

No. 638,357.

Patented Dec. 5, 1899.

W. F. RICHARDS.
CAR COUPLING.

(No Model.)

(Application filed Feb. 21, 1899.)

3 Sheets—Sheet 1.

Fig. 1.

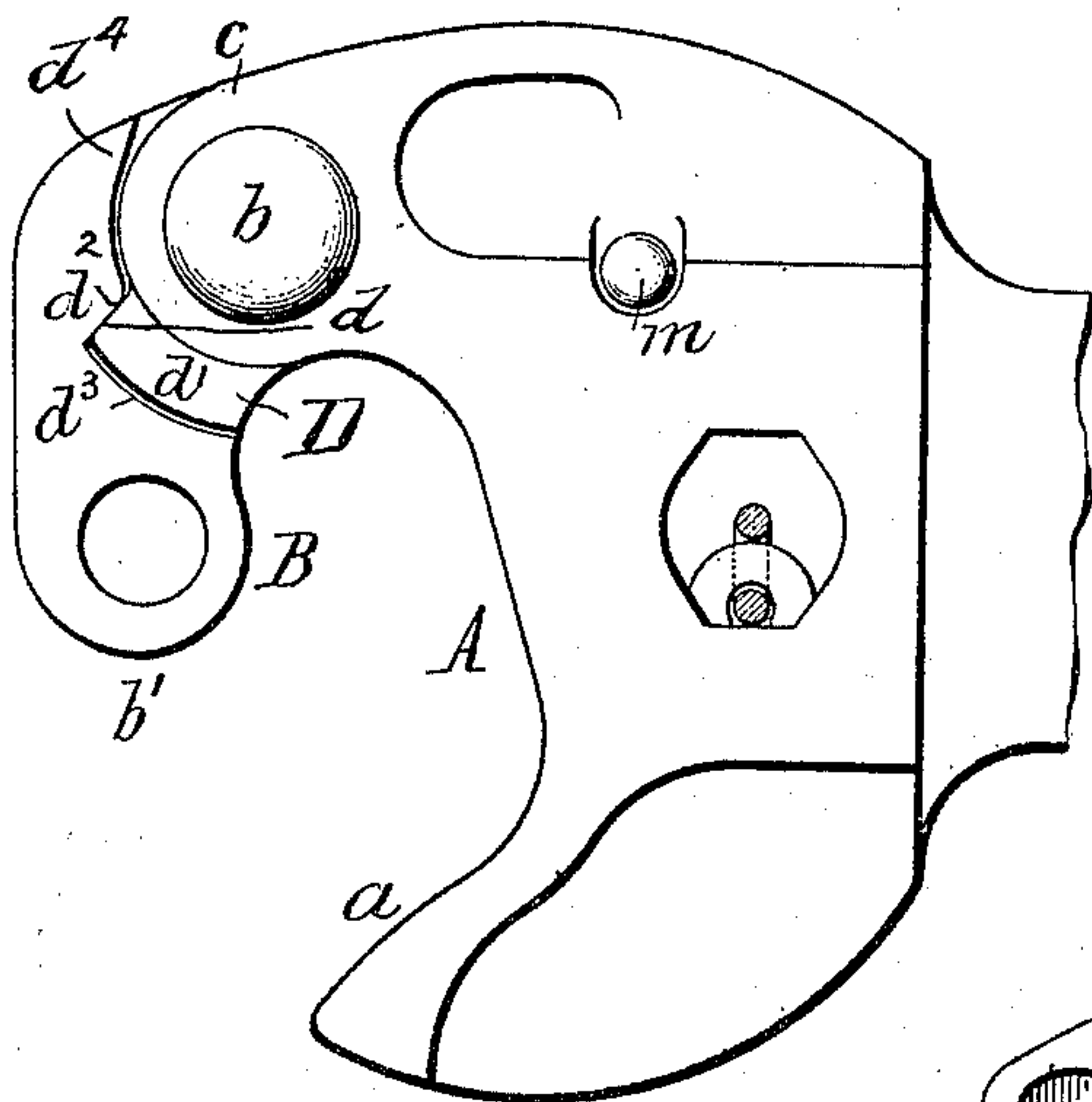


Fig. 2.

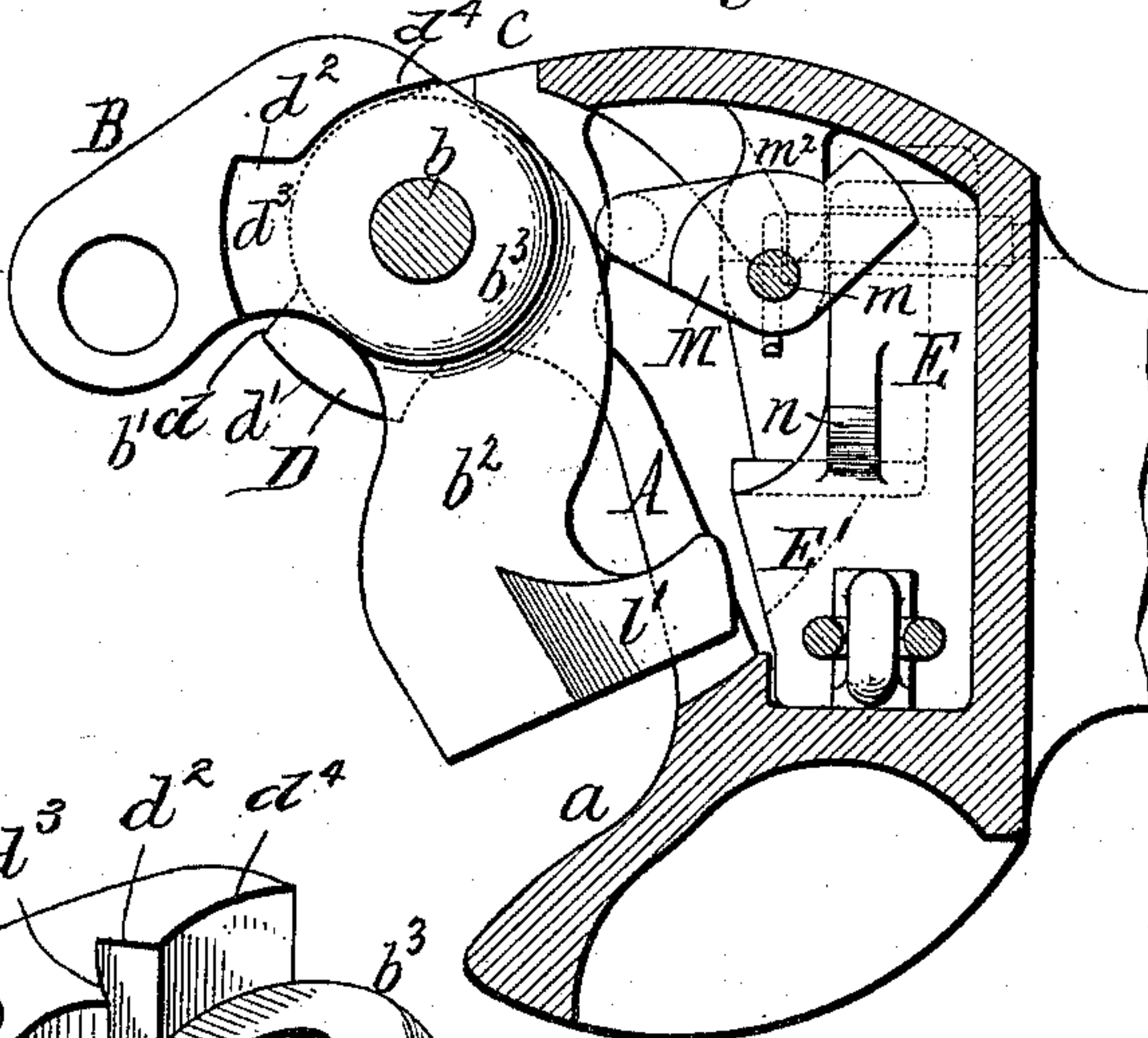


Fig. 3.

