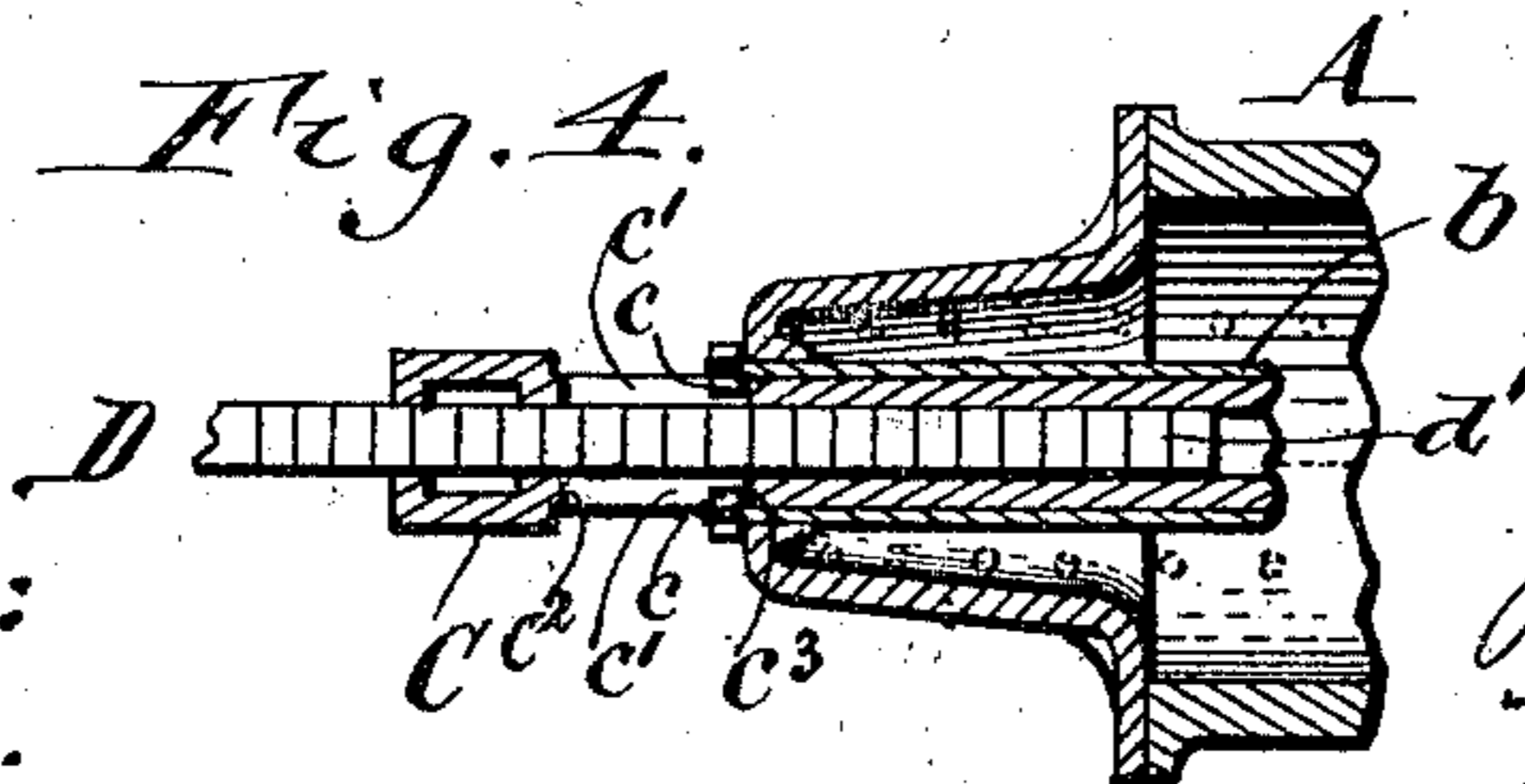
