

No. 680,666.

Patented Aug. 13, 1901.

B. V. NORDBERG.
VALVE GEAR FOR ENGINES.

(Application filed June 28, 1894.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

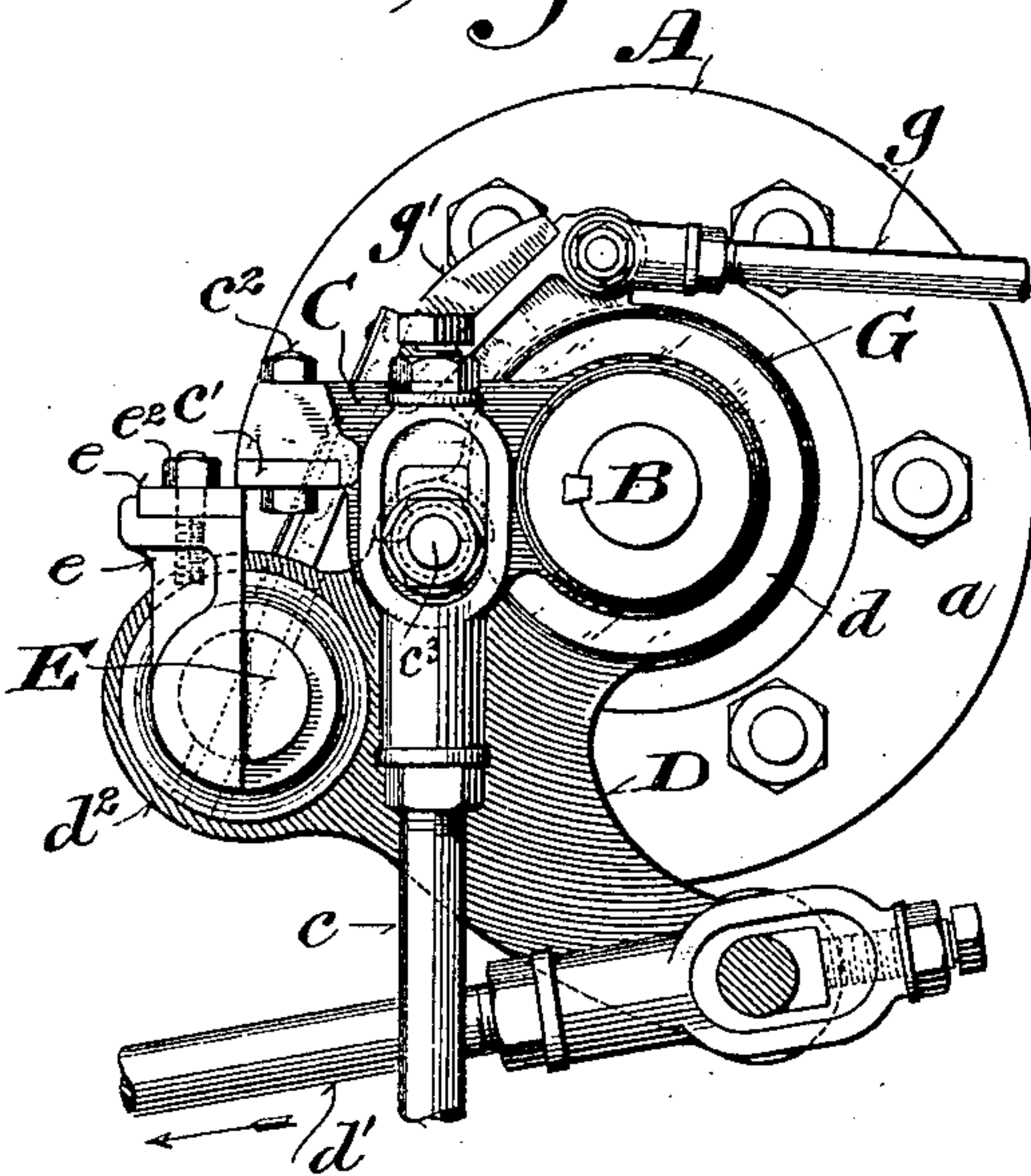


Fig. 3.