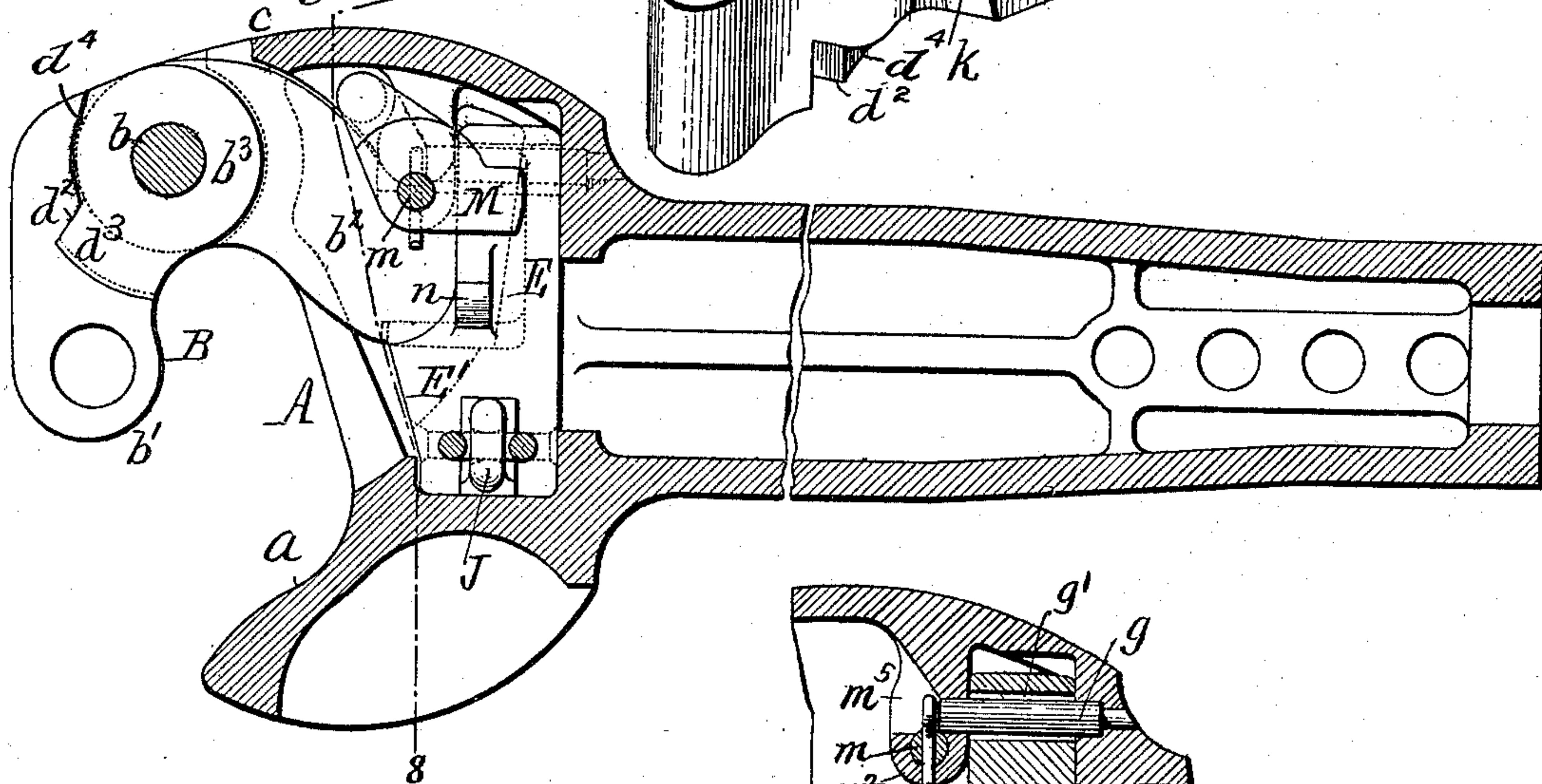


Fig. 4.

