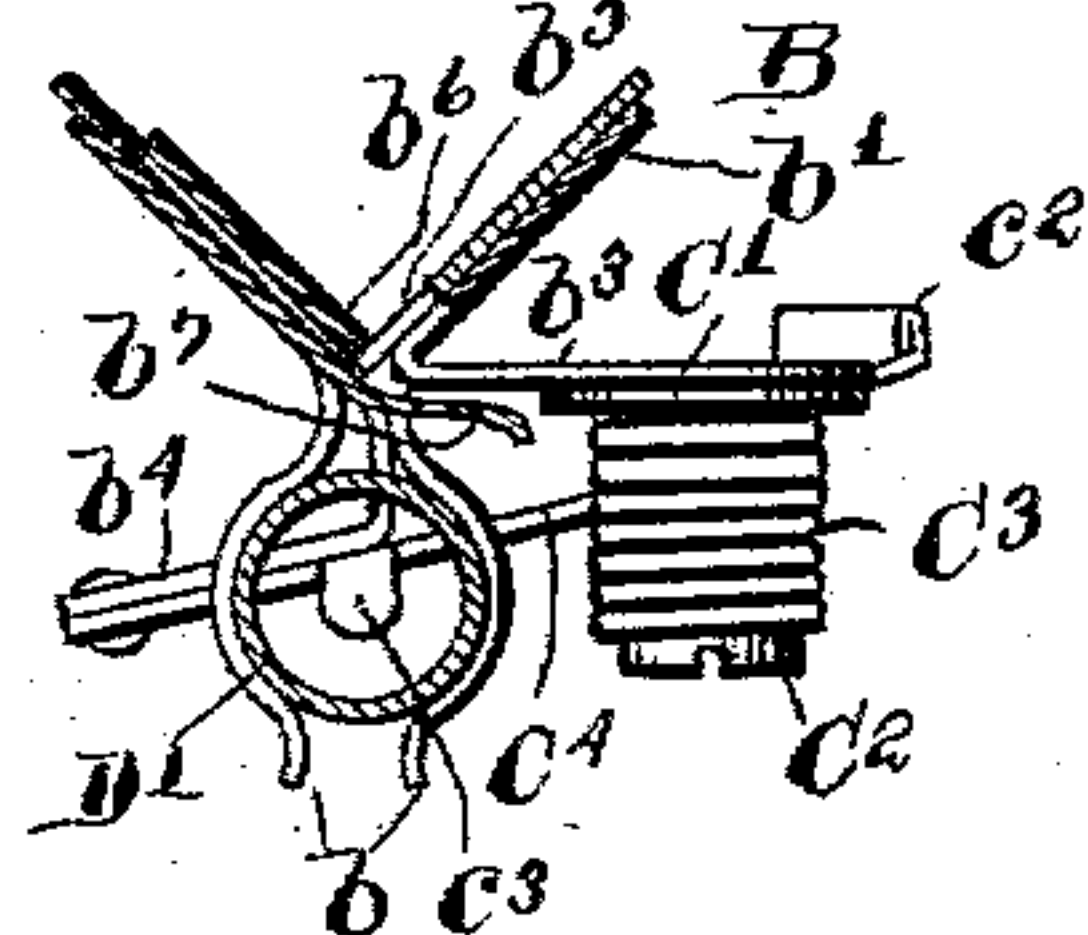


Fig 7