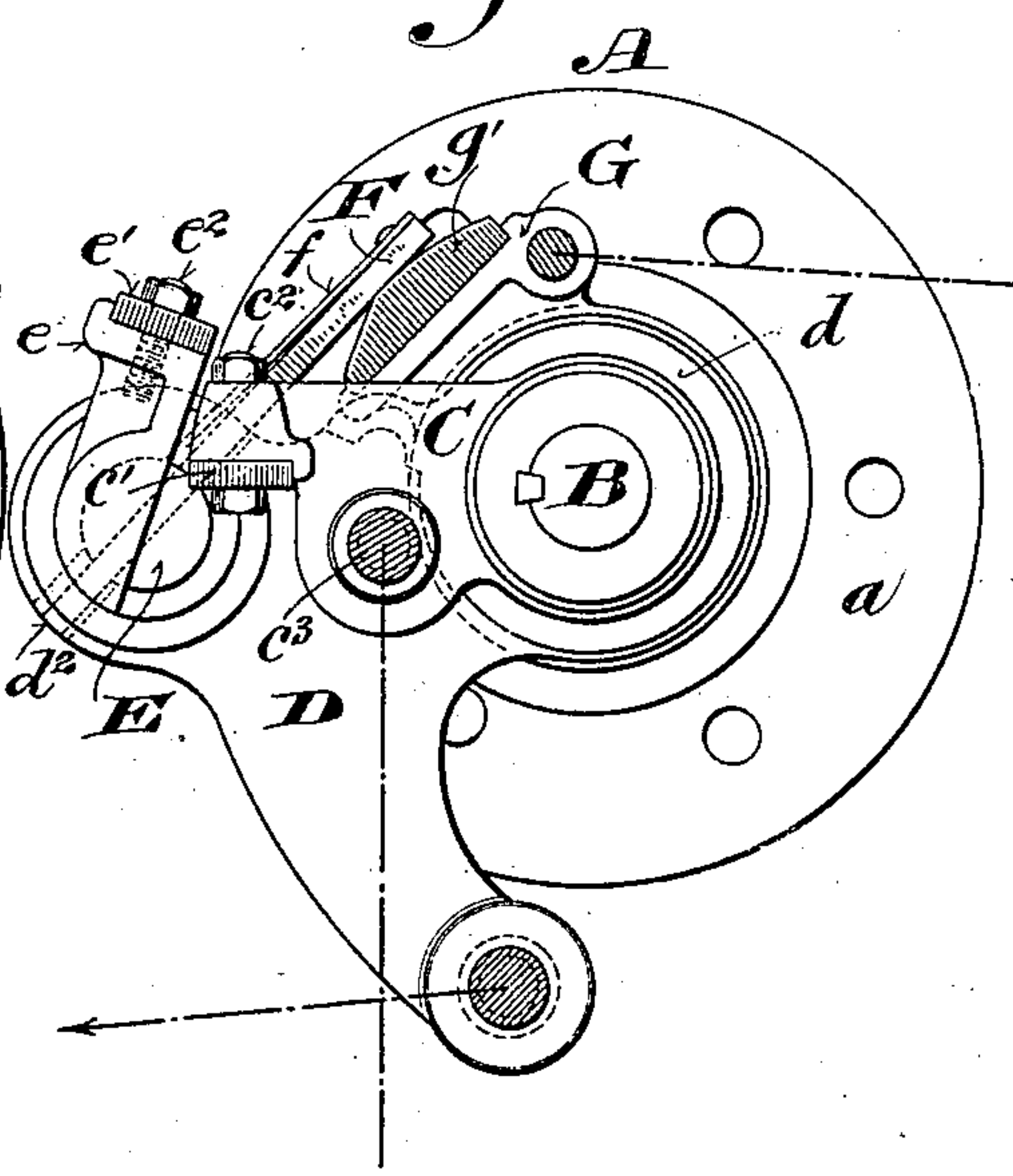


Fig. 2.