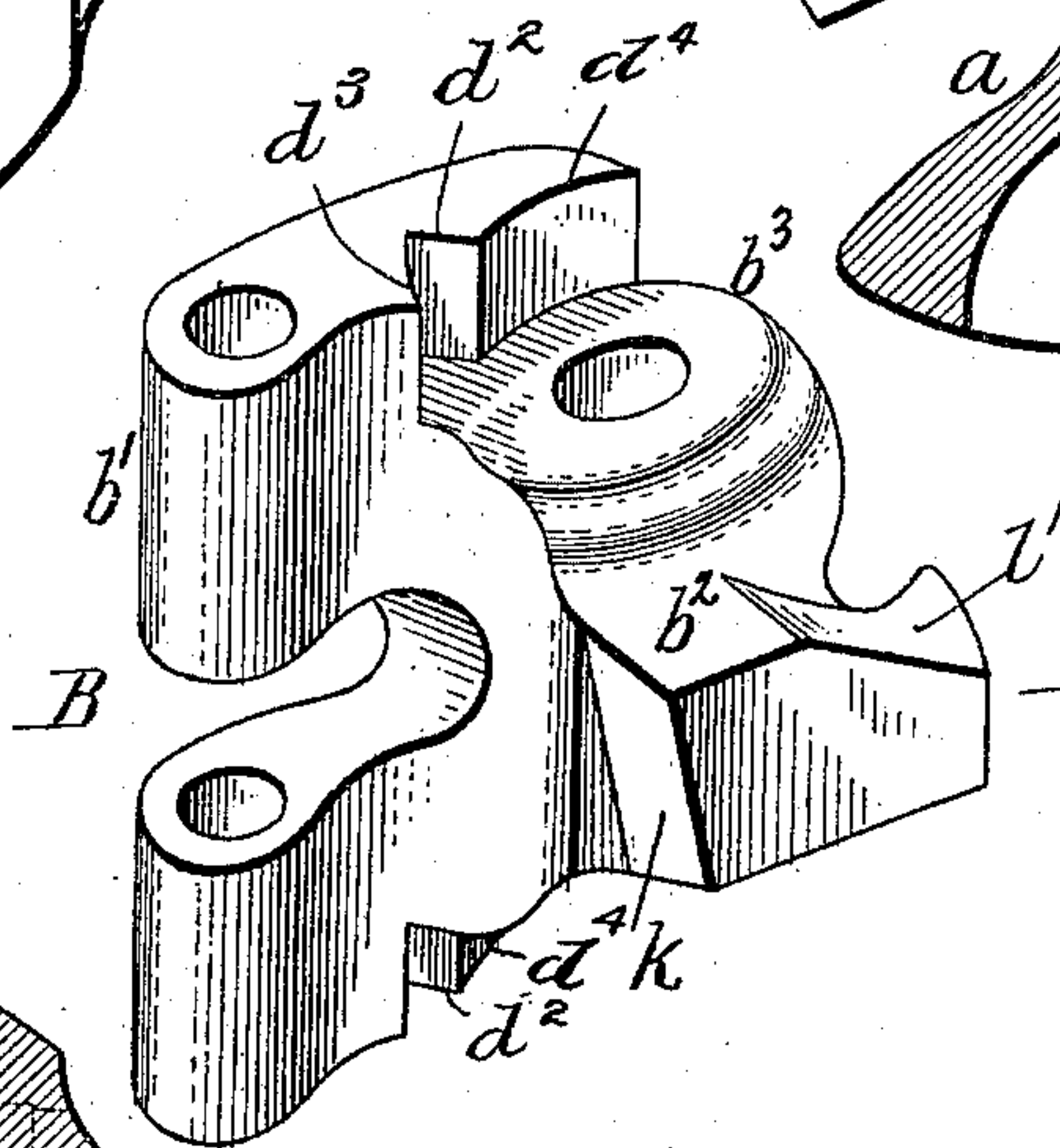
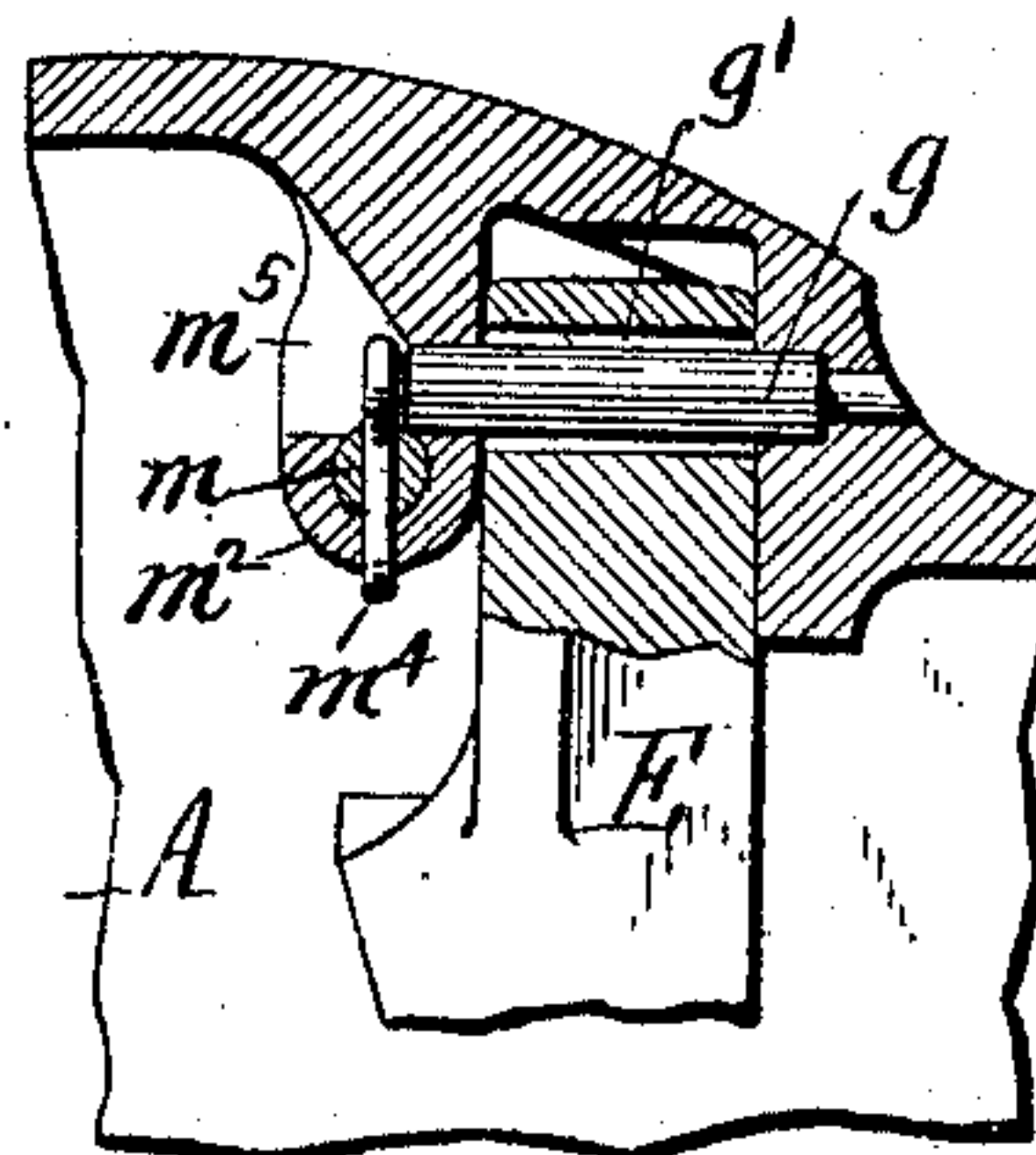


Fig. 5.