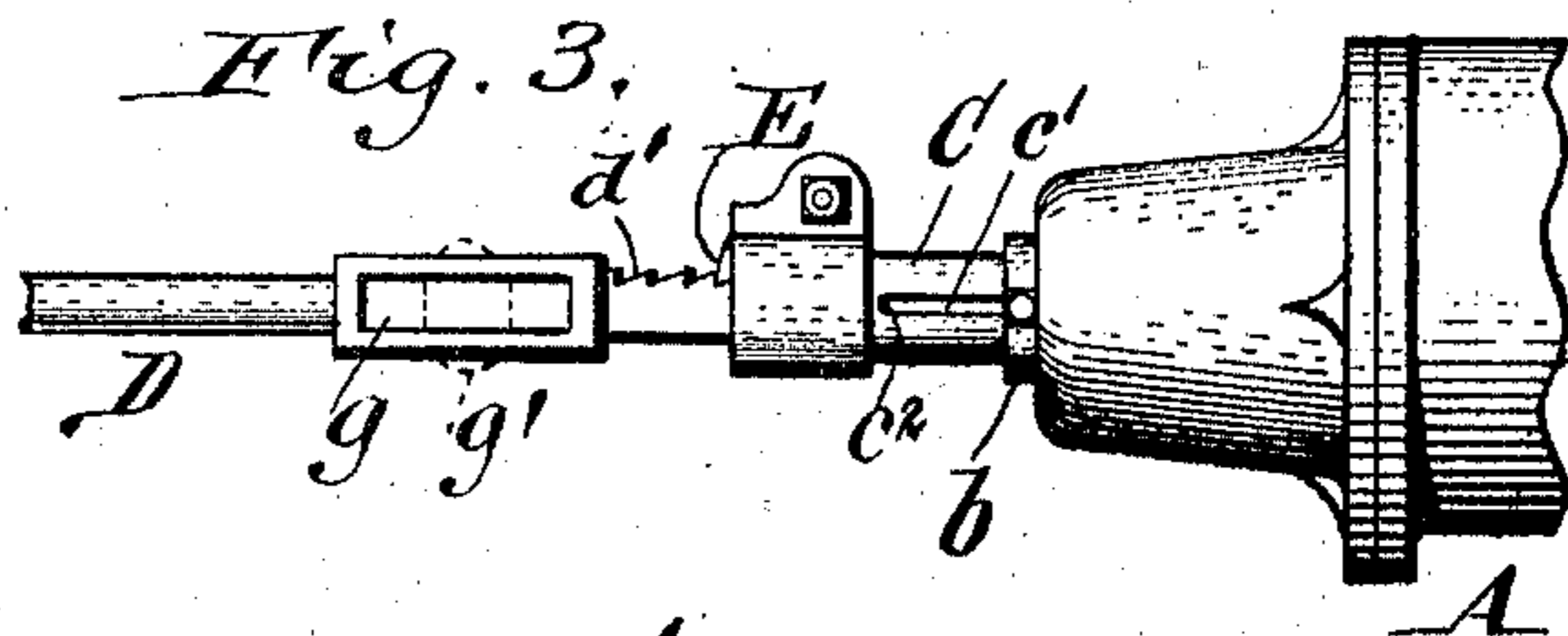
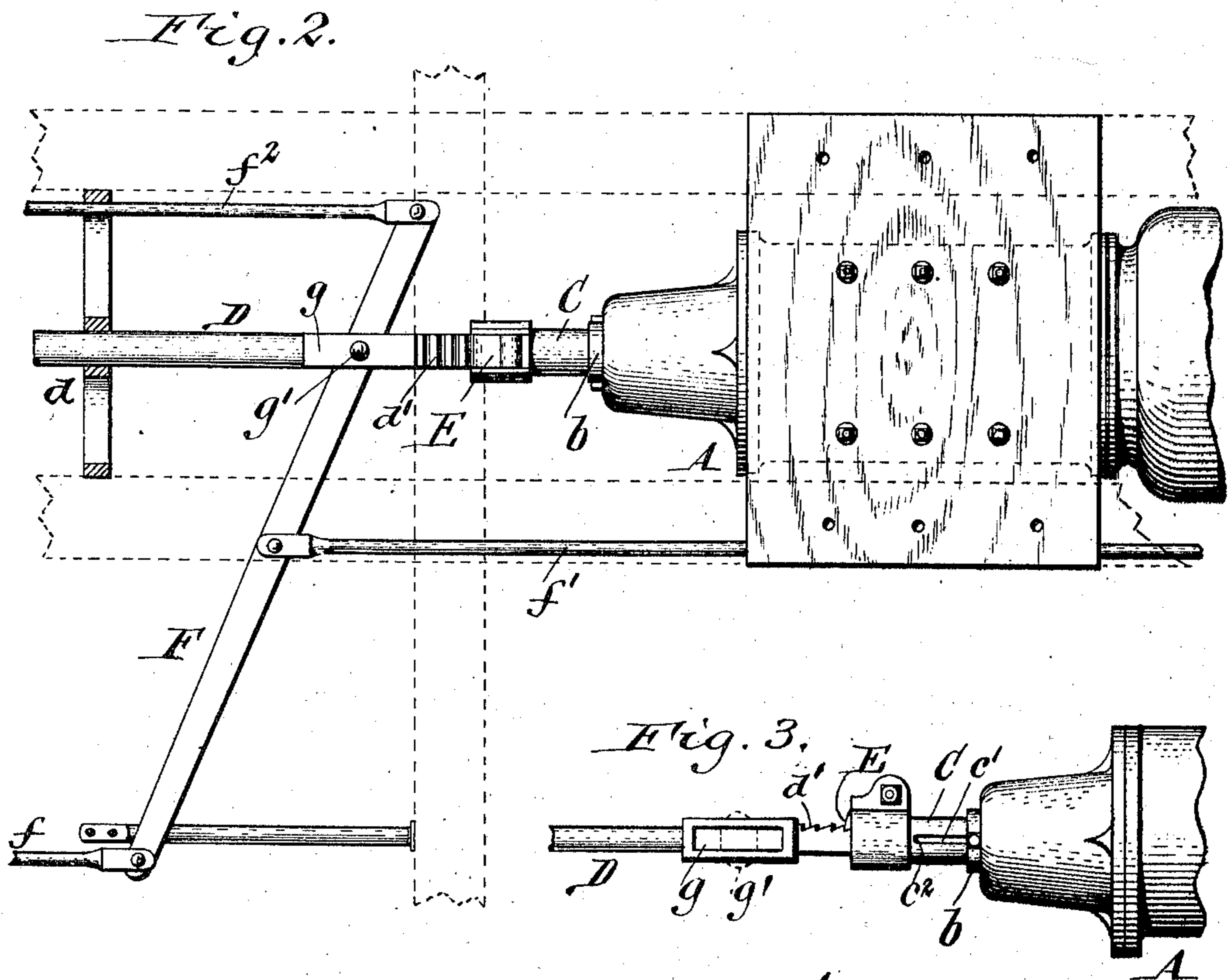