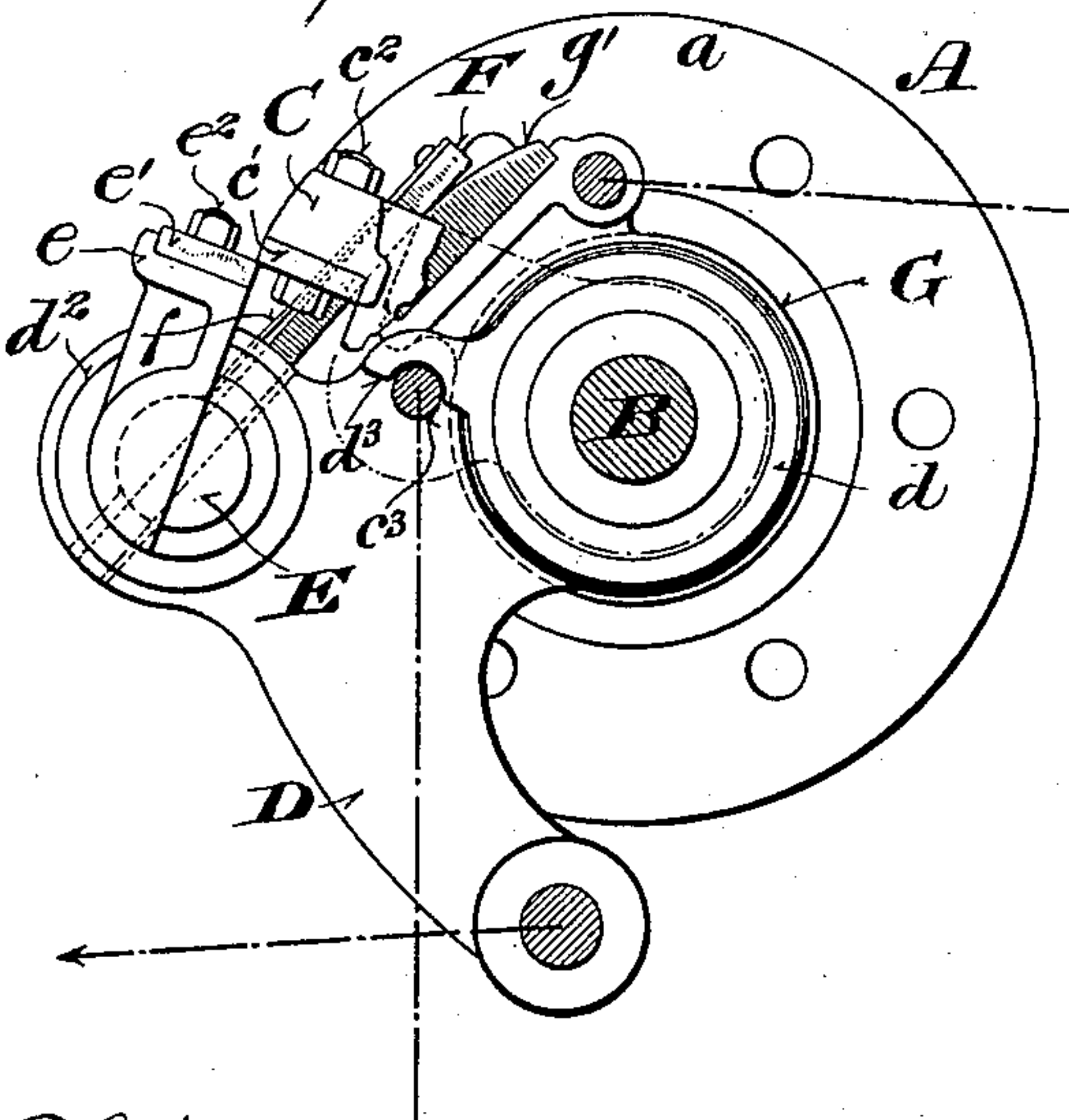