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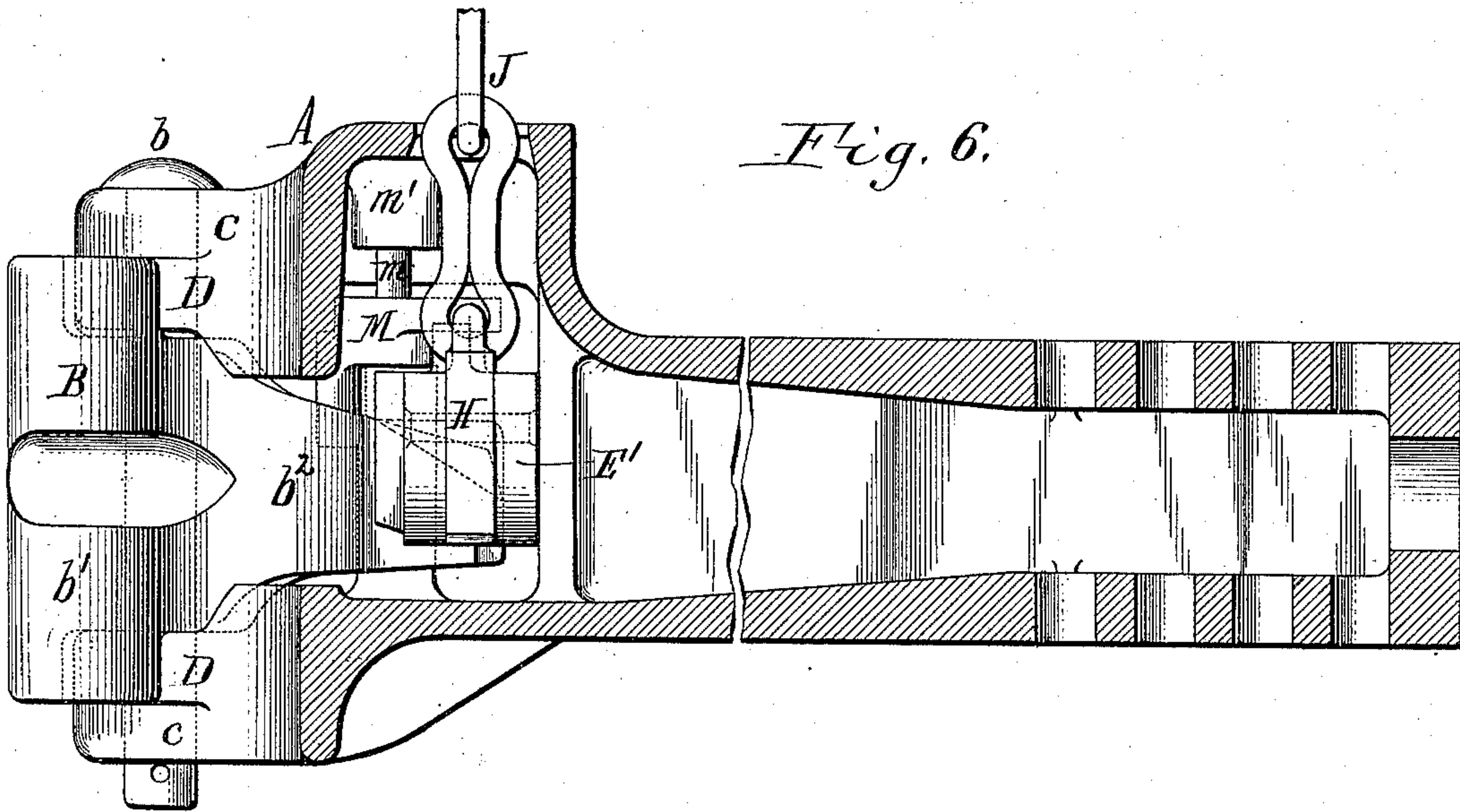


Fig. 6.

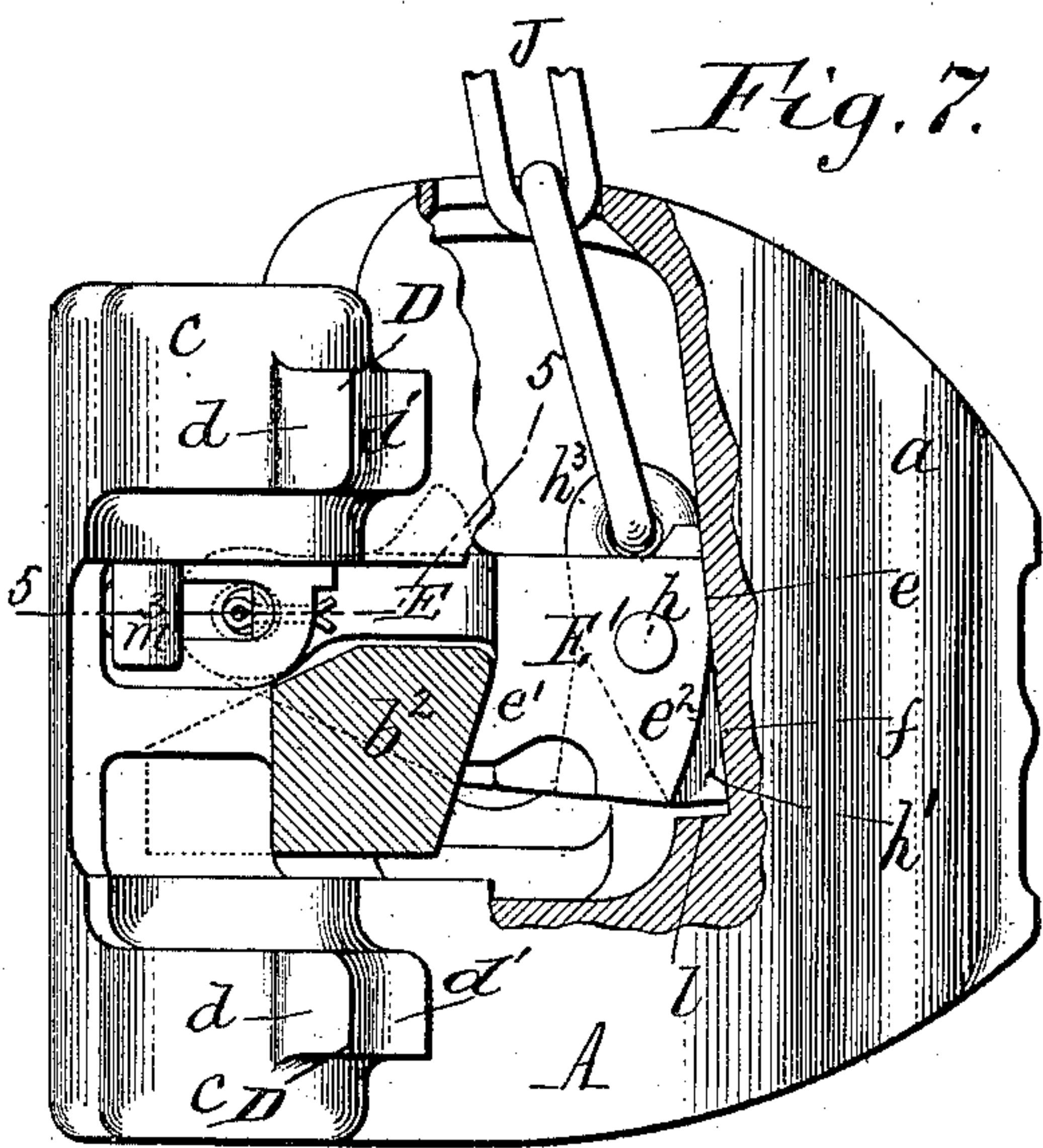


Fig. 7.