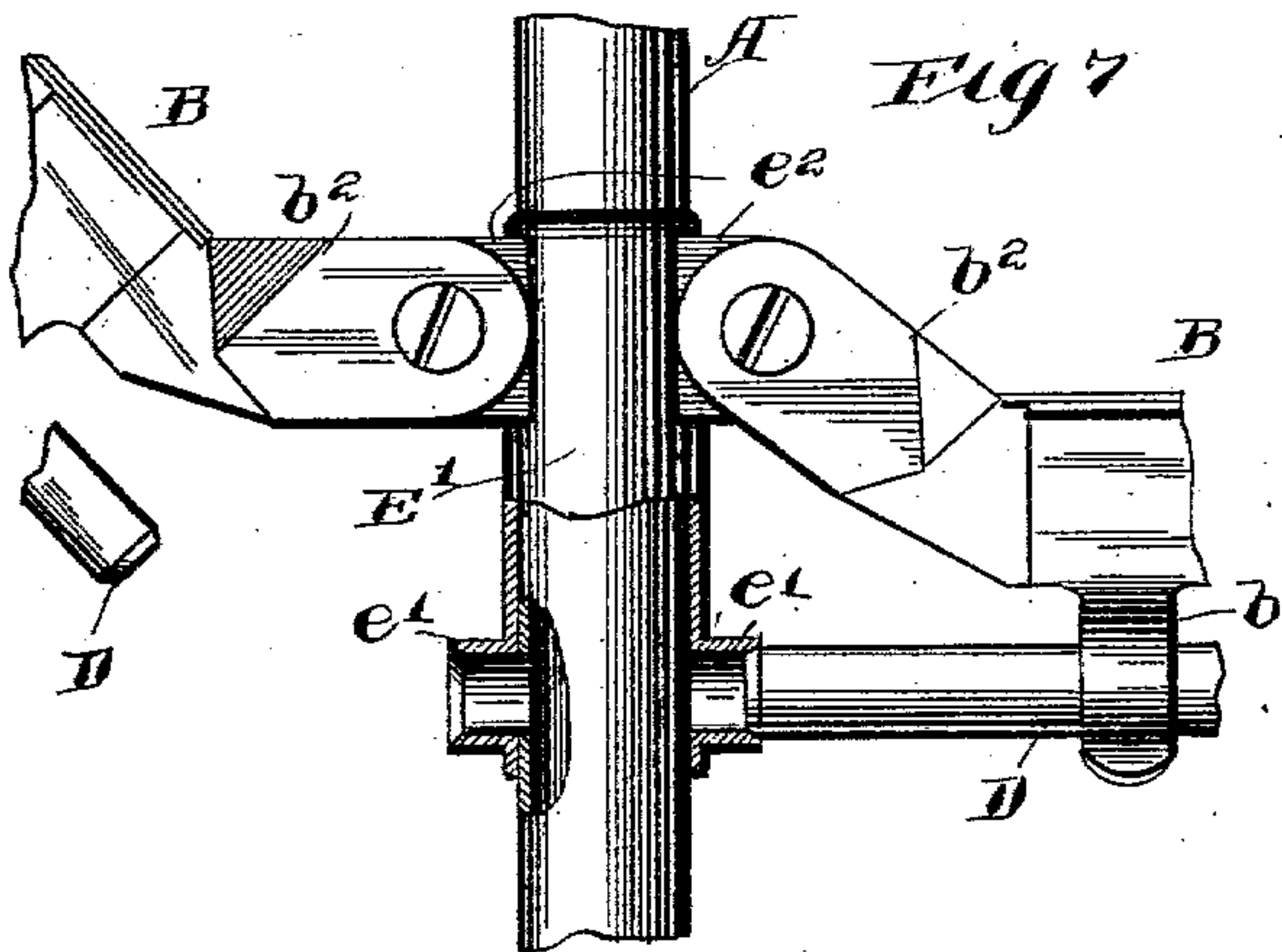


Fig 6

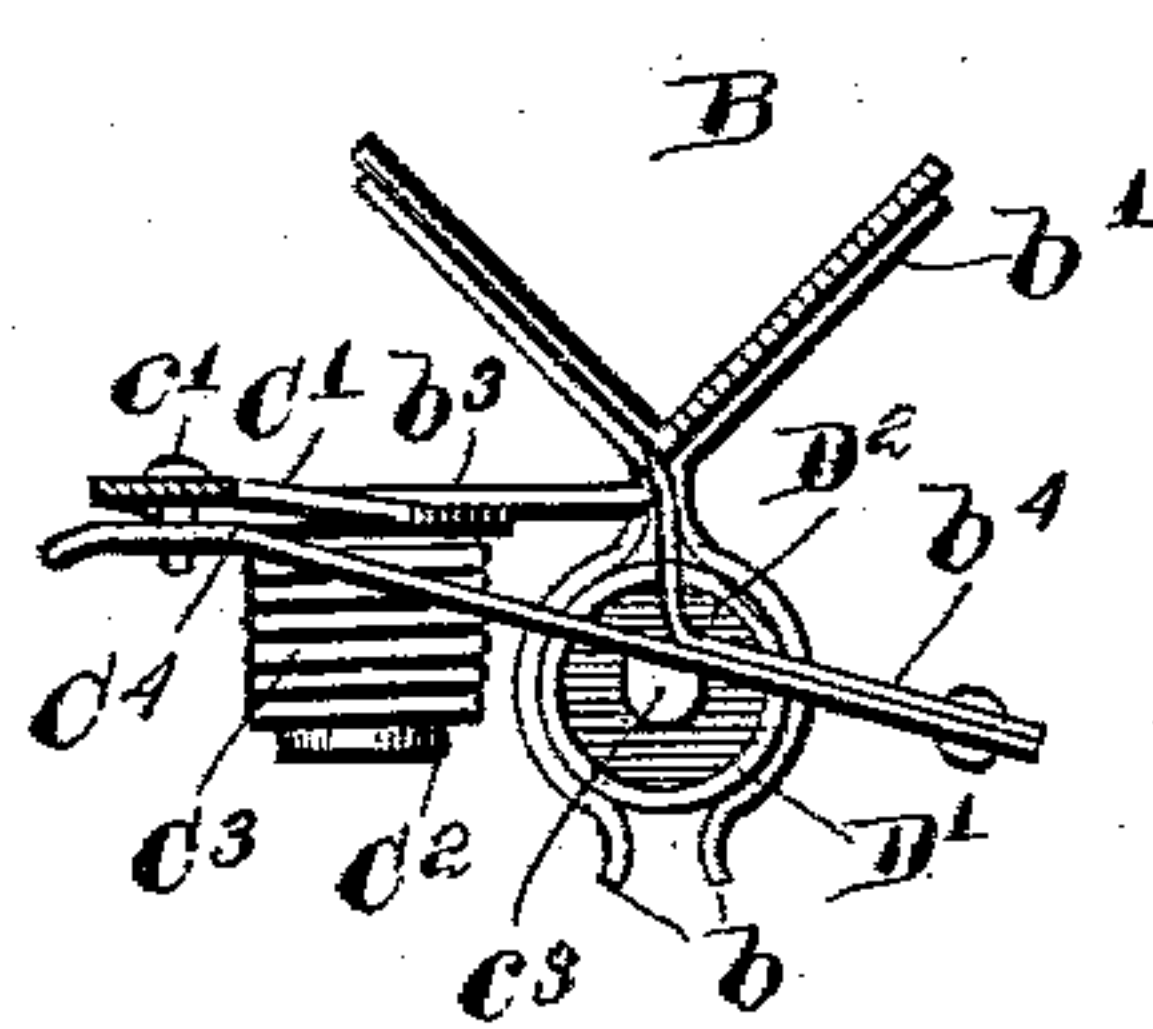
