

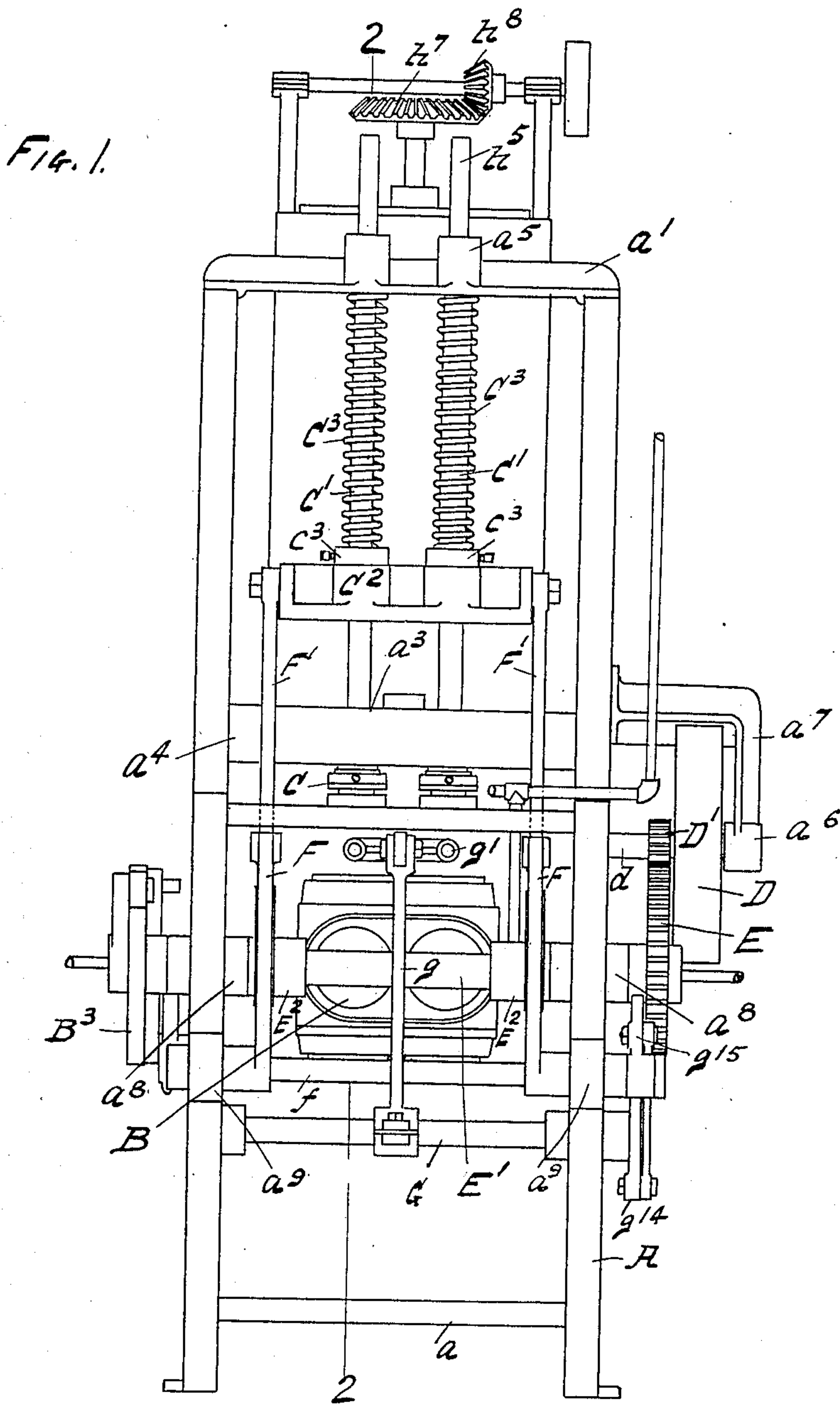
H. LIPPOLD & H. C. LORD.
MACHINE FOR FORMING ARTICLES OF PLASTIC MATERIALS.

913,664.

APPLICATION FILED FEB. 23, 1906.

Patented Feb. 23, 1909.