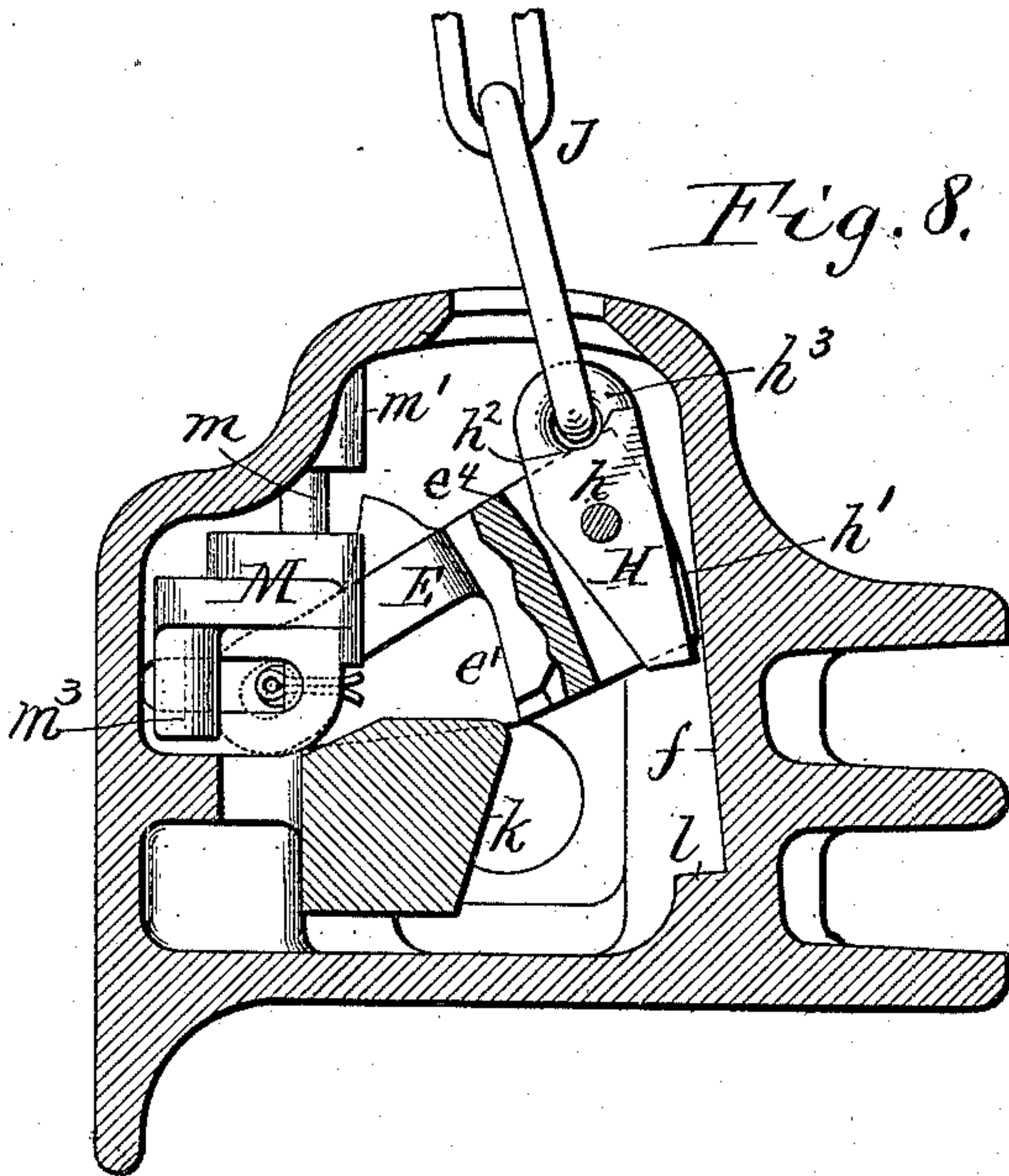


Fig. 8.

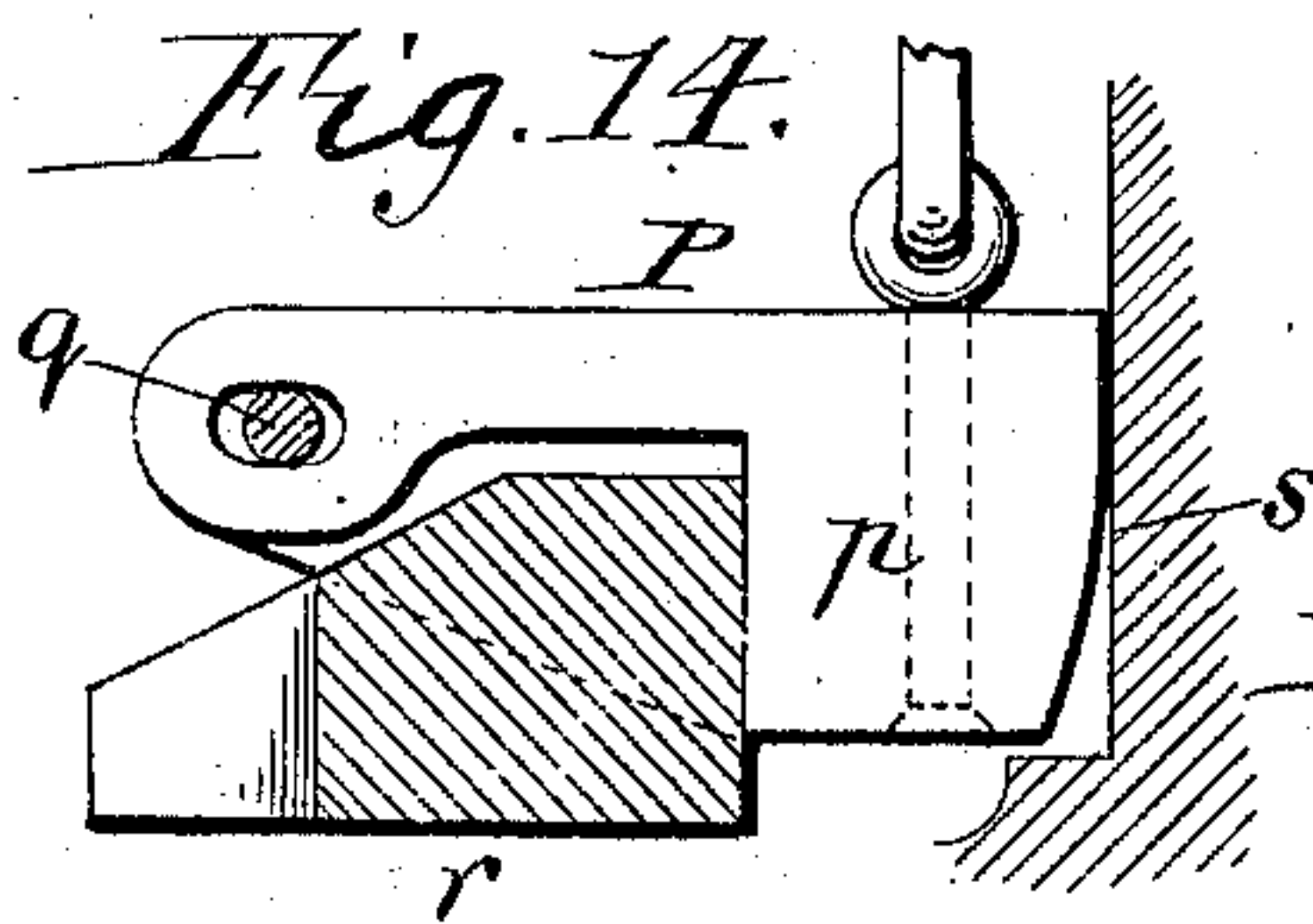


Fig. 14.