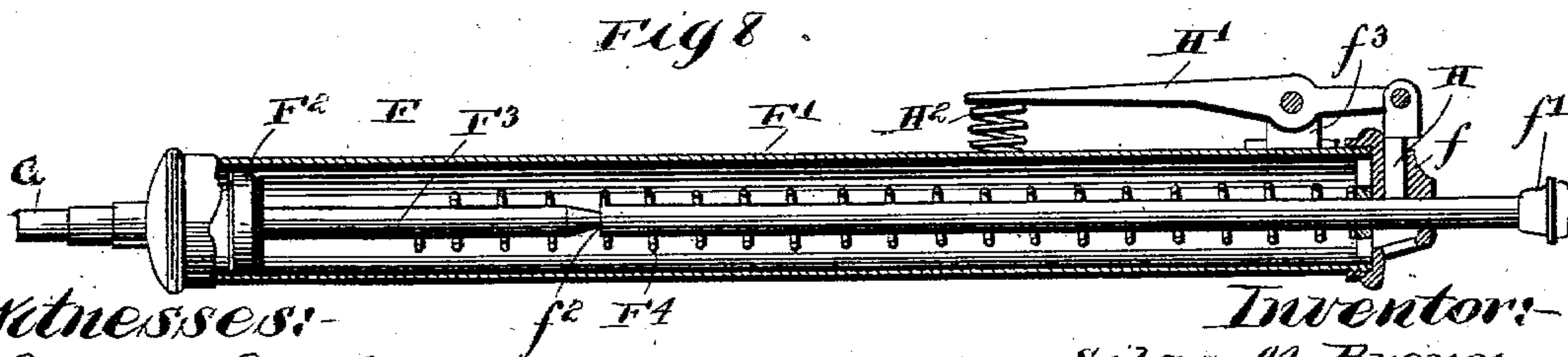


