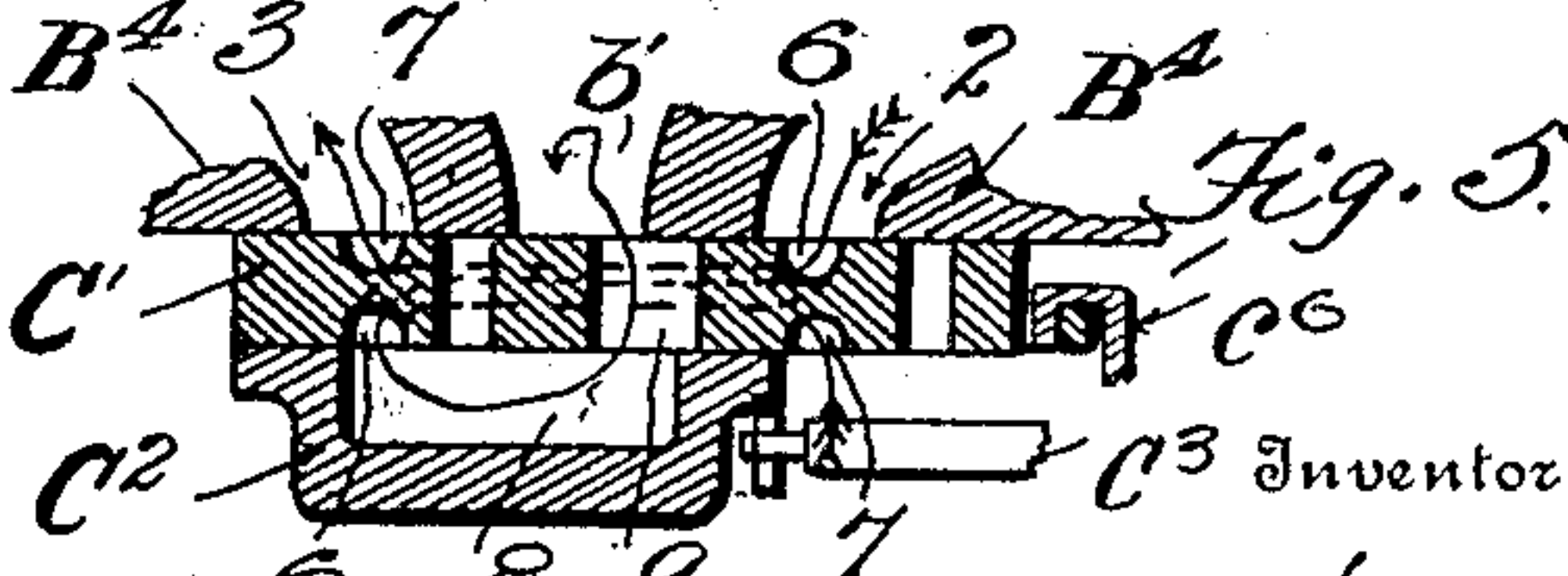
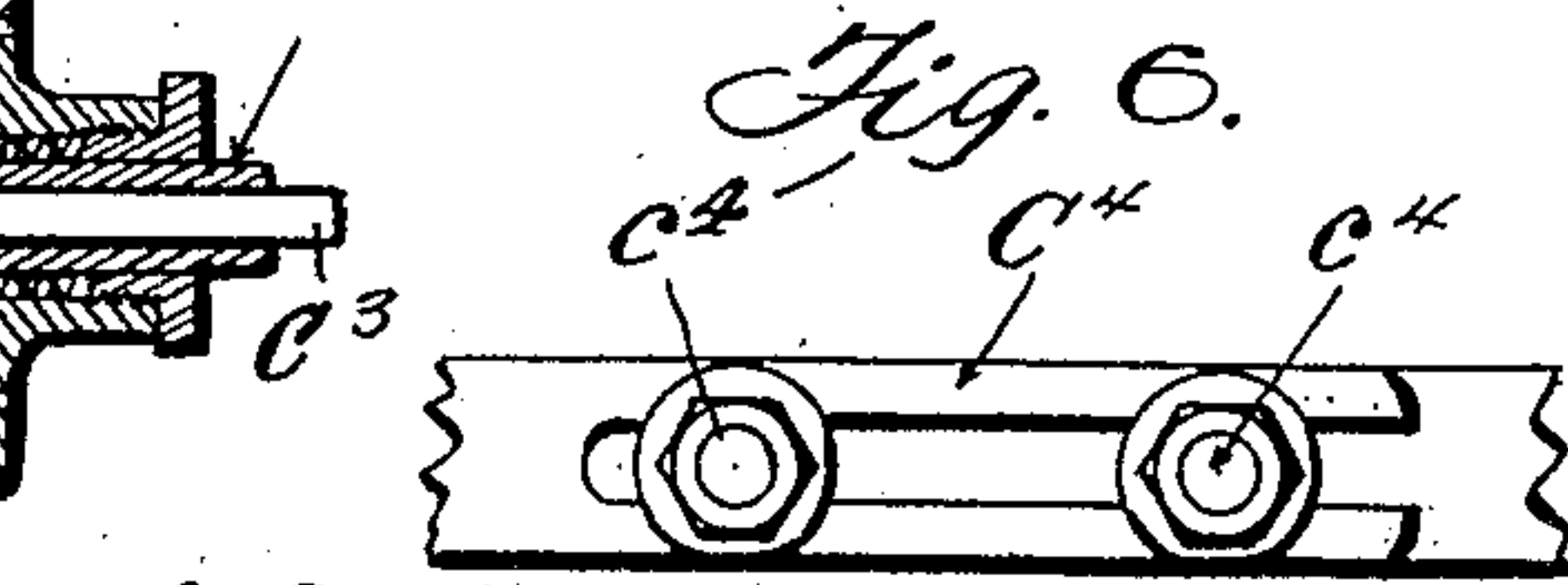