4 SHEETS—SHEET 1.



Witnesses
J. F. Parker.
B. H. Phillips

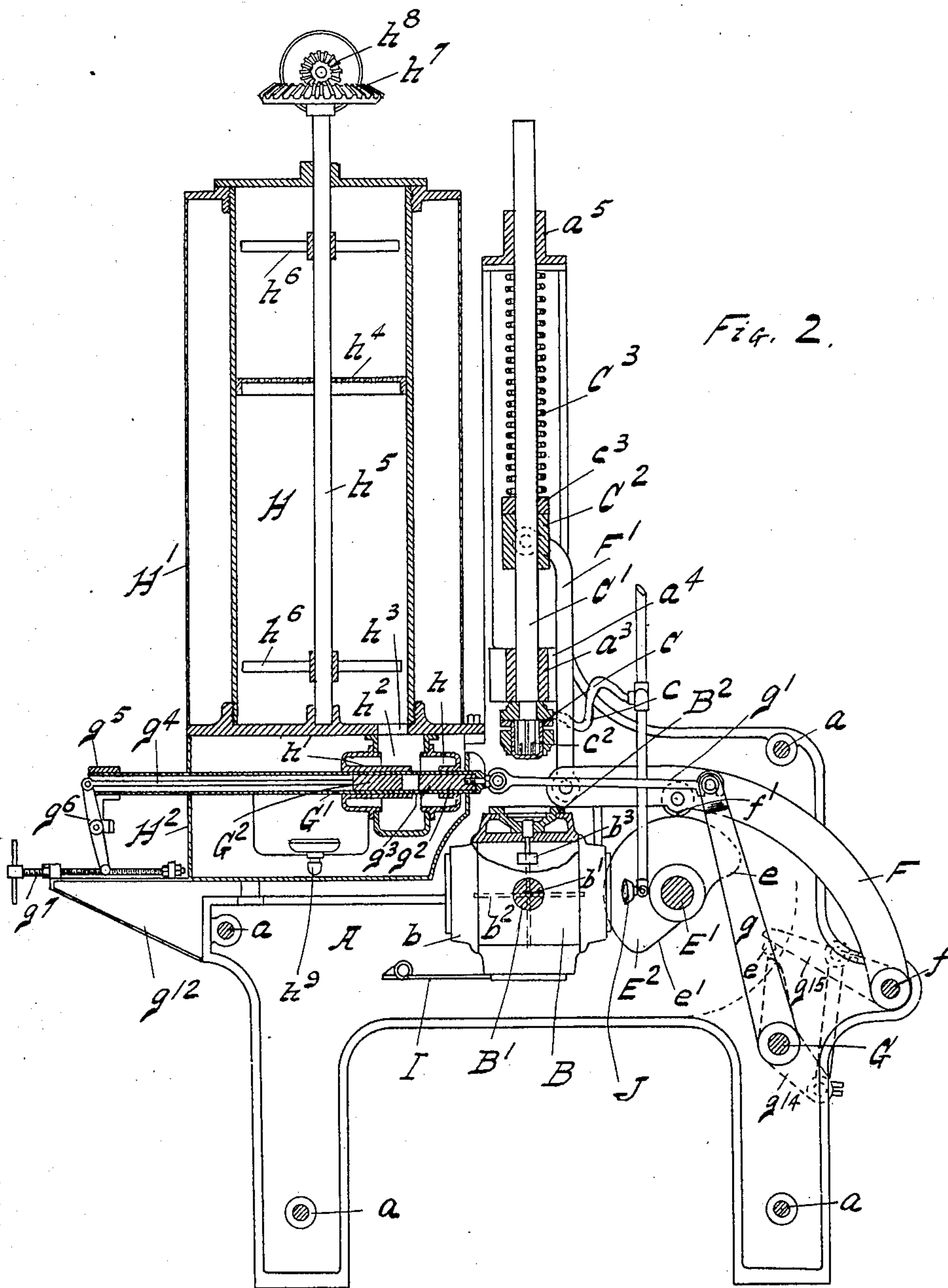
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Fig. 3.