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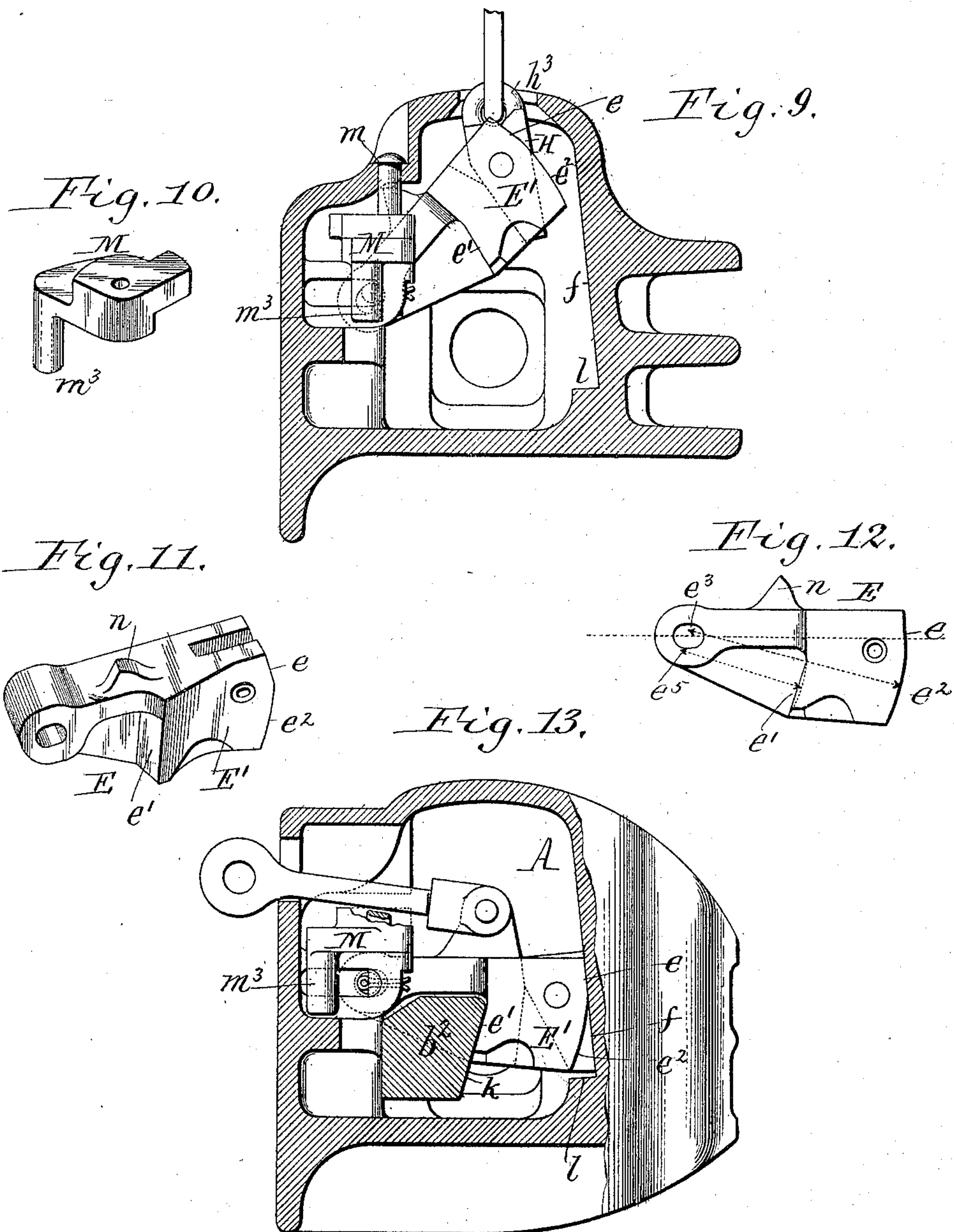
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3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

WILLARD F. RICHARDS, OF BUFFALO, NEW YORK, ASSIGNOR TO THE
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CAR-COUPLING.

SPECIFICATION forming part of Letters Patent No. 638,357, dated December 5, 1899.

Application filed February 21, 1899. Serial No. 706,327. (No model.)

To all whom it may concern:

Be it known that I, WILLARD F. RICHARDS, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Car-Couplings, of which the following is a specification.

This invention relates to car-couplings of the Master Car-Builders' type in which the coupling-knuckle is locked by a vertically-movable lock arranged transversely in the draw-head.

The principal objects of the invention are the strengthening of the coupling arm or hook of the knuckle in order to prevent the bending of the same under a heavy blow and the provision of simple and reliable means for preventing the lock from working up and releasing the knuckle by the pressure and movements of the parts when the train is in motion, thereby producing a coupling which can be safely and satisfactorily used on heavy cars and in long trains and which does not depart from the contour lines adopted by the Master Car-Builders' Association.

In the accompanying drawings, consisting of three sheets, Figure 1 is a top plan view of a car-coupling provided with my improvements, showing the knuckle closed. Fig. 2 is a horizontal section of the same, showing the knuckle fully opened and the lock lowered. Fig. 3 is a similar view showing the knuckle closed and locked. Fig. 4 is a perspective view of the knuckle. Fig. 5 is a fragmentary horizontal section through the pivot end of the lock in line 5 5, Fig. 7. Fig. 6 is a vertical longitudinal section of the draw-head and draw-bar, showing the knuckle locked. Fig. 7 is a front elevation of the draw-head with a portion thereof broken away and the tailpiece of the knuckle shown in cross-section, the knuckle being locked by the lock. Fig. 8 is a transverse vertical section in line 8 8, Fig. 3, showing the lock raised and just clearing the tailpiece of the knuckle. Fig. 9 is a similar section with the knuckle omitted and showing the lock fully raised. Fig. 10 is a perspective view of the kicking-lever. Fig. 11 is a perspective view of the lock. Fig. 12 is a side elevation of the lock. Fig. 13 is partly a front elevation and partly a cross-

section of the draw-head, showing the lifting-chain of the lock extending through an opening in the side of the draw-head. Fig. 14 is a front elevation of a modified construction of the lock, with the tailpiece of the knuckle and the adjacent parts of the draw-head shown in cross-section.

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

A is the chambered draw-head, which conforms to the well-known contour lines adopted by the Master Car-Builders' Association and has at one side the usual guard-arm *a*.

B is the coupling-knuckle, which is pivoted by the vertical pin *b* between the usual horizontal lugs *c* on the opposite side of the draw-head and which is composed, as usual, of a coupling-hook *b'*, tailpiece *b²*, and hub *b³*. When the knuckle, which is usually constructed of a steel casting, stands in its locked position and receives a severe blow from the coupling of an adjoining car, the hook *b'* of the knuckle is liable to be bent inwardly or backwardly, whereby it is caused to assume an abnormal angle to the tailpiece. The metal on the outer side of the hub of the knuckle is comparatively thin and is liable to stretch under such blows and to permit of such bending of the knuckle. When the knuckle has been so bent, it cannot be closed sufficiently to allow the lock to engage with its tailpiece, and the knuckle is left unlocked, whereby the automatic action of the coupler is defeated. In order to avoid this bending of the coupling-hook, the parts are constructed as follows: Each knuckle-lug *c* of the draw-head is provided on the inner portion of its front side with a projecting angular stop *D*, pointing with its salient angle forwardly. This salient angle is bounded on the outer side by an outwardly-facing straight or abrupt face *d* and on the inner side by a convex segmental face *d'*, which is concentric with the pivot of the knuckle. Each ear of the knuckle is provided in its rear side with an angular recess having a plain or abrupt inwardly-facing outer face *d²* and a segmental concave inner face *d³*, which is concentric with the knuckle-pivot. The outer face *d²* extends rearwardly to the concave face *d⁴* of the pivotal portion of the knuckle. The faces of

these angular stops and recesses are so arranged that when the knuckle is closed and is pressed backward by a buffing blow they come in contact and prevent displacement of the knuckle. The abrupt faces prevent any movement of the knuckle inwardly and the segmental faces prevent any movement of the knuckle outwardly, so that by the engagement of the stops in the recesses the knuckle is prevented from moving otherwise than squarely against the front side of the draw-head lugs, so far as the play of the parts will permit of such movement. This removes the tendency of buffing strains to force the knuckle inwardly and to bend the knuckle and pin in that direction.