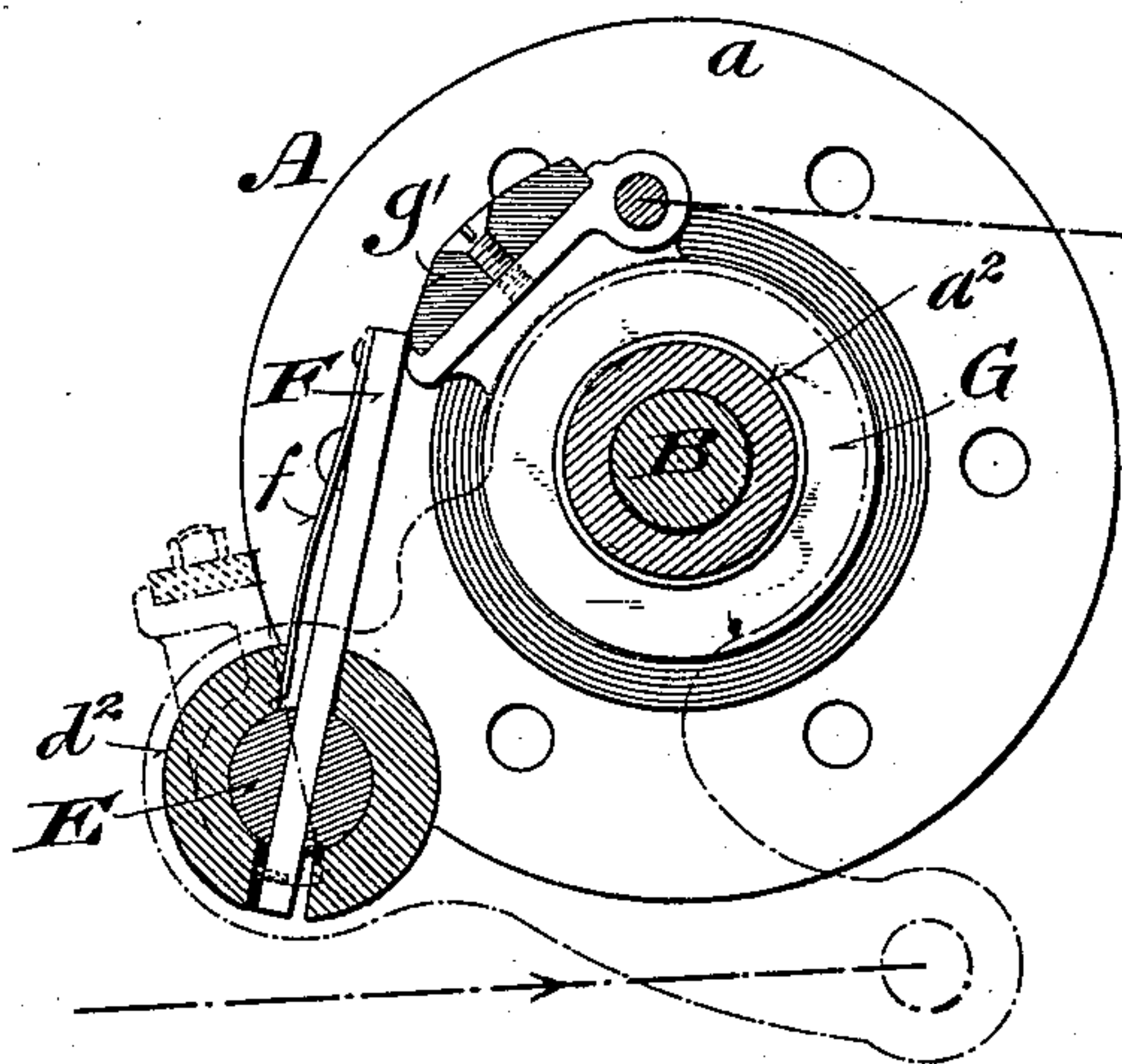