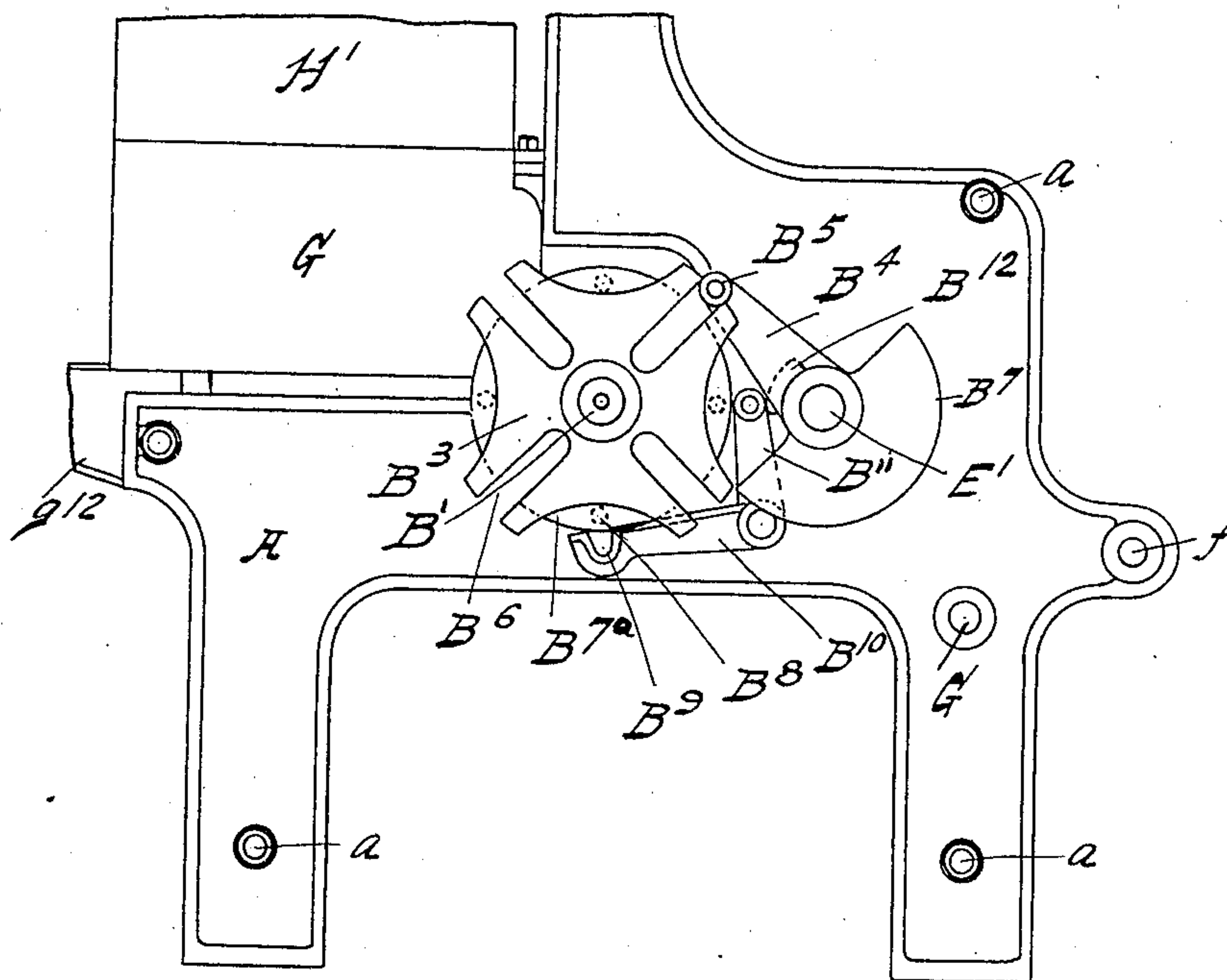
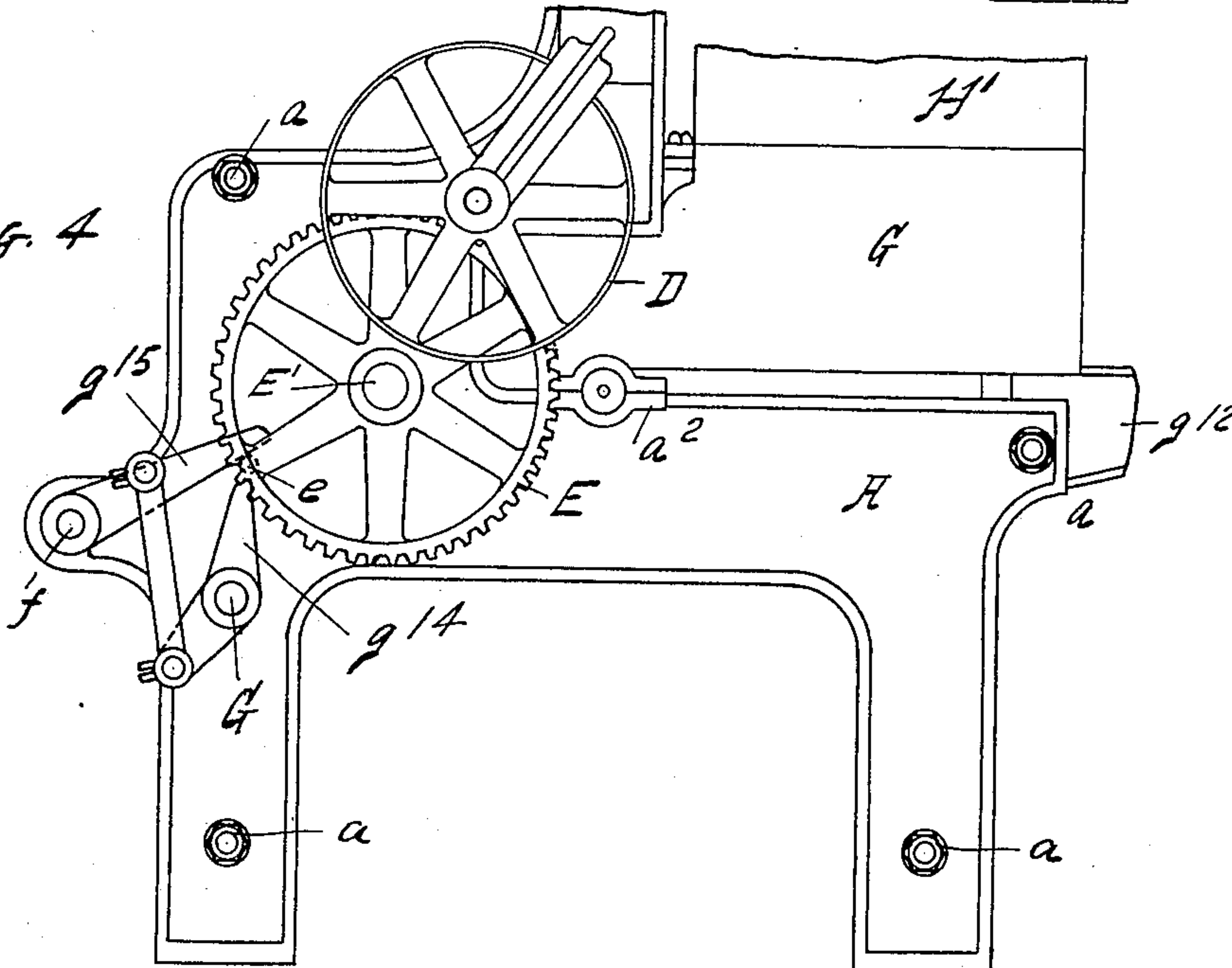