E is the lock, which engages with the tailpiece b^2 of the knuckle for retaining the latter in its closed position. This lock is arranged transversely in the draw-head and is pivoted by a longitudinal pin g , Fig. 5, at the same side of the draw-head on which the knuckle is pivoted, so that the head E' of the lock, which engages with the tailpiece of the knuckle, swings vertically and the lock extends from its pivot over the tailpiece of the knuckle and downwardly on the opposite or locking side of the tailpiece. The head E' overlaps the outer face of the tailpiece of the knuckle in the closed position of the latter, as represented in Figs. 7 and 13.

The inward and outward movements of the draw-bar produced by a train in motion cause the knuckle to vibrate on its pivot, and this motion of the knuckle causes a vertically-movable lock to gradually creep upward on the tailpiece, rendering the lock liable to become disengaged from the knuckle and allowing the knuckle to open and the train to part. To counteract this tendency and to prevent accidental uncoupling, the parts are constructed as follows: The lock is so mounted in the draw-head that it is capable of a slight lateral or transverse movement in the cavity of the draw-head, which movement is of such extent that the outer or front bearing-face e of the head of the lock can be brought in contact with the adjacent inner side f of the cavity of the draw-head. The draft of the train exerted on the coupling-hook of the knuckle presses the tail of the knuckle against the rear face e' of the head of the lock and the latter, with its front face e , against the guard-arm side f of the chamber of the draw-head. The frictional resistance which is so created between the end of the lock and the draw-head resists the tendency of the lock to work up in the draw-head. The lateral movement of the lock can be provided for, as shown in the drawings, Figs. 5, 11, and 12, by elongating the pivot-hole g' of the lock or by other means.

The head of the lock is preferably provided with a vertical friction-shoe H as an additional safeguard against upward movement. This shoe consists of an upright bar, which is pivoted in a vertical recess in the face of

the head of the lock by a transverse pin h , so that the shoe can swing in a vertical plane and lengthwise of the lock. The shoe is adapted to bear with its outer face h' against the adjacent wall f of the draw-head. The portion e^2 of the outer face of the lock, which lies below the level of the lock-pivot and below the bearing-face e , is curved or cut away nearly concentric with the lock-pivot, so that the head of the lock will easily clear the opposing inner side f of the draw-head as the lock is swung up on its pivot to release the knuckle. This clearance is best obtained by shaping the lower part e^2 of the front face of the lock in the form of an arc, which is struck from a center e^3 , located somewhat above the pivot-line of the lock, as represented in Fig. 12. The lower portion of the shoe projects beyond the lower curved face e^2 of the lock when the latter is in its lowest position, as represented in Fig. 7.

The wall f of the draw-head, against which the lock and the shoe bear, is inclined upwardly and toward the knuckle side of the draw-head, and the bearing-face e of the lock and the outer face h' of the shoe are correspondingly inclined. The back h^2 of the shoe is parallel with its bearing-face h' , or nearly so, in its upper portion, and the upper portion e^4 of the back of the recess which contains the shoe is shaped to support the back h^2 of the shoe when the latter is in its locking position, as indicated by dotted lines in Fig. 7. The lower portions of the back of the shoe and of the back of the recess are cut away to allow the upper end of the shoe to swing forwardly in raising the lock, as represented in Fig. 8. When the lock has been lowered to its locking position, the face of the shoe forms a downward continuation of the upper locking-face of the head of the lock and increases the frictional resistance between the lock and the draw-head.

The shoe is preferably formed at its upper end with an eye h^3 , to which the usual chain J is attached, whereby the lock is raised for releasing the knuckle. In the construction shown in Figs. 1 to 10 the chain passes through an opening formed in the top of the draw-head. In raising the lock for releasing the knuckle the shoe swivels on the lock and assumes the necessary angle to clear the beveled wall f of the draw-head, as shown in Fig. 8. When the lock is lowered in the draw-head, the shoe by coming in contact with the beveled wall f of the draw-head swings to the locking position. (Shown in Fig. 7.)

The outer or locking face k of the tailpiece of the knuckle is inclined, beveled, or undercut, so as to overhang the adjacent rear locking-face e' of the lock. The locking-face e' on the rear side of the head of the lock and the bearing-face e on the front side of the lock converge upwardly, as well as the locking-face k of the tailpiece of the knuckle and the inner side f of the guard-arm side of the

chamber of the draw-head, so that the head of the lock is arranged between two upwardly-converging surfaces—the locking-face k of the tailpiece of the knuckle, which approaches the guard-arm side of the draw-head upwardly, and the guard-arm side f of the chamber of the draw-head, which approaches the knuckle side upwardly. The lock extends in its locked position from its pivot-pin horizontally across the tailpiece of the knuckle, and the locking-face e' of the lock extends from the horizontal or shank portion of the lock downwardly and toward the pivot end of the lock or at an acute angle to the horizontal or shank portion of the lock. The pressure of the overhanging inclined face k of the tailpiece against the inclined rear face e' of the lock tends to crowd the lock downwardly, and thereby assists in counteracting the tendency of the lock to work up in the draw-head. The lock is therefore held against accidental upward movement in the draw-head by the friction of its head against the adjacent inner wall of the draw-head, by the additional friction caused by the shoe bearing against the draw-head, by the locking-face of the tailpiece of the knuckle overhanging the locking-face of the lock and crowding the lock down, and by the head of the lock being arranged in an upwardly-converging space bounded on one side by the inclined locking-face of the tailpiece and on the other side by the inclined side of the chamber of the draw-head, against which upwardly-converging surfaces the correspondingly upwardly converging inner and outer surfaces of the lock engage. All of these features are preferably used conjointly; but they may also be used separately.

In order to prevent the rear face e' of the lock from binding against the tailpiece of the knuckle in raising the lock out of its locked position, the rear locking-face e' of the lock is arranged approximately at such an angle that it represents the chord of an arc, which is struck from a center e^5 , located somewhat below the pivot-line of the lock, as represented in Fig. 12. This causes the beveled face e' to recede from the upper edge of the inclined locking-face k of the tailpiece as the lock is raised, and so provides ample clearance between the lock and the tailpiece, while providing a snug fit of the lock against the tailpiece when the lock is in its lower or locking position.