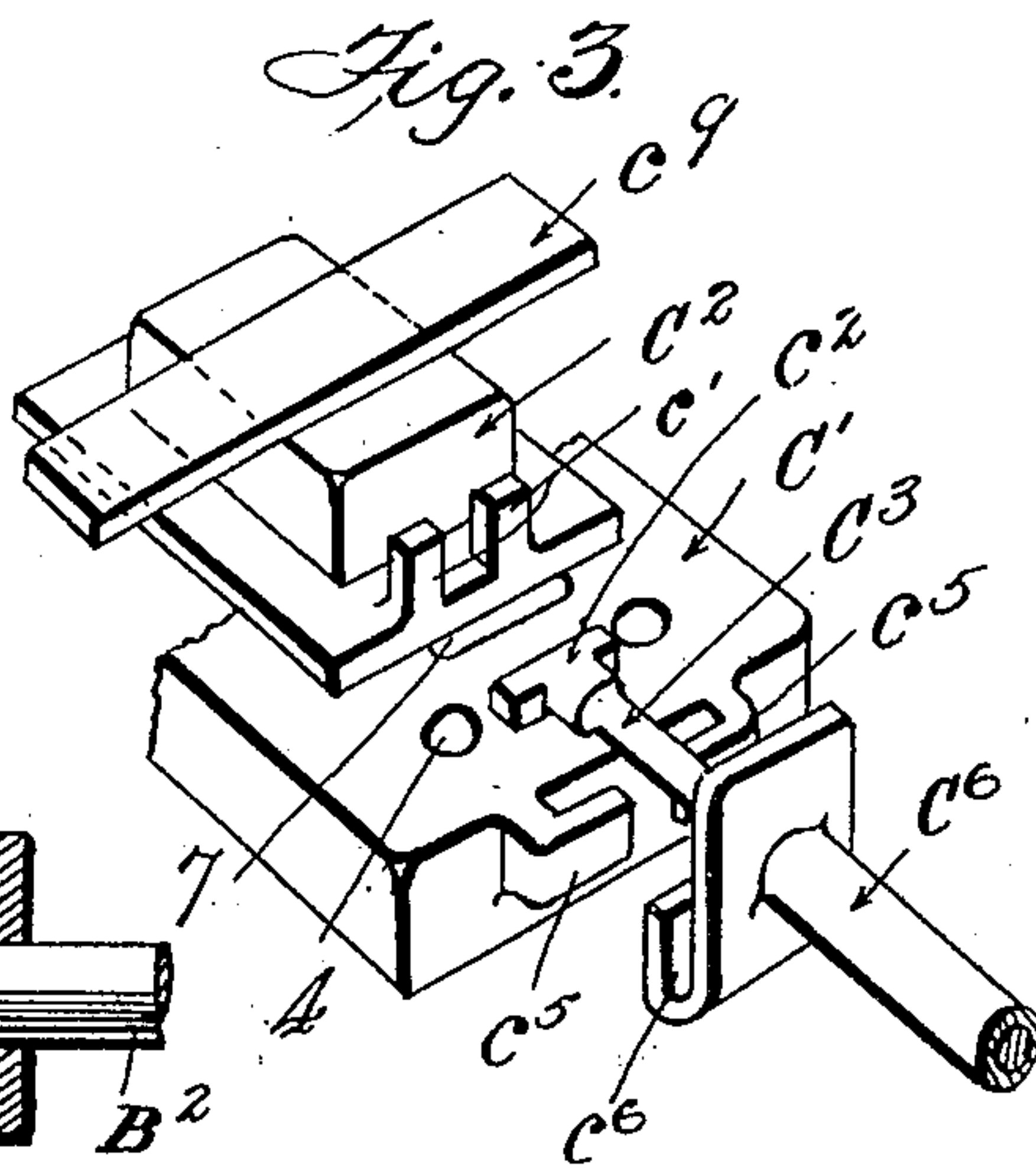