Fig. 4.



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Fig. 5

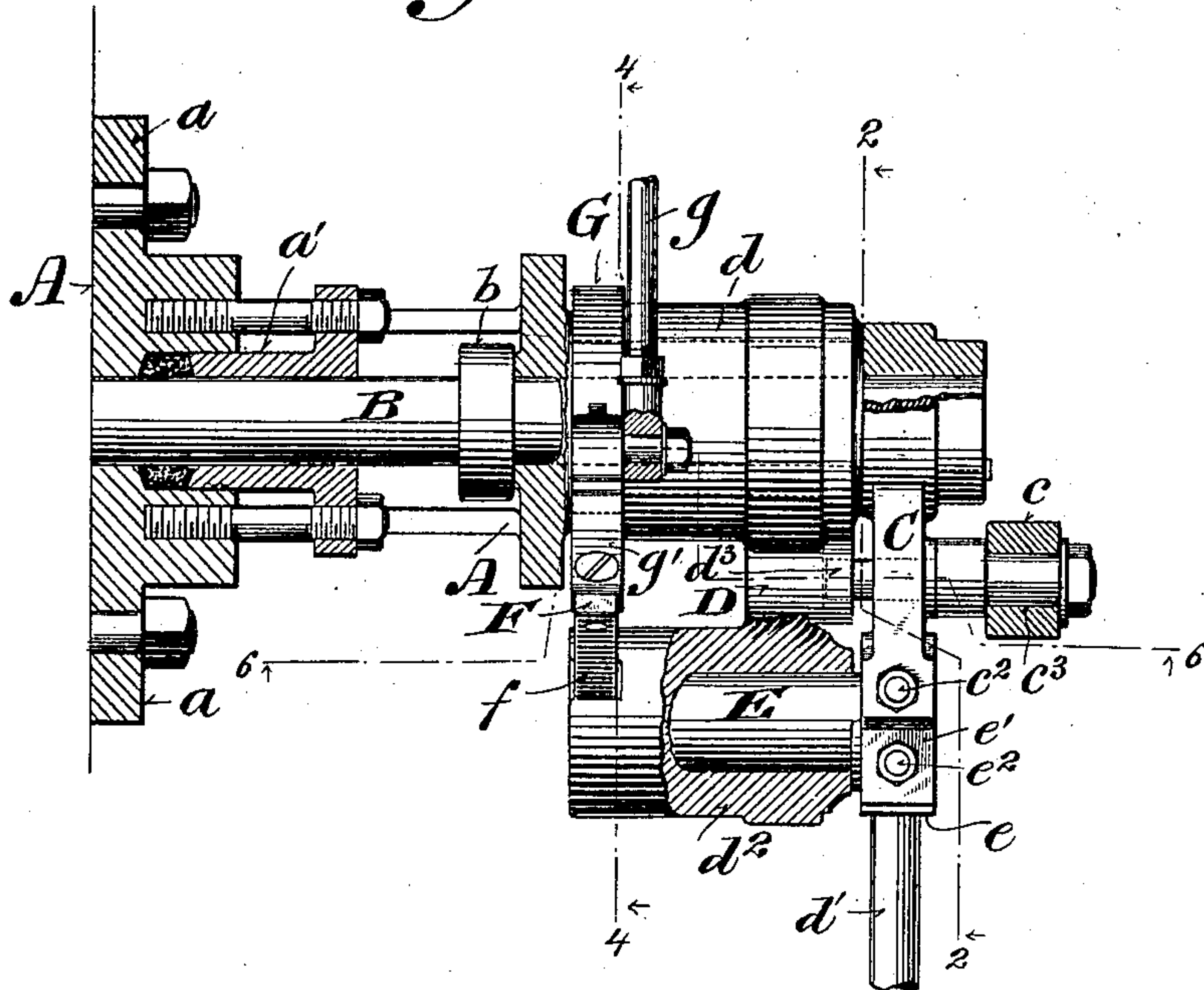
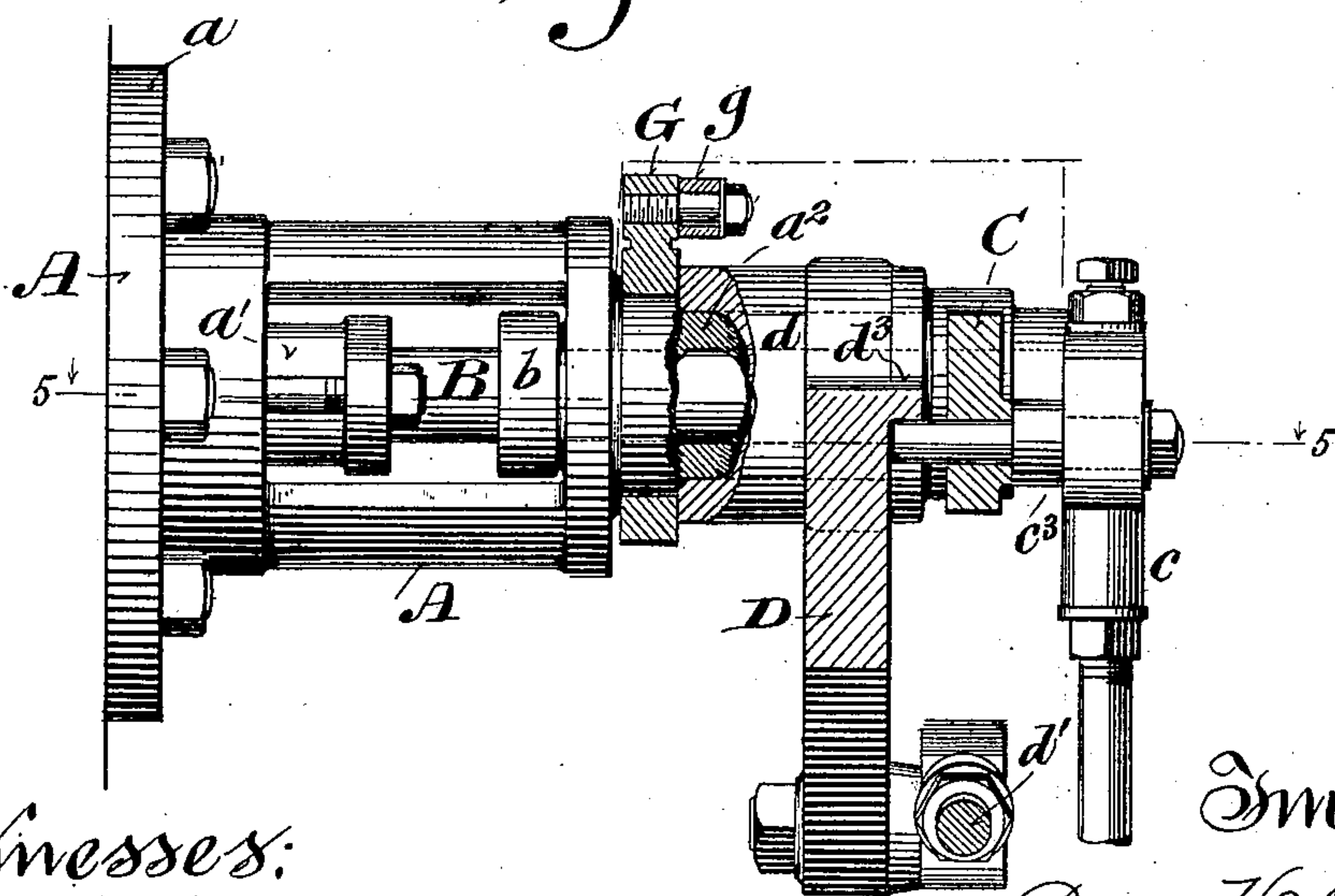