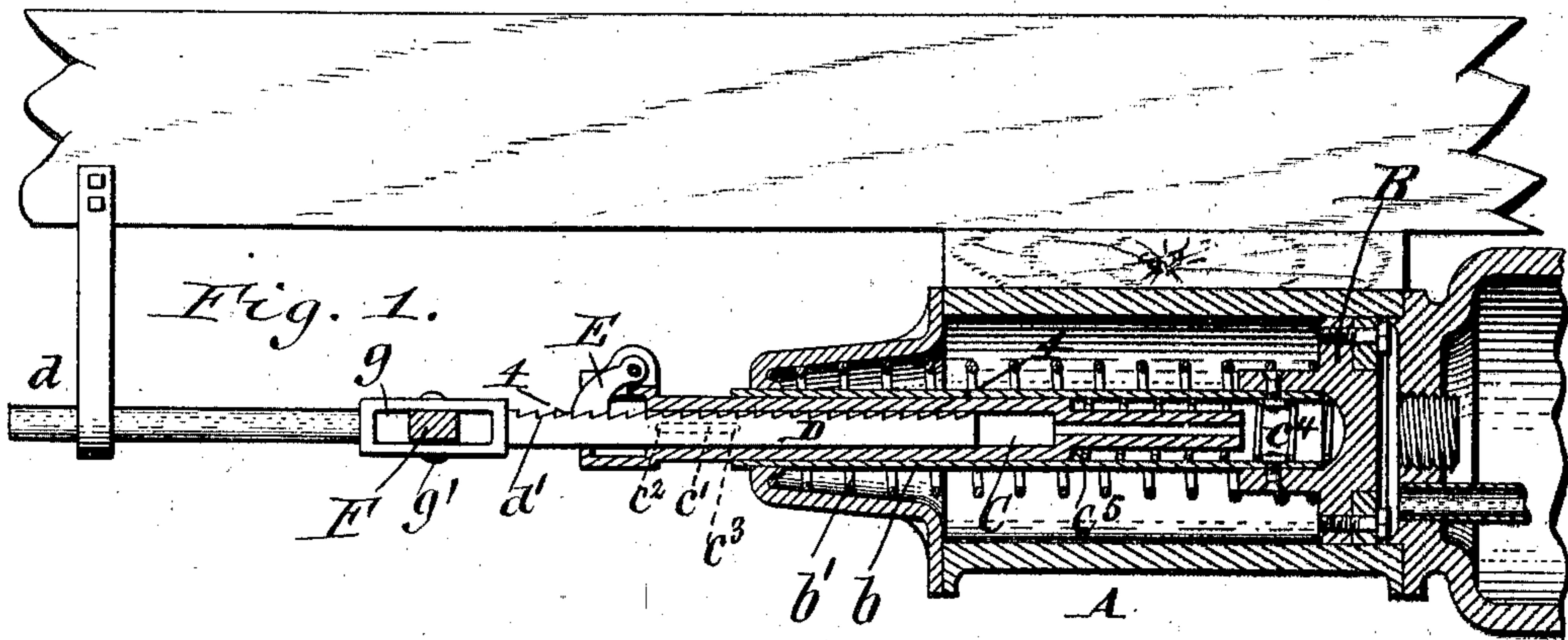