**912,893.**

2 SHEETS—SHEET 1.

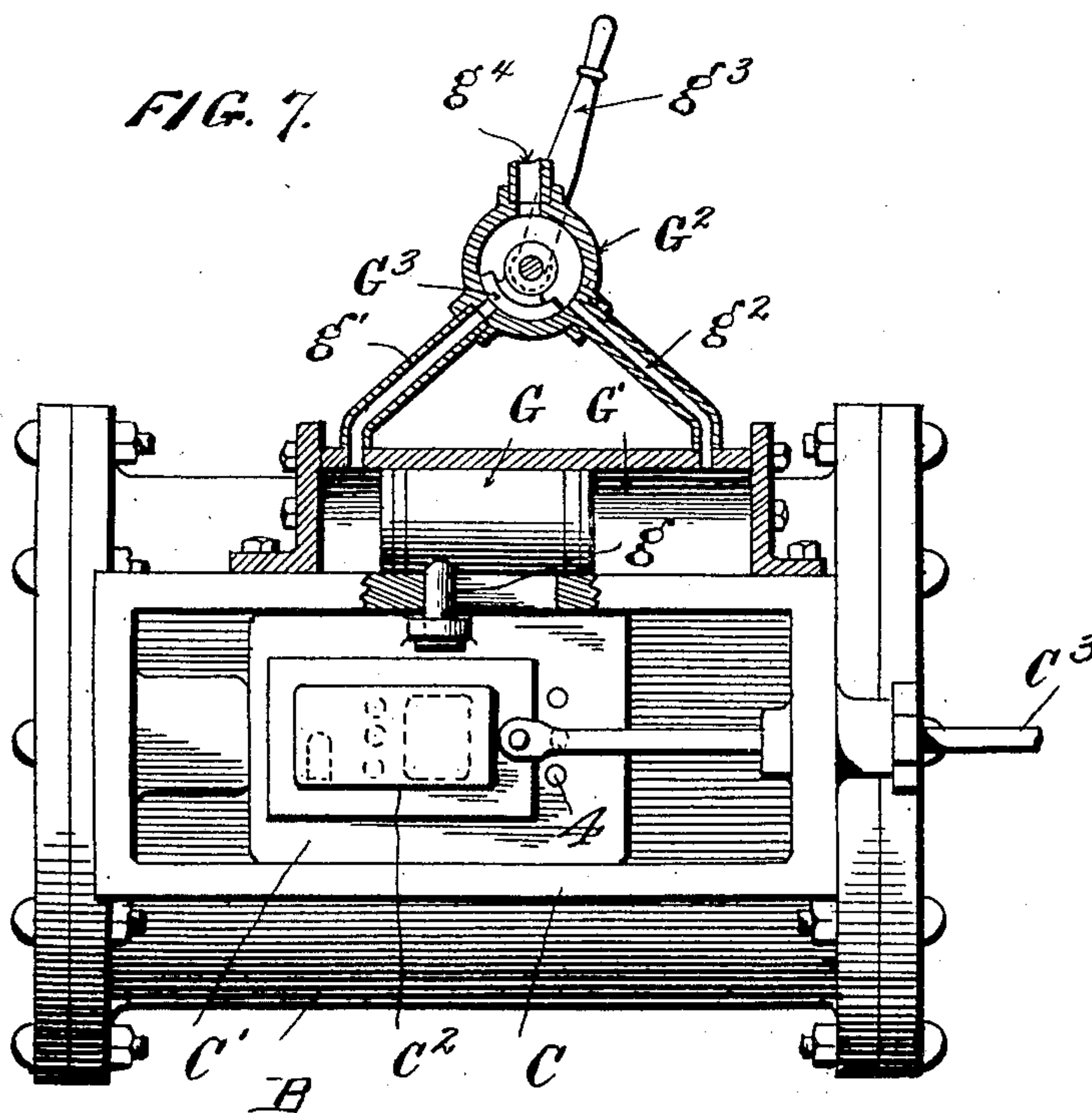



  
 C2 6 8 9 7 C3 Inventor
   
 Honzo Rummion
   
 By Eliza Rummion

Attorney

912,893.

2 SHEETS—SHEET 2.



INVENTOR,  
Alonzo Ransom  
per E. T. Bradford  
Attorney



# UNITED STATES PATENT OFFICE.

ALONZO RUNNION, OF SPENCER, WEST VIRGINIA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF TWO-THIRDS TO LEWIS S. GOFF AND ONE-THIRD TO OKEY J. CHAMBERS, OF SPENCER, WEST VIRGINIA.

## REVERSING-GEAR FOR ENGINES.

No. 912,893.

Specification of Letters Patent.

Patented Feb. 16, 1909.

Application filed September 10, 1907. Serial No. 392,192.

*To all whom it may concern:*

Be it known that I, ALONZO RUNNION, a citizen of the United States, residing at Spencer, in the county of Roane and State of West Virginia, have invented certain new and useful Improvements in Reversing-Gear for Engines, of which the following is a specification.

My said invention consists in certain improvements in the construction and arrangement of parts of reversing gear for steam engines, whereby such a gear is provided which is simple and inexpensive in its construction and efficient and positive in operation, all as will be hereinafter more fully described and claimed.

Referring to the accompanying drawings which are made a part hereof and on which similar reference characters indicate similar parts; Figure 1 is a top or plan view of a single stationary engine embodying my said invention, Fig. 2 a horizontal section through the cylinder and steam chest thereof showing in section the parts constituting my said invention, and one means for operating the reversing