Fig. 6.



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UNITED STATES PATENT OFFICE.

BRUNO V. NORDBERG, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO NORDBERG MANUFACTURING COMPANY, OF SAME PLACE.

VALVE-GEAR FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 680,666, dated August 13, 1901.

Application filed June 28, 1894. Serial No. 515,928. (No model.)

To all whom it may concern:

Be it known that I, BRUNO V. NORDBERG, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Valve-Gear for Engines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The main objects of my invention are to provide for the adjustment and fastening of the trip blocks or steels while the engine is running and generally to improve the construction and operation of valve-gear of the class to which my invention relates.

It consists of certain peculiarities in the construction and arrangement of the component parts of the valve-gear hereinafter particularly described, and pointed out in claims.

In the accompanying drawings like letters designate the same parts in the several figures.

Figure 1 is a front elevation of my improved valve-gear, showing the trip-blocks engaged in position to open the steam-valve. Fig. 2 is a vertical section on the line 2 2, Fig. 5, showing the gear at the point of being tripped. Fig. 3 is a front elevation showing the gear tripped. Fig. 4 is a vertical section on the line 4 4, Fig. 5, the wrist-plate, dash-pot, and governor connections being indicated in Figs. 2, 3, and 4 by dotted lines. Fig. 5 is a horizontal section on the line 5 5, Fig. 6; and Fig. 6 is a partial vertical section and side elevation on the line 6 6, Fig. 5.

A designates the bonnet, which is formed in the usual manner with a flange *a*, by which it is bolted to the cylinder, and with bearings for the valve-stem. It is provided with the usual stuffing box and gland *a'*, as shown in Figs. 5 and 6, and has a cylindrical extension *a²* at its outer end, upon which are mounted the valve-opening lever and the knock-off plate, as hereinafter explained.

B designates the valve-stem, which is provided with a collar or shoulder *b*, as shown in Figs. 5 and 6, to receive the outward end

thrust upon the stem and to hold it in its proper place.