(No Model.)

J. MACBETH.
CAR BRAKE ADJUSTER.

No. 556,011.

Patented Mar. 10, 1896.



Witnesses:
Ernest Pulsford.
Theo. L. Popp.

James Macbeth
Inventor.
By Wilhelm H. Popp.
Attorneys.

UNITED STATES PATENT OFFICE.

JAMES MACBETH, OF BUFFALO, NEW YORK.

CAR-BRAKE ADJUSTER.

SPECIFICATION forming part of Letters Patent No. 556,011, dated March 10, 1896.

Application filed January 11, 1896. Serial No. 575,062. (No model.)

To all whom it may concern:

Be it known that I, JAMES MACBETH, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Car-Brake Adjusters, of which the following is a specification.

This invention relates to car-brake adjusters whereby the slack in the brake-gearing is automatically taken up so as to insure proper working of the brakes.

The object of my invention is to produce an automatic brake-adjuster which is particularly applicable to the brake-gearing of freight-cars in which the piston-rod is loosely connected with the piston in the brake-cylinder.

In the accompanying drawings, Figure 1 is a vertical longitudinal section of a freight-car brake-gearing provided with my improved brake-adjusting mechanism. Fig. 2 is a top plan view of the same, partly in section. Fig. 3 is a fragmentary side elevation of the brake-cylinder and connecting parts. Fig. 4 is a fragmentary horizontal section in line 4-4, Fig. 1.

Like letters of reference refer to like parts in the several figures.

A represents the brake-cylinder secured to the under side of the car in a horizontal position and provided with an air-pipe opening into its rear end.

B represents the brake-piston arranged in the brake-cylinder and provided with a hollow or tubular piston-rod *b*, which passes through the front head of the cylinder. This piston is moved forward for applying the brakes by the pressure of the air against the rear side of the piston and is moved backwardly for releasing the brakes by a spring *b'* surrounding the hollow piston-rod and bearing with its ends against the front side of the piston and the front head of the cylinder.

C represents a tubular thrust bar or sleeve arranged within the hollow piston-rod and having its outer end projecting beyond the outer end of the piston-rod. The thrust-bar and piston-rod are capable of a limited lengthwise movement upon each other to permit the piston during the initial portion of its forward movement to move idle without affect-

ing the brakes until it passes the leakage-groove in the cylinder in the usual manner and to permit of taking up the slack during the last portion of the backward movement of the piston. This limited movement of the piston-rod and thrust-bar upon each other may be produced in various ways, preferably by means of stops *c* arranged on the outer end of the piston-rod on diametrically-opposite sides thereof and projecting into longitudinal slots *c'*, formed in the thrust-bar and adapted to engage with front and rear stops *c² c³*, formed by the ends of the slots. When the brakes are released, the rear ends or stops *c³* of the slots in the thrust-bar are in engagement with the stops of the piston-rod and the inner end of the thrust-bar is separated from the front side of the piston about the same distance as the length of the slots *c'*, as represented in Fig. 1.

c⁴ is a spring whereby the piston-rod and thrust-bar are yieldingly held in this relative position and which cushions the piston as it moves against the end of the thrust-bar. This spring bears with one end against the front side of the piston and with its other end against a shoulder *c⁵* formed on the inner portion of the thrust-bar.