plate, Fig. 3 a detail perspective view of the slide valve and adjacent parts illustrating their form and construction more clearly, Fig. 4, a diagrammatic view showing the reversing plate in dotted lines and the steam ports through the same indicated by whole lines, to show the form and direction of said ports more clearly, Fig. 5 a view similar to a portion of Fig. 2 with the reversing plate in the other position from that shown in Fig. 2. Fig. 6 a detail view of the joint in the eccentric arm for operating the valve rod, and Fig. 7 a sectional view, through a portion of the steam chest illustrating the preferred arrangement for operating the reversing plate on an enlarged scale.

In said drawings the portions marked A represent the bed of the engine, B the cylinder, and C the steam chest. The bed A, cylinder B and steam chest C are, or may be, in themselves, of any ordinary or approved construction and need no especial description herein.

It will be understood, of course, that while I have shown a single engine of the stationary type yet the invention is equally applicable to a double cylinder engine, a locomotive, or an engine of any type. In

the engine shown the single cylinder B has a piston B' mounted on a piston-rod B<sup>2</sup> which extends through the stuffing-box in the inner head of said cylinder, as usual, and the outer end of which is connected to a cross-head b which is mounted to slide in ways a on the frame A and is pivotally connected to the rod B<sup>3</sup> which is mounted on the crank a' of the shaft a<sup>2</sup> of the engine. A fly-wheel a<sup>3</sup> is mounted on said shaft, as shown.