Fig. 4.



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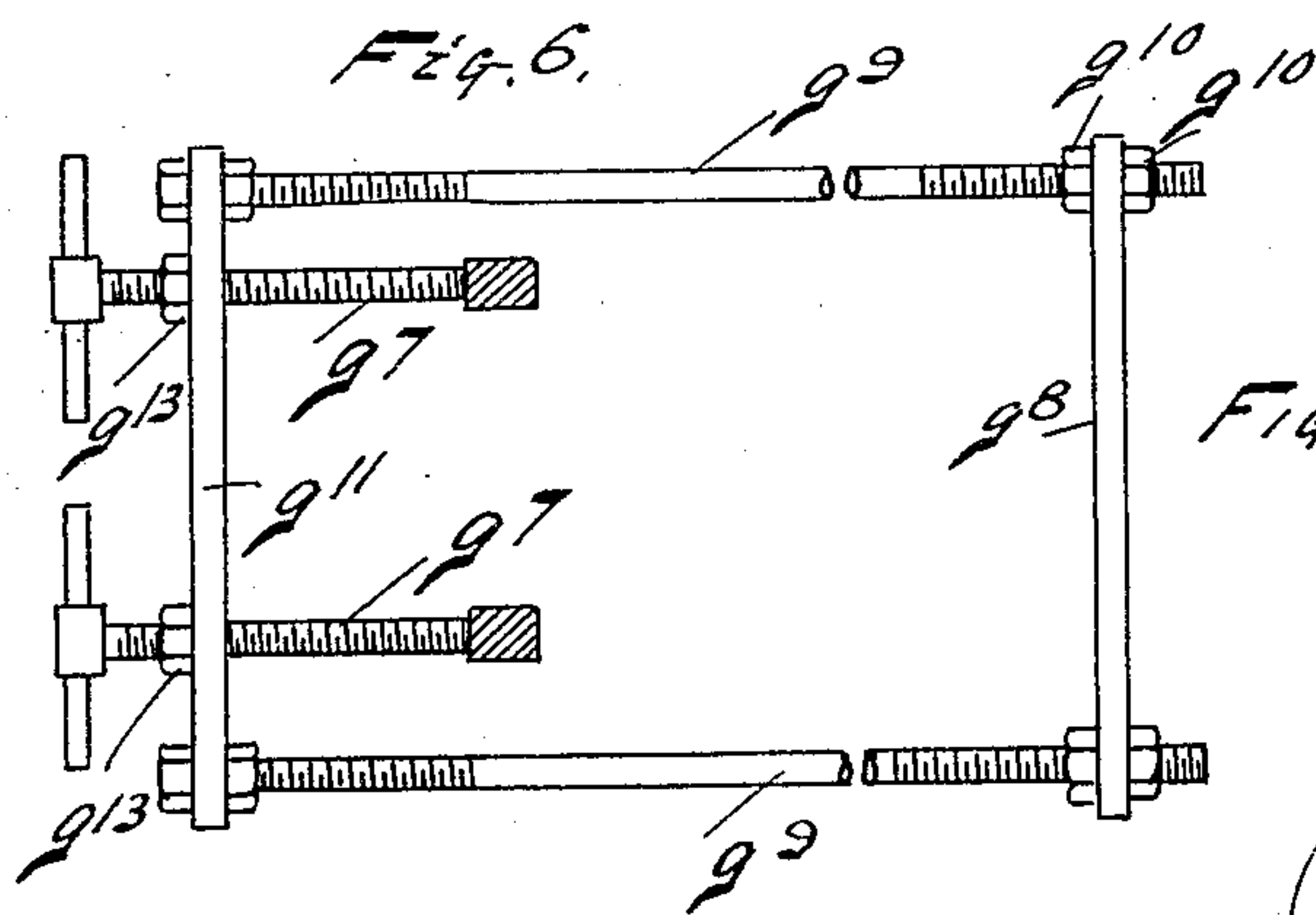