D represents a clutch-bar arranged with its rear end in the thrust-bar and supported at its front end by a bracket *d* secured to the under side of the car. This clutch-bar is provided on the upper side of its rear portion with ratchet-teeth *d'*, having inclined front sides and abrupt rear sides.

E represents a coupling or take-up pawl pivoted on the outer end of the thrust-bar and engaging with the teeth of the clutch-bar.

F represents the main brake-lever having one of its arms connected with the draft-rods *f f'* which are connected with the brake-shoes by intermediate mechanism, and its other arm connected with the draft-rod *f²* which is connected with the hand-wheel, whereby the brakes may be applied by hand in the usual manner. The brake-lever is connected with the clutch-bar, so that the pressure is transmitted from the latter to the lever in line with the thrust of the piston. The preferred means for accomplishing this result consists in providing the central portion of the clutch-

bar with a loop *g*, through which the brake-lever extends and to which the lever is pivoted by a pin *g'*.

When the brakes are released or off the parts of the brake mechanism are in the position shown in Fig. 1. Upon admitting compressed air into the rear end of the cylinder for applying the brakes the piston is moved forward and the springs *b'* and *c'* are compressed. During the first portion of the forward movement of the piston the latter moves alone until it passes the usual leakage-groove in the cylinder and until its front side engages with the inner end of the thrust-bar, after which the piston and thrust-bar move together to the end of the forward stroke. The forward movement of the thrust-bar is transmitted by the pawl to the clutch-bar and from the latter to the brake-shoes by the intermediate brake-gearing. During the first or idle portion of the forward movement of the piston the stops on its tubular piston-rod move from the rear ends to the front ends of the slots in the thrust-bar. Upon relieving the air-pressure for releasing the brakes the piston is moved backwardly to the end of its backward stroke by the spring *b'*. During the backward movement of the piston the clutch-bar is also moved backwardly by the relaxation in the brake-gearing, and this movement is transmitted from the clutch-bar to the thrust-bar by the pawl. The relaxation of the brake-gearing upon releasing the brakes takes place slowly and is practically of the same extent every time the brakes are released. The extent of the forward movement of the piston and piston-rod varies according to the amount of wear on the brake-shoes and the space between the latter and the car-wheels, and its backward movement is always the same as their forward movement, so that the piston and its rod always begin the forward stroke at the same place. When the brake-shoes are in the proper relative position with reference to the car-wheels the extent of the forward and backward movement of the clutch-bar and thrust-bar is practically the same, so that these two members also begin the forward stroke at the same place.

The extent of the forward movement of the clutch-bar varies according to the amount of wear on the shoes; but this bar is not always moved backwardly to the same place where it began its forward movement, because the backward movement is produced solely by the relaxation of the brake-gearing, which is practically the same every time the brakes are released. The extent of the forward movement of the thrust-bar also varies according to the condition of the brake-shoes in the same measure as the clutch-bar, but it is always moved back to the same place at which it begins its forward stroke. In the normal condition of the brakes during which the extent of the forward and backward movement of the

clutch-bar and thrust-bar is the same their relation is not disturbed, and under these circumstances the backward movement of the thrust-bar is produced solely by the relaxation of the brake-gearing, which movement it receives by the pawl from the clutch-bar. During the last portion of the backward movement of the piston the latter moves independently of the thrust-bar and the stops on its tubular piston-rod move from the front ends to the rear ends of the slots in the thrust-bar. The latter is restrained by the spring *c'* from being moved backward with the piston by frictional contact therewith during the normal condition of the brakes. In the normal condition of the brakes the extent of the forward movement and the subsequent backward movement of the thrust-bar and clutch-bar is such that the stops of the piston-rod during the last portion of its backward movement with the piston will not engage with the rear ends of the slots in the thrust-bar, whereby the relative position of the clutch-bar and thrust-bar is left undisturbed.