The downward flare of the space between the locking-face of the tailpiece and the beveled side of the chamber of the draw-head also prevents ice, snow, and cinders from lodging against these parts. The chamber of the draw-head is provided below the head of the lock with a ledge l , upon which the lower end of the shoe rests when the knuckle is swung out and which supports the free end of the lock at such a height that the beveled upper face l' at the rear end of the tailpiece

of the knuckle can enter underneath the lock and lift the same as the knuckle is swung back to allow the tailpiece to engage behind the head of the lock.

If desired, the lock may be operated from the side of the draw-head on which the knuckle is located, such a construction being shown in Fig. 13. In this case the lock is raised by a transverse link, which passes through an opening formed in the side wall of the draw-head and which is pivoted at its inner end to a lug projecting from the upper side of the lock. In this construction the latch is not connected with the lifting chain or link.

M is the kicker or kicking-lever whereby the knuckle is automatically thrown into its open position in the act of fully raising the lock. The kicker is arranged horizontally in the draw-head on the side on which the knuckle is arranged and is mounted on a vertical pivot-pin m , which is supported in bearings $m^1 m^2$, formed on the draw-head, as represented in Figs. 2, 3, 6, and 8. The front arm of the kicker is provided with a depending lug or pin m^3 , which extends downwardly in rear of the tailpiece of the knuckle in the closed position of the latter. The rear arm of the kicker extends rearwardly into the path of movement of a trip-lug n , arranged on the upper side of the lock. When the lock is raised to its full limit, its lug n strikes the rear arm of the kicker during the last portion of the upward movement of the lock and swings said arm toward the adjacent wall of the draw-head, thereby swinging the front arm of the kicker in the opposite direction and causing its pin m^3 to strike against the tailpiece and throw the knuckle to its open position. When the knuckle is closed, the kicker is returned to its former position by the tailpiece of the knuckle striking the depending pin of the kicker. The pivot-pin m , on which the kicker turns, is preferably secured in the draw-head by a horizontal cotter-pin m^4 , Fig. 5, which is inserted in the lower portion of the pin m and in the lower bearing m^2 . This bearing is provided toward the adjacent wall of the draw-head with a recess m^5 for the insertion of the cotter-pin. The latter stands with its head opposite the front end of the pivot-pin g of the lock and so serves at the same time to hold this pivot-pin in its bearings.

The lateral movement of the lock in the chamber of the draw-head, whereby the head of the lock is pressed by the tailpiece of the knuckle against the adjacent side of the chamber of the draw-head, can be utilized in a lock in which the front and rear bearing-faces of its head are parallel or perpendicular, as represented in Fig. 14. In this figure P represents the lock; p , the head of the lock; q , the pivot of the lock; r , the tailpiece of the knuckle, and s the wall of the draw-head, against which the head of the lock is forced by the pressure exerted by the knuckle.

I claim as my invention—

1. The combination with the draw-head having its lugs, between which the knuckle is pivoted, provided with forwardly-projecting angular stops, having in front of the knuckle-pivot abrupt faces which extend forwardly from said lugs and face outwardly, of a coupling-knuckle having its pivotal portion provided on its rear side with angular recesses having inwardly-facing outer abrupt faces adapted to bear against the abrupt faces of the draw-head when the knuckle is closed, substantially as set forth.

2. The combination with the draw-head having its lugs, between which the knuckle is pivoted, provided with projecting stops, having outwardly-facing abrupt faces which project forwardly from said lugs, and having inner convex faces, which extend backwardly and inwardly from the front ends of said abrupt faces, of a coupling-knuckle having its pivotal portion provided on its rear side with recesses having corresponding outer, inwardly-facing, abrupt faces and inner, concave faces, substantially as set forth.

3. A knuckle for car-couplings having its pivotal portion provided on its rear side with angular recesses having outer, inwardly-facing, abrupt faces and having inner faces which extend backwardly and inwardly from the front ends of said abrupt faces, substantially as set forth.

4. The combination with the draw-head, of a lock pivoted to one side of the draw-head to swing vertically and capable of transverse movement in the draw-head to bear with its head against the opposite side of the chamber of the draw-head, and a coupling-knuckle pivoted to the draw-head and adapted to press with its tailpiece against the lock and to force the same with its head against the inner side of the draw-head, substantially as set forth.

5. The combination with the draw-head having the inner side of its chamber inclined upwardly, of a coupling-knuckle pivoted at the opposite side of the chamber, and a vertically-swinging lock capable of a limited lateral movement in said chamber and having its locking-head provided with an inclined face which bears against the inclined side of the chamber when the lock is in its lower position, substantially as set forth.

6. The combination with the draw-head and the coupling-knuckle, of a lock pivoted to the draw-head and provided at its head with a movable shoe which is adapted to bear against the opposing inner side of the draw-head when the lock is in its locking position, substantially as set forth.

7. The combination with the draw-head having the inner side of its chamber inclined upwardly and toward the opposite side of the chamber, of a coupling-knuckle, and a vertically-swinging lock provided at its free end with a movable shoe having an inclined face which engages against the inclined side of

the draw-head when the lock is in its lower position, substantially as set forth.

8. The combination with the draw-head having the inner side of its chamber inclined upwardly and toward the opposite side of the chamber, of a coupling-knuckle, a vertically-swinging lock having an inclined face adapted to bear against the inclined side of the draw-head and a shoe pivoted to the free end of the lock and having a similarly-inclined face, substantially as set forth.

9. The combination with the draw-head having the inner side of its chamber on the guard-arm side of the draw-head inclined upwardly and toward the knuckle side of the draw-head, of a coupling-knuckle having its tailpiece provided with an overhanging inclined locking-face, and a vertically-swinging lock having its head provided on its rear side with a correspondingly-inclined locking-face and on its front side with an inclined face fitting against the inclined side of the chamber of the draw-head, substantially as set forth.

10. The combination with the draw-head, of a coupling-knuckle pivoted to one side of the draw-head and having its tailpiece provided with an overhanging inclined locking-face, a vertically-movable lock pivoted to the same side of the draw-head and provided on its rear side with a corresponding inclined locking-face, and a pivoted shoe arranged at the front side of the lock and adapted to engage against the opposing inner side of the chamber of the draw-head, substantially as set forth.

11. The combination with the draw-head, the lock and the longitudinal pivot-pin of the lock, of a kicking-lever, a vertical bolt on which said lever turns and which is arranged in front of said longitudinal pin, and a cotter-pin arranged in the lower end of said vertical pin and standing opposite the front end of said longitudinal pin and confining the latter in its bearings, substantially as set forth.

12. A lock for car-couplings having its head provided on its inner and outer sides with downwardly-diverging faces, substantially as set forth.

13. The combination with the draw-head having the inner side of its chamber inclined upwardly, of a coupling-knuckle having its tailpiece provided with an overhanging inclined locking-face, and a vertically-swinging lock having its head provided with downwardly-diverging faces, one adapted to bear against the inclined face of the knuckle and the other against the inclined side of the draw-head, substantially as set forth.

Witness my hand this 17th day of February, 1899.

WILLARD F. RICHARDS.

Witnesses:

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ELLA R. DEAN.