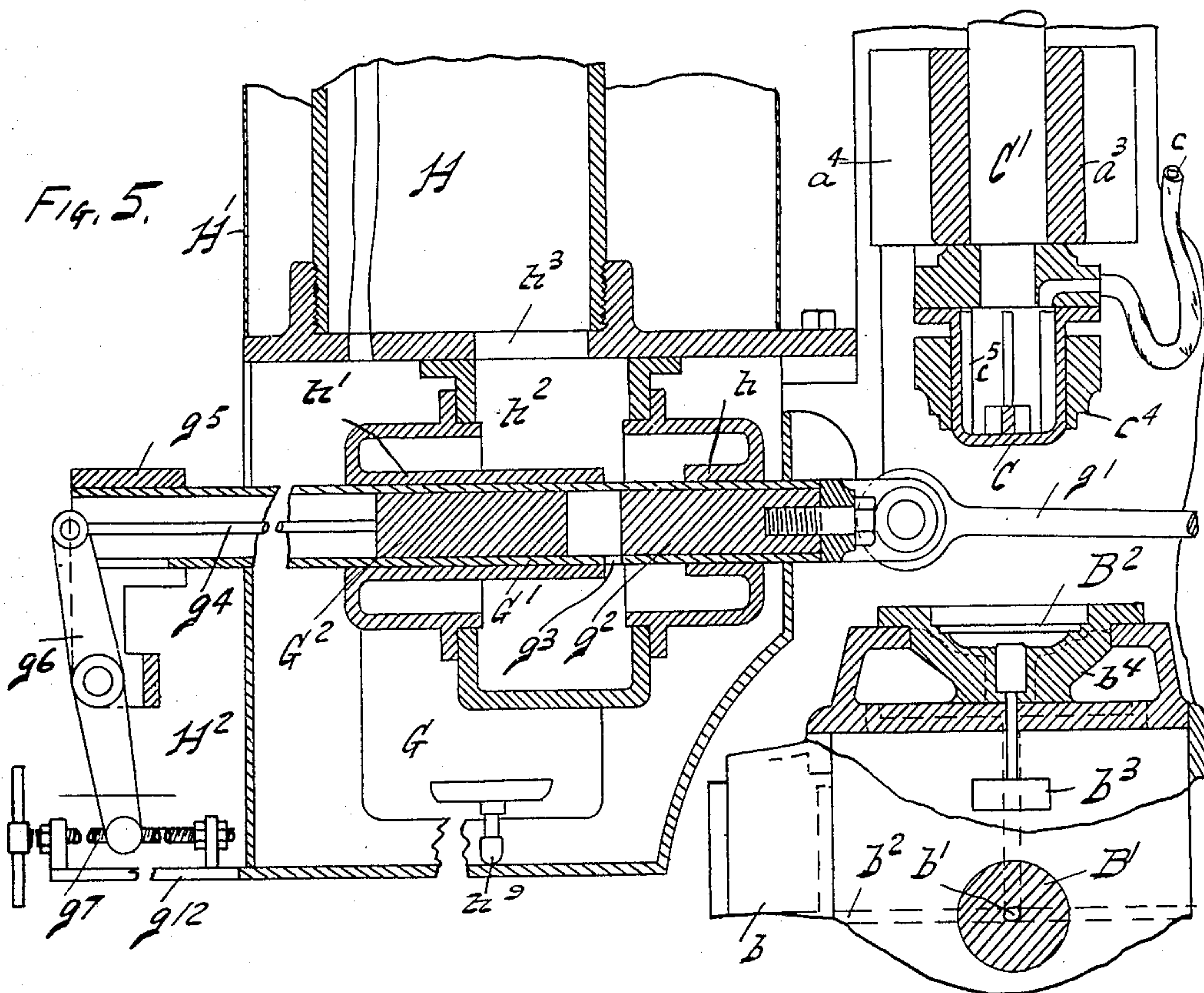
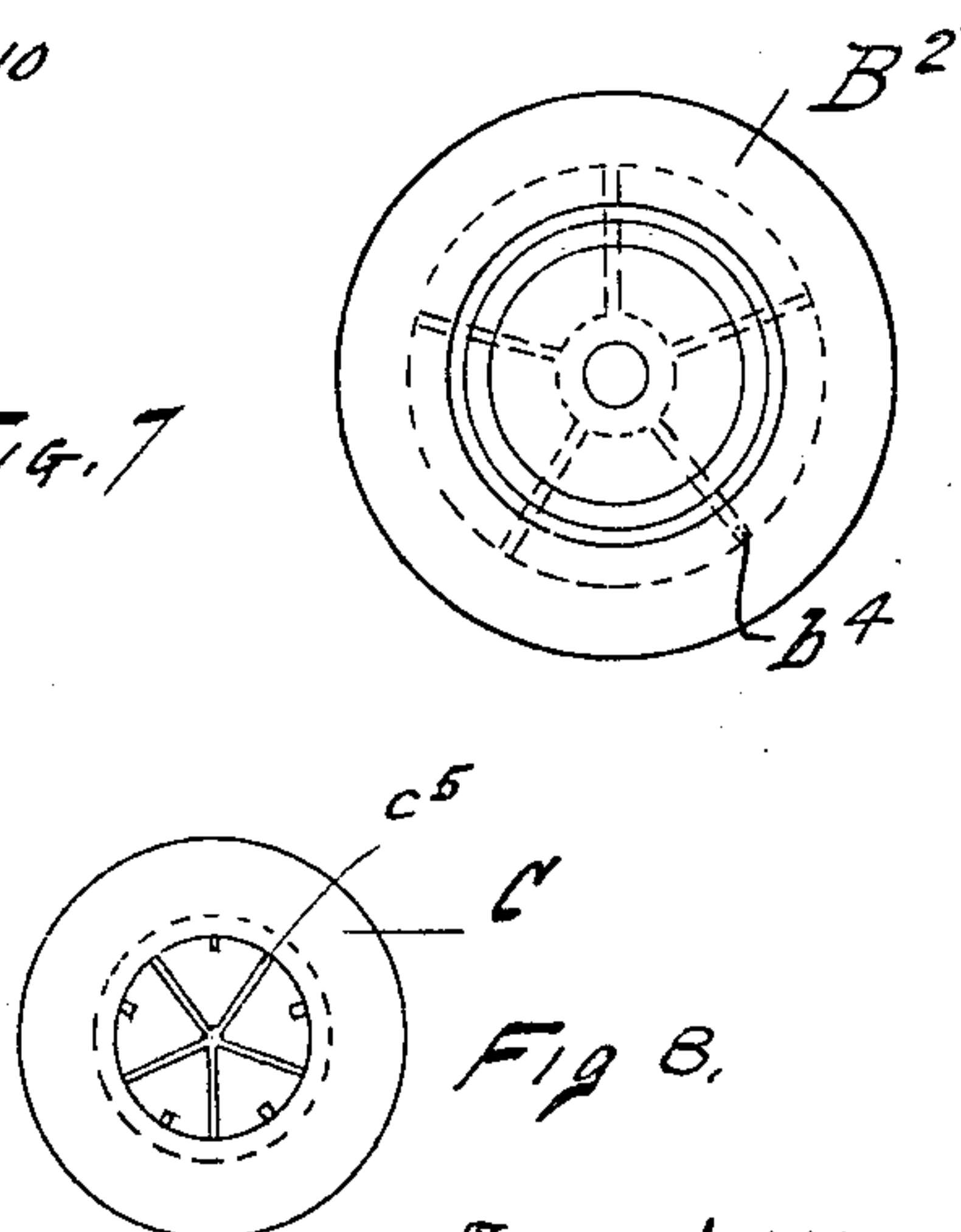