Fig 8



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UNITED STATES PATENT OFFICE.

SILAS M. BROWN, OF CHICAGO, ILLINOIS.

FLASH-LIGHT APPARATUS.

SPECIFICATION forming part of Letters Patent No. 720,881, dated February 17, 1903.

Application filed November 11, 1901. Serial No. 81,792. (No model.)

To all whom it may concern:

Be it known that I, SILAS M. BROWN, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Flash-Light Apparatus; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to a flash-light apparatus designed more especially for use by photographers for momentarily illuminating a scene or object to be photographed and in which is employed as the illuminant a highly-combustible powder, such as powdered magnesium.

Among the objects of my invention is to produce an apparatus of this character which is simple in its construction, which may be readily and economically operated, and which is portable, so as to be readily moved from place to place.

The apparatus herein shown embodying my invention embraces generally one or more shallow trays or receptacles adapted to contain the illuminant, an ignition device for each tray, and pneumatically-controlled means for actuating said igniting device or devices.

The invention consists in the matters hereinafter set forth, and more particularly pointed out in the appended claims.

In the drawings, Figure 1 is a side elevation, with parts broken away, of an apparatus embodying my invention. Fig. 2 is a side elevation of a fragment of one of the trays or receptacles for containing the illuminant, showing the associated igniting device. Fig. 3 is a plan view of the parts shown in Fig. 2. Fig. 4 is a longitudinal section taken on line 4 4 of Fig. 3. Fig. 5 is a transverse section taken on the indirect line 5 5 of Fig. 4. Fig. 6 is a transverse section taken on line 6 6 of Fig. 2. Fig. 7 is a fragmentary view illustrating the manner of hinging the lower pair of trays to the central tubular support and of connecting the branch pipes with said tubular support. Fig. 8 is a longitudinal section of the pump constituting part of the pneumatic devices.

As shown in the drawings, four trays or receptacles are employed, which are connected symmetrically to a central support; but one or a greater number of trays than illustrated may be employed, as desired.

In said drawings, A designates a vertical pipe, which desirably constitutes the main body of the device and which is designed to be supported in any suitable manner, as upon a tripod, to bring the same to the desired level of operation.

B B designate four horizontal open-topped sheet-metal shallow trays or receptacles which are arranged in upper and lower pairs, the trays of each pair being connected at their inner ends by means of hinged joints to the pipe A. The trays may be made of any desired or suitable form, and, as herein shown, consist of elongated trough-like receptacles which are open at their tops and the sides of which converge at their bottoms.

C C designate a plurality of igniting devices, one for each tray and supported upon and below said trays, as clearly shown in Fig. 1.