If the brake-shoes have become worn considerably the forward movement of the clutch and thrust bars is increased in the same measure, but the clutch-bar does not move backwardly to the same extent, because its backward movement is practically uniform at all times and is only so much as is produced by the relaxing of the brake-gearing, thereby causing the place at which the clutch-bar begins its next forward movement to be advanced to the extent of the wear on the brake-shoes. Although the thrust-bar has been also moved forwardly an abnormal distance by the wear on the brake-shoes it is nevertheless moved backwardly to the beginning of its forward stroke by the stops of the piston-rod engaging with the rear ends of the slots in the thrust-bar and carrying the latter along with it to the end of its backward stroke. This causes the thrust-bar to be moved rearwardly on the clutch-bar and the pawl to be shifted from one tooth on the clutch-bar rearwardly to the next tooth, thereby lengthening the distance between the piston and the brake-lever and taking up the wear on the brake-shoes accordingly. After the slack in the brake-gearing has been taken up the stops of the piston-rod during the idle portion of its movement in applying and releasing the brakes continue to move back and forth in the slots without engaging with the ends thereof and shifting the adjusting-sleeve until the wear on the brake-shoes is again sufficient to require the same to be taken up.

In the operation of the adjusting mechanism the brake-gearing is fully relaxed before the piston and its rod reach the end of their backward stroke, thereby preventing the stops of the piston-rod from engaging with the rear end of the slots in the thrust-bar and shifting the latter when the brake-shoes are in proper condition.

I claim as my invention—

1. The combination with the brake cylinder and piston, of a thrust-bar having a limited longitudinal movement with reference to said piston, a clutch-bar connected with the brake-gearing and a clutch device connecting the thrust-bar and the clutch-bar, substantially as set forth.

2. The combination with the brake-cylinder, the brake-piston and the piston-rod provided with a stop, of a thrust-bar having a lengthwise movement with reference to said piston and provided with stops on opposite sides of the piston-stop, a clutch-bar connected with the brake-gearing and having a lengthwise movement with reference to the thrust-bar and a clutch device connecting the thrust and clutch bars, substantially as set forth.

3. The combination with the brake-cylinder and piston, of a thrust-bar having a limited longitudinal movement with reference to the piston, a spring whereby the piston and the thrust-bar are yieldingly held apart, a clutch-bar connected with the brake-gearing and having a lengthwise movement with reference to the thrust-bar and a clutch device connecting the clutch-bar and thrust-bars substantially as set forth.

4. The combination with the brake-cylinder and the brake-piston provided with a hollow piston-rod, of a thrust-bar having a limited lengthwise movement in the piston-rod, a spring interposed between the thrust-bar and the piston, a clutch-bar connected with the brake-gearing and a clutch device connecting the thrust and clutch bars, substantially as set forth.

5. The combination with the brake-cylinder,

the brake-piston and the hollow piston-rod provided with a stop or projection, of a thrust-bar arranged in the hollow piston-rod and provided with a longitudinal slot which receives the stop or projection of the piston-rod, a clutch-bar connected with the brake-gearing and a clutch device connecting the clutch and thrust bars, substantially as set forth.

6. The combination with the brake-cylinder, the brake-piston and the hollow piston-rod, of a hollow thrust-bar having a limited lengthwise movement with reference to the piston-rod, a clutch-bar connected with the brake-gearing and arranged in said thrust-bar and a pawl pivoted on the thrust-bar and engaging with teeth on the clutch-bar, substantially as set forth.

7. The combination with the brake-cylinder, the brake-piston, the hollow piston-rod provided with a stop or projection and the spring whereby the piston is moved backwardly, of a hollow thrust-bar arranged in the hollow piston and provided with a longitudinal slot which receives the stop or projection on the piston-rod, a spring interposed between the piston and the thrust-bar, a clutch-bar arranged in said thrust-bar and connected with the brake-gearing and a pawl pivoted on the thrust-bar and engaging with teeth on the clutch-bar, substantially as set forth.

Witness my hand this 30th day of December, 1895.

JAS. MACBETH.

Witnesses:

THEO. L. POPP,
KATHRYN ELMORE.