Fig. 7



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UNITED STATES PATENT OFFICE.

HENRY LIPPOLD AND HUGH C. LORD, OF ERIE, PENNSYLVANIA, ASSIGNORS TO TRIBUNE TRAP & TARGET COMPANY, OF ERIE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

MACHINE FOR FORMING ARTICLES OF PLASTIC MATERIALS.

No. 913,664.

Specification of Letters Patent.

Patented Feb. 23, 1909.

Application filed February 23, 1906. Serial No. 302,650.

To all whom it may concern:

Be it known that we, HENRY LIPPOLD and HUGH C. LORD, citizens of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented new and useful Improvements in Machines for Forming Articles of Plastic Materials, of which the following is a specification.

This invention relates to machines for forming articles of plastic material and consists in certain improvements in the construction thereof as will be hereinafter fully described and pointed out in the claims.

The invention is illustrated in the accompanying drawings as follows.

Figure 1 is a front elevation of the machine. Fig. 2 is a section on the lines 2—2 in Fig. 1. Fig. 3 is a side elevation of a part of the machine. Fig. 4 is a side elevation of the same part, the view being from the opposite end of the machine. Fig. 5 is an enlarged section, similar to that shown in Fig. 2, of a part of the machine. Fig. 6 shows a part of the delivering mechanism. Fig. 7 shows a plan view of the mold. Fig. 8 shows a plan view of the plunger.

A marks the sides of the machine. These sides are connected by the rods or bars a , these sides and bars forming the frame of the machine.

The mold block B is mounted on a shaft B'. There are preferably eight molds B² carried by the mold block. These molds are mounted in the pans b . The pans are connected by the passages b^2 (see dotted line, Figs. 2 and 5) with a water supply, the purpose of this supply being to keep the molds cool. A knock out pin b^3 is arranged in the bottom of each mold. These mold blocks are designed to be moved one quarter of a revolution with each cycle of the machine, bringing to the upper position a fresh mold and bringing a mold with an article in it to the bottom position where it is discharged through the action of the knock out pin b^3 , the knock out moving under the influence of gravity.