The steam chest C is provided with a steam-inlet c and an exhaust-port b leads through the adjacent side B<sup>4</sup> of the cylinder B. Steam-ports 2 and 3 lead through the side B<sup>4</sup> into the cylinder at points near each end thereof. The reversing plate C' is mounted on the outer face of the side B<sup>4</sup> and is formed with ports 4, 5, 6 and 7 leading through said plate and arranged to register with the ports 2 and 3, as will be presently described. The ports 4 consist of a series of holes extending straight through plate C near one end and the ports 5 consist of a similar series extending through near the opposite end of said plate, the two parts being arranged a distance apart so that they will register with the ports 2 and 3 when the plate is in the position shown in Fig. 2. The port 6 extends from the upper side of plate C down into said plate and then lengthwise of said plate to a point adjacent to the ports 4 where it extends through the opposite side of said plate. The port 7 leads through the plate C from a point on its upper side adjacent to the ports 4 to a point on the opposite side and near the other end of said plate adjacent to the ports 5. The ends of ports 6 and 7 are substantially opposite each other on different sides of the plate. The slide valve C<sup>2</sup> is mounted on the outer face of said plate C' and is formed with a hollow chamber or port 8 of a length to form a connection between either of the ports at one end of the plate C' which should be in connection with the exhaust end of the cylinder and the exhaust-port b' through a central port 9 in said plate C'. A transverse bar c<sup>9</sup> is secured on the outer face of said valve C<sup>2</sup> and supports it in proper alinement in the steam chest C the ends of said bar being adapted to slide on the sides of said steam chest. On the inner end of said valve are formed upwardly extending fingers c'



behind which a T-shaped head  $c^2$  on the end of the valve-rod  $C^3$  is adapted to engage and thus connect said valve with said valve-rod. Said valve-rod is connected by a pivot-bolt  $c^3$  with the arm  $C^4$  which is mounted in the usual manner on the eccentric  $C^5$ . Said arm  $C^4$  is formed in two parts secured together by clamping bolts  $c^4$  extending through holes in one and a slot in the other, as shown most clearly in Fig. 6. The plate  $C'$ , as shown in Figs. 2 and 3, is formed with inturned lugs  $c^5$  on its inner end with which a hook-shaped part  $c^6$  on the end of the sleeve  $C^6$  is adapted to engage. Said sleeve  $C^6$  is mounted in the stuffing-box in the end of the steam chest  $C$  and the valve-rod  $C^3$  fits snugly and is adapted to slide within said sleeve. On the outer end of said sleeve it is provided with a collar  $C^7$  having a pin  $c^7$  which is adapted to engage with a slot  $c^8$  in a lever  $C^8$  which is mounted on a pivot  $a^5$  on a part of the bed or frame  $A$ . A bar  $C^9$  is pivoted on steam chest  $C$  and has notches  $c^9$  to engage lever  $C^8$  and hold it in either position desired.

As shown in Fig. 7, the reversing plate  $C'$  is loosely connected, at one side, with an arm  $g$  of a sliding piston  $G$  mounted in a steam chamber  $G'$  on one side of steam chest  $C$ . Said steam chamber is connected at each end by ports  $g'$  and  $g^2$ , respectively, with a valve casing  $G^2$  containing a valve  $G^3$  for controlling the flow of steam into one end or the other of chamber  $G'$  as desired. Said valve is provided with an operating lever  $g^3$  and the valve casing has a steam inlet pipe  $g^4$  connected with any source of supply.

The operation of my said invention is as follows: The parts being in the position shown in Fig. 2, the live steam passes through the steam-pipe  $c$  into the steam chest  $C$  and from thence through ports 4 of the plate  $C'$  and port 2 which extends through the side  $B^4$  of cylinder  $B$  into said cylinder behind piston  $B'$  where it expands and drives said piston toward the opposite end of the cylinder. At the same time the spent steam on the opposite side of the piston  $B'$  exhausts through port 3 in side  $B^4$  and the port 5 in the plate  $C'$ , the port 8 in the under side of the slide valve  $C^2$  and the central port 9 in plate  $C'$  into the exhaust port  $b'$ , which extends through the side  $B^4$ . When piston  $B'$  has reached the opposite end of cylinder  $B$  the slide valve  $C^2$  will have been shifted by reason of its connection with the eccentric  $C^5$ , above described, so as to uncover the ports 5 and to throw ports 4 under the slide valve  $C^2$  and into communication, through port 9, with the exhaust port  $b'$ , when the course of the live steam and the exhaust steam will be into and from the opposite ends of the cylinder, in the same manner as above described.