C is the valve-closing or drop lever, which is fixed to the outer end of the valve-stem B. It is adjustably connected by a rod *c* with a dash-pot or other valve-closing device (not shown) in the usual manner and is formed at the end on the under side with a seat for a trip block or steel *c'*, which is secured thereto by a bolt *c²* passing through a vertical hole in it and said lever and provided at its upper threaded end with a nut which is always exposed and accessible whether the engine is at rest or in operation.

D is an elbow-shaped valve-opening lever, formed at one end with a hub *d*, which is loosely mounted and capable of turning on the extension *a²* of the bonnet, as clearly shown in Figs. 2 and 6. It is adjustably connected at the opposite end by a rod *d'* with the wrist-plate or other valve-opening device (not shown) in the usual manner. At the elbow said lever is formed parallel with the hub *d* with sleeve *d²*, in which is fitted a rocking pin E. This pin is provided at the front or outer end with an offset arm *e*, formed at the end with a seat for the attachment of a trip block or steel *e'*, which is secured thereto by a bolt *e²*, the nut of which is constantly exposed and accessible. The seats for the trip blocks or steels on lever C and the arm *e* are formed in planes which are parallel with each other when the trip blocks or steels are brought into engagement, as shown in Figs. 1 and 2. By the arrangement and mode of attachment of the trip-steels, which are made, as shown, of a flattened quadrangular shape, they can be reversed or turned so as to utilize either of the four corners of each steel for engagement with the other steel, and the nut on the upper exposed end of the bolt by which each steel is secured in place is always exposed and easily accessible whether the engine is running or at rest, so that either nut may be tightened and either trip-steel secured in place without stopping the engine. This is of great importance in engines employed in rolling-mills, where the stopping of the engine by the wear, loosening, or displacement of the trip-steels often causes serious inconvenience and damage.

At its opposite and inner end the rocking pin E is provided with a bar F, which is fitted and secured in a slot therein and projects on opposite sides thereof into radiating recesses in the adjacent end of the sleeve d^2 , as shown in Fig. 4. One or both of these recesses is formed to limit the movement of the bar F and said rocking pin, as desired. A flat spring f , bearing at its lower end against one side of the upper recess in sleeve d^2 , is secured at its upper end to the bar F and presses said bar toward the valve-stem.

G designates the knock-off plate, which is loosely mounted so as to turn upon the extension a^2 of the bonnet next inside of the valve-opening lever B. It is connected in the usual manner by a rod g with the governor or other controlling device (not shown) and is formed with a seat on its periphery for the attachment of a cam-block g' , which is made to project beyond the connection of the rod g with said plate, so that it may be turned after being attached to said plate to shape in a lathe by a rapid movement, thereby greatly facilitating the construction and fitting of this part of the valve-gear. The cam-block g' is arranged in the path of the bar F and by engagement therewith turns the rocking pin E and swings the arm e at its opposite end outward, so as to disengage the trip block or steel e' from the trip block or steel c' , carried by the lever C, and thus permit the instant closing of the steam-valve by the dash-pot or other device employed for that purpose.

It is to be understood that the point at which the trip blocks or steels will be disengaged varies according to the position of the cam-block g' , which is controlled in the usual manner by the governor or controlling connection through the rod g . The valve-opening lever D is formed on the outer side next to the valve-closing lever C with a projection d^3 , as shown in Figs. 2, 5, and 6, in position to engage with the inwardly-projecting end of the pivot-pin c^3 , by which the rod c is connected with said lever C. The return movement of lever D after opening the steam-valve is thus caused to close said valve in case the dash-pot or valve-closing device fails to operate. Besides securing the advantages hereinbefore stated, the valve-gear, as shown and described, is simple in construction and efficient in operation.

Various modifications in minor details of construction may be made within the intended scope of my invention.

I claim—

1. In a valve-gear for engines, the combination with the valve-stem, of a valve-closing lever fixed thereon and formed on the under side with a seat in a plane radial to the valve-stem, an adjustable trip-block secured to said seat by a bolt passing transversely through said lever and always accessible on the upper side thereof whatever the position of the valve-gear may be, a valve-opening lever, a rocking

pin journaled in said valve-opening lever and provided at one end with an upwardly-projecting arm the free end of which is movable into and out of the path of the valve-closing lever and at the opposite end with a bar passing through a recess in the sleeve of the rocking pin, and a knock-off plate adapted to engage said bar and to disengage the valve closing and opening levers, substantially as and for the purposes described.