D D designate a plurality of branch pipes, which are adapted to be connected at their inner ends with the main pipe A and extend at their outer ends to the igniting devices C. Said branch pipes are sustained from the trays by means of clasps *b*, depending from said trays, said clasps being shown as made integral with suitably-formed sheet-metal plates *b'*, attached to the lower sides of the trays. Certain of said plates also support the igniting devices, as will hereinafter more fully appear. Said branch pipes are connected with the main pipe in such manner that the trays and said pipes carried thereby may be swung upwardly about their hinges into positions substantially parallel with the main pipe when the apparatus is to be transported, and when said trays and branch pipes are in their horizontal positions said branch pipes are connected with the main pipe by air-tight joints. The manner of connecting said branch pipes with the main or trunk pipe consists in this instance of upper and lower sleeves E E', which are slipped over the tubes in the manner shown in Fig. 7 and provided with laterally-extending nipples *ee'*, registering with openings in the main pipe,

and in the outer ends of which the inner ends of the branch pipes fit when said branch pipes are in their horizontal positions, as shown at the right-hand side of Fig. 7. Said inner ends of the branch pipes are desirably made conical and fit complementary annular seats in the ends of the nipples to provide air-tight joints at these points.

The hinges joining the trays to the supporting-pipe A consist of oblique arms b^2 on said trays, the lower pair of which arms are connected by transverse pins with laterally-extending lugs e^2 on the sleeve E' , and the arms of the upper trays are connected in overlapping relation by means of a pin e^3 with an upright extension on the upper sleeve E , as shown in Fig. 1. In case the trays be made of other form than here shown or be supported in a different manner the main and branch air-pipes will be varied to suit the different requirements or conditions.

The construction of the igniting devices is shown more clearly in Figs. 2 to 6, inclusive, and is made as follows: C' designates a horizontally-vibratory spring-pressed hammer, which is loosely connected or pivoted at one end to a stud C^2 , depending from an arm or bracket b^3 on the adjacent clasp-plate b' , as herein shown. C^2 designates a spiral spring which surrounds said pivot-stud and is attached at one end to said stud and at its other end to the arm and is so formed as to tend to throw the hammer C' inwardly toward the inner end of the tray. C^4 designates a detent-lever, which is pivoted at one end to an arm b^4 , made integral with the clasp-plate b' , and the outer or free end of said latch is provided with a tooth or detent c , adapted to engage a lug or projection c' on the hammer C' when the hammer is in its retracted position, as more clearly shown in Fig. 3. When said hammer is in its retracted position, the spring C^3 is placed under tension, and when said hammer is released said spring acts to throw the hammer inwardly with considerable force against the lower side of the tray. Said tray is provided at its lower side and in line with the free end of the hammer, when the latter is thrown inwardly in the manner stated, with an opening b^5 , through which the hammer is adapted to project when thrown inwardly. Means are provided for exploding a charge of fulminate when the hammer is thus thrown inwardly, and thereby ignite the illuminant contained in the tray. Said fulminate may be placed on the tray adjacent to the opening b^5 and exploded by contact with the hammer, or said hammer may be constructed to carry the fulminate and explode the same by contact with the tray or a part attached thereto. The latter construction is herein shown, the hammer being provided at its outer end with a loop or socket c^2 , adapted for the reception of a charge of fulminate, and the tray is provided adjacent to said opening with a contact-plate b^6 , having a serrated edge against which the charge of fulminate car-

ried by the hammer C' strikes. A convenient manner of furnishing the fulminate is to insert the charged or striking end of a match into said loop or socket in such manner that said charged end of the match will strike the serrated edge of said plate b^6 . The plate b^6 is formed to provide a tongue or projection b^7 , Figs. 2 and 5, which extends below the opening b^5 in said tray and prevents the powdered illuminant dropping therefrom.