When it is desired to reverse the engine by

the preferred arrangement, as shown in Fig. 7, the operator shifts valve  $G^3$  by means of lever  $g^3$  from a central position, which holds both parts  $g'$  and  $g^2$  closed, to open whichever port required to let steam into that end of chamber  $G'$  that will drive piston  $G$  to shift plate  $C'$  to reverse the engine as desired. If the form shown in Figs. 1, 2 and 3 is used then the operator disconnects lever  $C^8$  from the notch in holding bar  $C^9$  with which it is engaged and by means of said lever slides the sleeve  $C^6$  to throw the reversing plate  $C'$  from the position shown in Fig. 2 to that shown in Fig. 5. When in this position the live steam will pass into port 7 and through said port discharge into port 3 at the opposite end of cylinder  $B$  while the exhaust steam will pass through port 2 into port 6 and discharge into port 8 and through port 9 into the exhaust port  $b'$ . As the slide valve  $C^2$  is operated back and forth the operation of the engine will be the same as above described, the ports 6 and 7 through the reversing plate  $C'$  being in use while the ports 4 and 5 are thrown out of use. In the operation of the engine with the reversing plate in the position shown in Fig. 2 ports 6 and 7 perform no function.

Having thus fully described my said invention, what I claim as new and desire to secure by Letters Patent, is:

1. In an engine reversing mechanism, the combination, with the cylinder and steam chest, of a sliding reversing plate mounted over the ports leading from said steam chest into said cylinder, said reversing plate having two sets of ports, one set formed to lead directly through said plate into the ports in the side of the cylinder at each end thereof and the other set of ports being formed to lead from each end of the steam chest into the ports through the side of the cylinder at the opposite ends of the steam chest, a slide valve mounted on said reversing plate, and means for operating said plate and valve comprising a connecting rod attached to one adapted to slide through a sleeve attached to the other, substantially as set forth.

2. In an engine, the combination, of the cylinder formed with steam ports for the inlet and exhaust of the steam through one side thereof, the steam chest secured on said side, a sliding reversing plate mounted on said side of said cylinder and formed with two sets of ports and a central exhaust port, one set of ports being arranged to lead directly through said reversing plate into ports in the side of said cylinder and the other set of ports being arranged to lead through said plate from near each end thereof on one side to near the other end thereof on the opposite side to communicate with the ports in the side of the cylinder and admit the steam through said ports to opposite sides of the piston from that to which the steam will be



admitted through the direct ports, a slide valve formed with a hollow under side or port forming a communication between the exhaust port and the exhaust port of the reversing plate, and means for operating said plate and valve, substantially as set forth.

3. In an engine, the combination, with the cylinder having the ports through one side thereof, the steam chest secured to said side, the sliding reversing plate mounted on said side and formed with two sets of ports arranged to be used alternately to establish communication from the steam chest to said cylinder and from said cylinder to the exhaust port, the slide valve mounted on said reversing plate, means for operating said reversing plate consisting of a steam operated sliding piston mounted in a chamber in one side of the steam chest and connected to said reversing plate, a valve for controlling the steam to operate said piston in either

direction, and an operating lever for said valve, substantially as set forth.

4. A reversing mechanism for steam engines comprising a sliding reversing plate having two sets of ports each set being formed to register with the ports leading into the cylinder interchangeable, the slide valve, means for operating said slide valve, and means for operating said reversing plate consisting of a steam operated piston connected therewith and a valve for controlling the steam supply for operating said piston, substantially as set forth.

In witness whereof, I, have hereunto set my hand and seal at Spencer West Virginia this 29th day of August, A. D. nineteen hundred and seven.

ALONZO RUNNION. [L. S.]

Witnesses:

E. H. WEST,  
J. M. SCHMENDER.