The plungers C are arranged above the molds. They are adapted to be reciprocated and enter the mold to complete the form of the article therein. These have the stripping rings c^4 arranged upon them by means of which the article is prevented from following the plunger as it is withdrawn. The

plunger has a cavity c^2 which is connected by a passage c with a supply of cooling liquid. The plunger is carried by the rod C'. The rod C' is slidingly mounted on the bearings a^3 a^5 in the cross pieces a' and a^4 . The rod extends through a yoke C². A collar c^3 is arranged immediately above this yoke on the rods. The springs C³ are tensioned between the cross bar a' and the collar c^3 . In the operating machine these plungers are forced down by the springs C³ and forced into the mold, thus shaping the article therein, and are withdrawn by a mechanism properly timed with the mechanism turning the mold.

The mechanism for operating the plungers is as follows. A gear D' is driven by the drive pulley D. This gear and pulley are mounted on the shaft d , and this shaft has bearings in the side frame and in the box a^6 carried by an arm a^7 extending from the sides of the machine. The gear D' drives a gear E fixed on a shaft E'. A cam E² is fixed on this shaft and the arms F are pivoted on the rod f journaled on the bearings a^9 a^9 in the sides of the machine. The arms F extend upwardly and over the cams E². Rollers f' ride the cam. The links F' connect the levers F with the yoke C². The cam has the lifting surface e which forces the arm F and with it the yoke C² upwardly, and also the surface e' , down which the arm follows as the plunger is forced into the mold by the spring C³. The plastic material in the mold forms a dash-pot and cushions the plunger at the end of its stroke.

The mold is preferably driven by what is known as a Geneva movement, the slotted member of the movement B³ being fixed on the shaft B'. The arm B⁴ on the shaft E' has the roller B⁵ which enters the slots B⁶ to drive the shaft B'. The curved surfaces B⁷ and B^{7a} characteristic of the Geneva movement are also arranged on these parts. In order to make a more positive stop for the mold, we provide the pins B⁸ on which a notch B⁹ in the arm B¹⁰ operates. The arm B¹⁰ is actuated by the bell crank lever B¹¹ and a cam B¹² on the arm B⁴. This mechanism operates in the well known manner of a Geneva movement and moves the mold block one quarter of a revolution with each cycle of the machine.

The material is conveyed from a station-

ary chamber and delivered to the mold just prior to the descent of the plunger. This is accomplished by the following mechanism. The material enters a pocket h^2 from the

5 chamber H. Openings h and h' extend through this packet. A pump barrel G' extends through these openings. This pump barrel has its front end closed by the plug g^2 .
A link g' connects the front ends of the
10 barrels with the lever g . The lever is carried by a shaft G and mechanism hereinafter described oscillates this lever so as to reciprocate the barrel, bringing it over the mold at the proper moment and returning it.
15 The barrel has an opening g^3 through the bottom wall thereof and when the barrel is in its rearward position, this opening is in the pocket h^2 . The plunger g^2 operates in the barrel and is connected by a stem g^4 with a lever g^5 . The lever g^5 is carried by a bracket g^5 on the outer end of the barrel. The lower end of the lever is in the path of the stop screws g^7 and the bar g^8 . The distance between the stop screws and the bar
20 g^8 is less than the travel of the barrel G' , so that as the barrel is moved forward to deliver the material into the mold the lower end of the lever g^5 contacts the bar g^8 and forces the plunger g^2 forward so as to
25 empty the material from the barrel. As the barrel is moved back, the lower end of the lever g^5 connects the screw g^7 prior to the completion of the stroke, and just after the opening g^3 has entered the pocket h^2 . The
35 further movement of the barrel moves the plunger, sucking in a fresh charge. It will be noted that the plunger and barrel remain in the same relation as the barrel is moved forward, thus carrying with it the charge,
40 until the barrel opening is over the mold, and on the rearward movement the plunger remains in its forward position until the opening g^3 is in the pocket. The bar g^8 is carried by the rods g^9 g^9 and is adjustably
45 mounted thereon by the nuts g^{10} g^{10} . The screw g^7 is provided with a jam nut g^{13} by which it may be locked in adjustment. The screws g^7 are carried by the bar g^{11} and this bar is carried by the bracket g^{12} extending
50 from the frame of the machine.

The chamber H is provided with a strainer plate h^4 and with agitating paddles h^6 . These paddles h^6 are carried by the shaft h^5 , and this shaft is driven through
55 the gears h^7 and h^8 . A heating chamber H^2 is arranged below the chamber H and a case H' extends along the chamber so that the material therein may be heated. A burner h^9 is properly arranged in the chamber H^2
60 for this purpose.

If, through any defect in the material or otherwise, the knock out pins b^3 fail to discharge the article, a stripping finger I is arranged in the path of the target as the
65 mold block is turned, so as to force the ar-

ticle out of the mold. It is preferably formed with a spring so as to yield if engaged by the parts of the mold.