The means for pneumatically actuating the igniting devices are made as follows: F designates an air-pump, consisting of a cylinder F' , a piston F^2 , a piston-rod F^3 , connected with the piston and extending through one head or cap f of the cylinder and provided at its outer end with a handle f' , and a spring F^4 , surrounding said rod and adapted to be compressed when the piston is moved outwardly in the exhaust stroke thereof. Said pump is connected by a pipe G with the main or trunk pipe A of the apparatus and there-through with the branch pipes. Means are provided for holding said piston and piston-rod in their outermost positions, consisting of a latch H on the casing, which is adapted for engagement with an annular notch f^2 on the rod, as shown in Fig. 8, when said rod is pulled outwardly in the exhaust stroke of the piston. Said latch H has sliding engagement with the cap f of the cylinder and is pivoted at its outer end to one end of a vibratory lever H' , which latter is pivoted between its ends upon a stud f^3 , formed on or attached to the outer surface of the cylinder of the pump. Interposed between the end of the said lever remote from the latch H and the cylinder is a spiral expansively-acting spring H^2 . When the piston and piston-rod are pulled outwardly to exhaust the air from the connected pipes A and D, said latch is forced by the spring H^2 into engagement with said notch of the piston-rod when the latter is brought into line with said latch and holds the piston retracted against the action of the spring F^4 until said latch is released. To the outer end of the branch pipes D are attached axially-aligned barrels or cylinders D' , as shown in Figs. 2, 4, 5, and 6, and in each of said cylinders is a plunger D^2 . The bracket or arm b^4 and the detent-lever C^4 extend across the outer open end of the barrel, and said plunger is confined in said cylinder at one end by said arm b^4 and at its other end by an annular shoulder in said cylinders, where it is joined to the branch pipe. Said plunger is provided with an axial extension or stud d , which is adapted when the plunger is in its outermost position for engagement with a lug c^3 , formed on the detent-lever C^4 , as clearly shown in Figs. 4, 5, and 6. When, therefore, said plunger is forcibly driven backwardly to the outer end of the barrel or cylinder D' , the extension d of the plunger strikes said lug c^3 of the detent-lever C^4 and acts to release said detent-lever from the hammer and permit an explosion of the ful-

minate under the action of said spring-pressed hammer.

In the operation of the device the branch pipes are disposed horizontally, as shown in Fig. 1, so that the main pipe A is in communication with said branch pipes and with the pump. The trays are filled with the proper amount of illuminant, and the hammers are set and charged with the proper amount of fulminate, the plungers D² being moved inwardly in the cylinders D' when the hammers are set. The piston of the air-pump is drawn outwardly a distance sufficient to permit the latch H to be engaged with the notch f² of the piston-rod, and said latch then acts to hold said piston in its retracted position. The latch H is then released by pressing inwardly on the free end of the lever H², which causes the piston F² in the air-pump to be suddenly forced inwardly, and thereby forces the air in the cylinder through the main and branch pipes of the apparatus. The plungers D² of the cylinders D', connected with said branch pipes, are thereby forced outwardly by the pressure of air, and said plungers acting against the detent-levers C⁴ operate there-through to release said hammers and ignite the illuminant.

One of the main or principal advantages arising from the use of my improved flash-light apparatus is the ease and facility with which the same may be operated and its ready adaptability to various locations. This is due to the fact that the aperture comprises in itself all of the elements or devices necessary to its complete operation and is not required to be attached to extraneous power devices for actuating the igniting devices. Moreover, the pneumatically-operated actuating devices are very simple and may be economically constructed and comprising few parts are not likely to get easily out of order.

It is preferable that the plungers D² of the cylinders D' should have a considerable amplitude of movement in said cylinders, so that when the piston of the air-pump is drawn back the suction thereby produced will draw the said plungers inwardly away from the detent-levers on which they act in effecting the release of the hammers, and said pistons will, when thrown outward in the cylinders on the release of the pump-piston, act with a hammer-blow on said detent-levers, thereby making the operation of the device more certain and positive and requiring less power for the actuating of the apparatus than would be the case if the plungers were always in contact with said detent-levers and the air-pressure acted through said pistons on said levers to effect the release of the hammers.

It will be obvious that a single air-pump may be used not only for operating the set of igniting devices belonging to a single apparatus, such as is illustrated, but one pump may be used to operate several sets of igniting devices located at different places. As, for instance, in photographing a large scene,

such as the stage of a theater, a number of apparatuses like the one herein shown may be stationed at several points and all of them connected by branch pipes to the outlet of an air-pump like that illustrated, and in that case the igniting devices of all of the apparatuses would be operated at once by manipulation of the air-pump.