2. In a valve-gear for engines, the combination with the valve-stem, of a valve-closing lever fixed thereon, a valve-opening lever, a rocking pin journaled in said opening-lever and having at one end an upwardly-extending arm and at the other end a bar passing through a recess in the sleeve of the rocking pin, adjustable trip-blocks secured respectively to the upper end of said arm and the under side of the valve-closing lever by bolts, one end of each of which bolts is constantly exposed and accessible, and a knock-off plate adapted to engage said bar and to disengage the valve closing and opening levers, substantially as and for the purposes described.

3. In a valve-gear for engines, the combination with the valve-stem, of the valve-closing lever fixed thereon, and the valve-opening lever provided with a rocking pin between the valve-stem and wrist-plate connection, said rocking pin being provided with an upwardly-extending arm formed at its upper end with a trip-block seat, and a removable and adjustable trip-block secured to said seat by a bolt one end of which is constantly exposed and accessible, the free end of said arm carrying the adjustable block being movable into and out of the path of the valve-closing lever, substantially as and for the purposes described.

4. In a valve-gear for engines, the combination with the valve-stem, of a valve-closing lever fixed thereon and formed on the under side with a seat in a plane radial to the valve-stem, a trip-block secured to said seat by a bolt one end of which is always exposed and accessible, a valve-opening lever provided with a rocking pin between the valve-stem and wrist-plate connection, said rocking pin being provided with an upwardly-extending arm formed at its upper end with a trip-block seat, and a removable and adjustable trip-block secured to said seat by a bolt one end of which is constantly exposed and accessible, substantially as and for the purposes described.

5. In valve-gear for engines the combination with the valve-stem, of a valve-opening lever formed with a sleeve parallel with said stem, a rocking pin journaled in said sleeve and provided at one end with a trip-arm and at the opposite end with a bar which projects through, and is limited in movement by a radial recess in said sleeve, a knock-off plate and a spring pressing said bar toward said knock-off plate, substantially as and for the purposes set forth.

6. In valve-gear for engines the combination with a valve-stem and bonnet, of a valve-

closing lever fixed on said stem and provided with a trip-block, a valve-opening lever formed at one end with a hub which is loosely mounted so as to turn on said bonnet and
 5 with a parallel sleeve, a rocking pin journaled in said sleeve and provided at one end with a bar and at the other with an arm carrying a trip-block at its end, a knock-off plate loosely mounted so as to turn on said bonnet
 10 and a spring pressing said bar toward said plate substantially as and for the purposes set forth.

7. In valve-gear for engines the combination with the valve-stem and bonnet provided
 15 with bearings therefor, of an elbow-shaped valve-opening lever formed at one end with a hub which is loosely mounted so as to turn upon said bonnet and at its elbow with a sleeve parallel with said hub, a rocking pin
 20 journaled in said sleeve and provided at one end with a bar projecting radially therefrom and at the other end with an offset arm formed at the end with a seat, a trip-block secured to said seat, a valve-closing lever
 25 fixed upon the outer end of said stem next to the valve-opening lever and formed at the end on the under side with a seat, a trip-block secured to said seat, a knock-off plate loosely mounted so as to turn upon said bon-
 30 net on the opposite side of the valve-opening lever from the valve-closing lever and formed on its periphery with a seat to which a cam-block is secured, and a spring pressing the bar of said rocking pin toward said knock-off

plate, substantially as and for the purposes 35 set forth.

8. In valve-gear for engines the combination with the valve-stem, of a valve-closing lever fixed thereon, an independently-mov-
 40 able valve-opening lever, an arm pivotally connected with the valve-opening lever and movable at its free end into and out of the path of the valve-closing lever, said arm and said valve-closing lever being formed on the
 45 end and side respectively with seats in planes which are parallel with each other when the trip-blocks are in engaging position, and trip-blocks secured to said seats by bolts which are constantly exposed and accessible at one
 50 end, substantially as and for the purposes set forth.

9. In valve-gear for engines the combination with the valve-stem, of a valve-closing lever fixed thereon and pivoted to its actuat-
 55 ing connecting-rod by a pin projecting therefrom on one side and an independently-movable valve-opening lever provided with a projection on one side in the path of the projecting end of said pin, substantially as and for
 60 the purposes set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

BRUNO V. NORDBERG.

Witnesses:

CHAS. L. GOSS,
 JOHN A. GOSS.