This machine is particularly designed for molding targets formed of composition, they
70 being delivered to the mold hot and set by cooling. The speed of the machine is determined very largely by the rapidity with which the article may be cooled so as to set it in its shape. We prefer, therefore, to
75 provide the molds with the projecting webs b^4 . These webs not only stiffen the material so that the walls may be made much thinner, but they also greatly increase the cooling surface, thus making the cooling more rapid.
80 We also provide the plunger C with the webs c^5 for a similar purpose. We augment the internal cooling of the mold by the direct action of a cooling medium delivered to the article while the mold is edgewise.
85 In the machine shown, this is accomplished by a spray jet J which is in position to deliver preferably a jet of water directly upon the article, and in as much as the article fills
90 the mold, the water is kept from getting directly into the mold. As the mold block B is turned, the jet strikes the article and instantly sets it, thus very materially increasing the speed of the machine.

What we claim as new is:

1. In a machine for forming articles of plastic material, the combination of a mold; a plunger operating in the mold; a stationary supply chamber; a pump barrel in communication with the chamber; a plunger in
100 the barrel, said barrel having an opening and means for moving the barrel to bring the opening alternatively into communication with the chamber and into position to deliver material to the mold; and means for
105 operating the plunger to suck a charge into the barrel and to expel it into the mold.

2. In a machine for forming articles of plastic material, the combination of a mold; a plunger operating in the mold; a stationary supply chamber; the pocket h^2 in communication with the chamber; the barrel G' working in said pocket and having the openings g^3 thereon; means for reciprocating the
115 barrel to move the opening g^3 into the pocket h^2 and over the mold; and the plunger G^2 in the barrel and means for actuating the plunger.

3. In a machine for forming articles of plastic material, the combination of a series
120 of molds; a rotary support for said molds, said molds being adapted to be brought successively to an upright and to an inverted position by the rotation of their support; a plunger adapted to operate in said molds
125 successively by a movement into and out of the molds; a stationary supply chamber; and devices for carrying the material from the chamber and forcibly discharging the same independently of the plunger to the
130

mold with the mold in position to receive the plunger.

4. In a machine for forming articles of plastic material, the combination of a mold; 5 a plunger operating in the mold; a stationary supply chamber; a movable barrel having an opening therein adapted to be brought into communication with the chamber and over the mold device for actuating 10 said barrel; a plunger in the barrel adapted to suck in a charge with the barrel in communication with the chamber and to expel it into the mold.

5. In a machine for forming articles of 15 plastic materials, the combination of a series of molds; a rotary support for said molds, said support being adapted to move the molds from an upright to an inverted position; a plunger for operating upon said 20 molds successively; and means for cooling the article in the molds while the molds are in a position between the plunger and the inverted position of the mold, said means acting on the exterior surface of the article 25 in the mold.

6. In a machine for forming articles of plastic material, the combination of a series of molds; a rotary support for said molds, said support being adapted to move the 30 molds from an upright to an inverted position; a plunger for operating upon said molds successively; and devices for delivering a cooling fluid directly to the article in the mold, with the mold in a position other 35 than under the plunger.

7. In a machine for forming articles of plastic material, the combination of a series of molds, a rotary support for said molds, said support being adapted to move the 40 molds from an upright to an inverted position; a plunger for operating upon said molds successively; and devices for delivering a cooling fluid directly to the article while the mold is in an edgewise position.

45 8. In a machine for forming articles of plastic material, the combination of a series of molds, a rotary support for said molds, said support being adapted to move the molds from an upright to an inverted position; a plunger for operating upon said 50

molds successively; and devices for delivering a cooling liquid directly to the article while the mold is in an edgewise position.

9. In a machine for forming articles of plastic materials, the combination of a mold; 55 a plunger operating in the mold; a stationary supply chamber; devices for carrying and delivering the material from the chamber to the mold; a rotary support for the mold, adapted to move the mold from an 60 upright to an inverted position; and devices for cooling the fluid delivered to the article in the mold while the mold is out of the path of the plunger.

10. In a machine for forming articles of 65 plastic material the combination of a mold; a chamber surrounding the rear of said mold and adapted to contain a cooling fluid; webs arranged on said mold for stiffening the same and extending into said chamber for 70 increasing the cooling surface; and a plunger for operating in said mold.

11. In a machine for forming articles of plastic material, the combination of a mold; a plunger for operating said mold; said 75 plunger having a chamber for the reception of a cooling fluid; and webs arranged in said chamber for stiffening the plunger and increasing the cooling surface of said plunger.

12. In a machine for forming articles of 80 plastic material, the combination of a mold; a chamber surrounding the rear of said mold and adapted to contain a cooling fluid; webs arranged in said mold for stiffening the same and extending into said chamber for 85 increasing the cooling surface; and a plunger for operating in said mold, said plunger having a pocket therein for containing a cooling fluid; and webs arranged in said plunger for stiffening the same and increasing the 90 cooling surface.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

HENRY LIPPOLD.
HUGH C. LORD.

Witnesses:

B. F. PARKER,
B. J. PHILLIPS.