It is obvious that many changes may be made in the structural details without departing from the spirit of my invention, and I do not wish to be limited to such details except as hereinafter made the subject of specific claims.

I claim as my invention—

1. A flash-light apparatus comprising a supporting-pipe adapted for connection with an air-forcing device, a plurality of trays or receptacles supported on said pipe, an igniting device for each of said trays, branch pipes communicating at their inner ends with said supporting-pipe and pneumatically-operated means communicating with the outer ends of said branch pipes for actuating said igniting devices.

2. A flash-light apparatus comprising a main supporting-pipe adapted for communication with an air-forcing device, a plurality of trays hinged to the supporting-pipe in a manner to swing toward and away from said pipe, an igniting device for each tray, a plurality of branch pipes, one supported on each tray and each communicating with said trunk-pipe, and pneumatically-operating means communicating with the outer ends of said branch pipes for actuating the igniting devices.

3. A flash-light apparatus comprising a main supporting-pipe, a plurality of trays hinged to the said pipe in a manner to swing toward and away from said pipe, an igniting device for each tray, a plurality of branch pipes, one supported on each tray, pneumatically-operated means at the outer ends of said branch pipes for actuating said igniting devices, and nipples on said supporting-pipe adapted to register with the inner ends of the branch pipes when the latter and the trays are in their lowermost positions.

4. A flash-light apparatus comprising a tray or receptacle for the illuminant, an igniting device embracing a spring-pressed hammer, a detent-lever for holding said hammer in its retracted position, and pneumatically-operated means for releasing said detent-lever.

5. A flash-light apparatus comprising a tray or receptacle for the illuminant, an igniting device comprising a spring-pressed hammer, a detent-lever for holding said hammer in its retracted position, an air-cylinder, and a plunger in said cylinder adapted for engagement with said detent-lever.

6. A flash-light apparatus comprising a tray or receptacle for the illuminant, an igniting device comprising a spring-pressed hammer, a detent-lever for holding said hammer retracted, an air-cylinder, a plunger in said air-

cylinder adapted for engagement with said detent-lever, and an air-pump communicating with said air-cylinder.

7. A flash-light apparatus comprising a supporting-pipe, a plurality of trays or receptacles supported on said pipe, igniting devices for each of said trays, branch pipes communicating at their inner ends with said supporting-pipe, pneumatically-operated means communicating with the outer ends of said branch pipes for actuating said igniting devices, a pump communicating with said supporting-pipe, a spring applied to actuate the piston of said pump, and means for locking said piston in a fixed position constructed to suddenly release the same.

8. A flash-light apparatus comprising a tray or receptacle for the illuminant, an igniting device comprising a spring-pressed hammer, a detent-lever for holding said hammer retracted, an air-cylinder, a plunger in said air-cylinder adapted for engagement with said detent-lever, an air-pump connected with said cylinder, and means for locking the piston of said pump in a fixed position constructed to effect the sudden release of the same.

9. A flash-light apparatus comprising a tray or receptacle for the illuminant, an igniting

device embracing a horizontally-swinging hammer, means on the outer end of said hammer for carrying a charge of fulminate and means for effecting the operation of said hammer, said tray being provided with a lateral opening through which the hammer is adapted to project when in its innermost position, and with a part against which said fulminate is adapted to strike.

10. A flash-light apparatus comprising a tray or receptacle for the illuminant, an igniting device embracing a swinging hammer, pneumatically-operating means for effecting the operation of said hammer, said tray being provided at its lower side with a lateral opening through which the hammer is adapted to project when in its innermost position, and means below said opening in the tray for preventing the illuminant from dropping through said opening.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 9th day of November, A. D. 1901.

SILAS M. BROWN.

Witnesses:

C. CLARENCE POOLE,
WILLIAM L. HALL.