

No. 763,366.

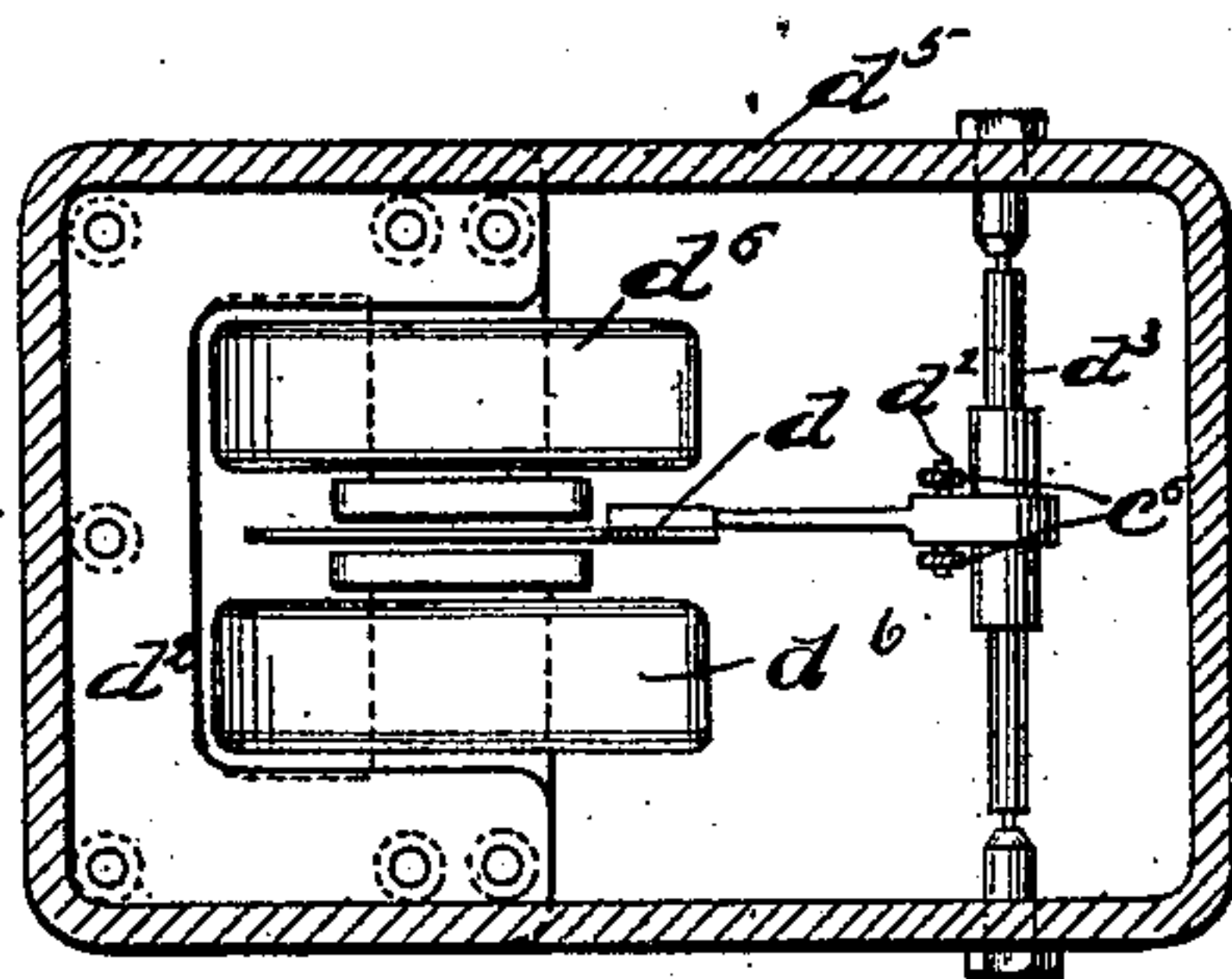
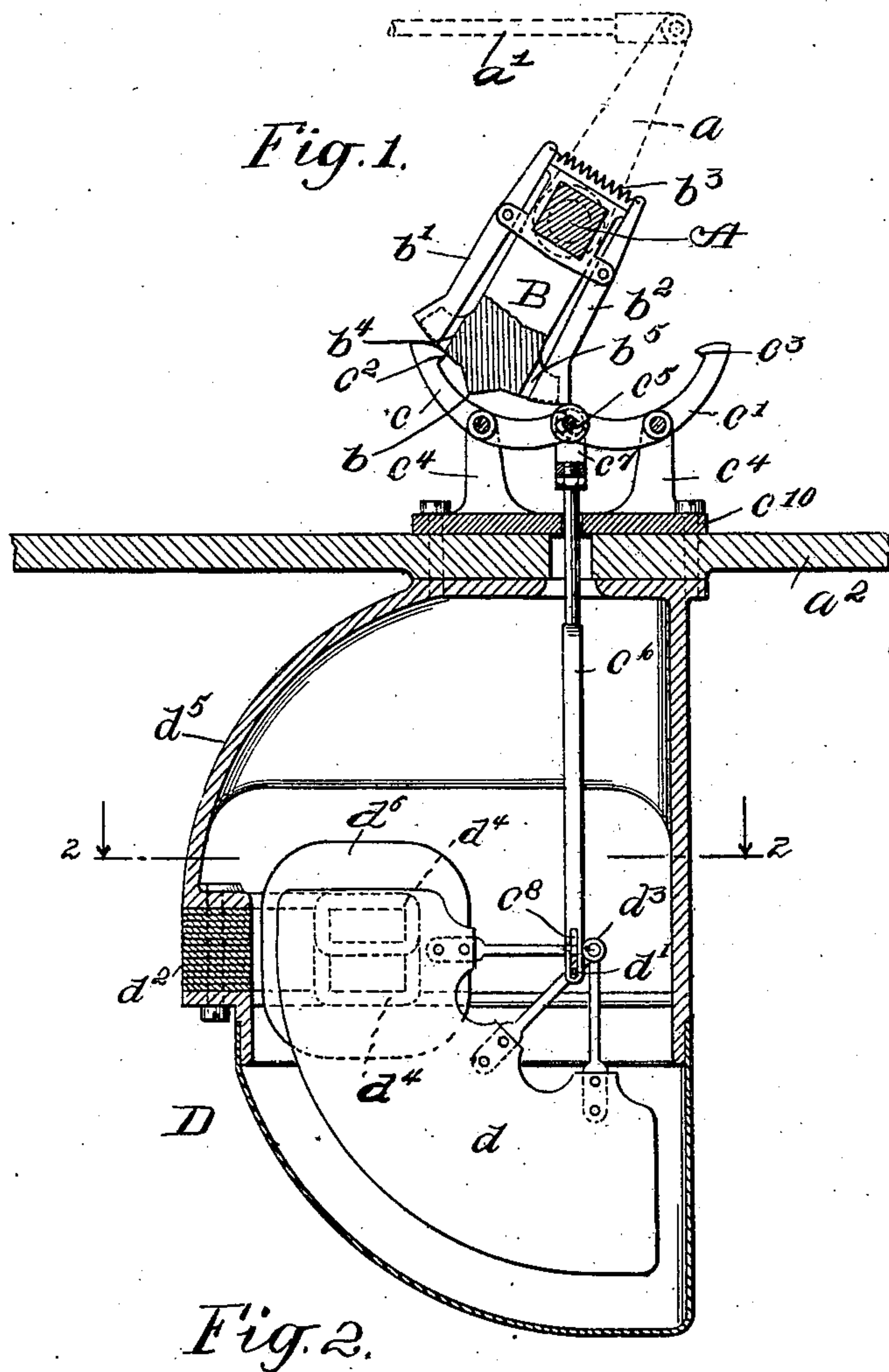
PATENTED JUNE 28, 1904.

J. P. COLEMAN.
LOCK FOR LEVERS IN INTERLOCKING MACHINES.

APPLICATION FILED OCT. 8, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



WITNESSES:

B. A. Himmann
A. de B. B. B.

INVENTOR

John P. Coleman

BY

F. O. Crane
His ATTORNEY

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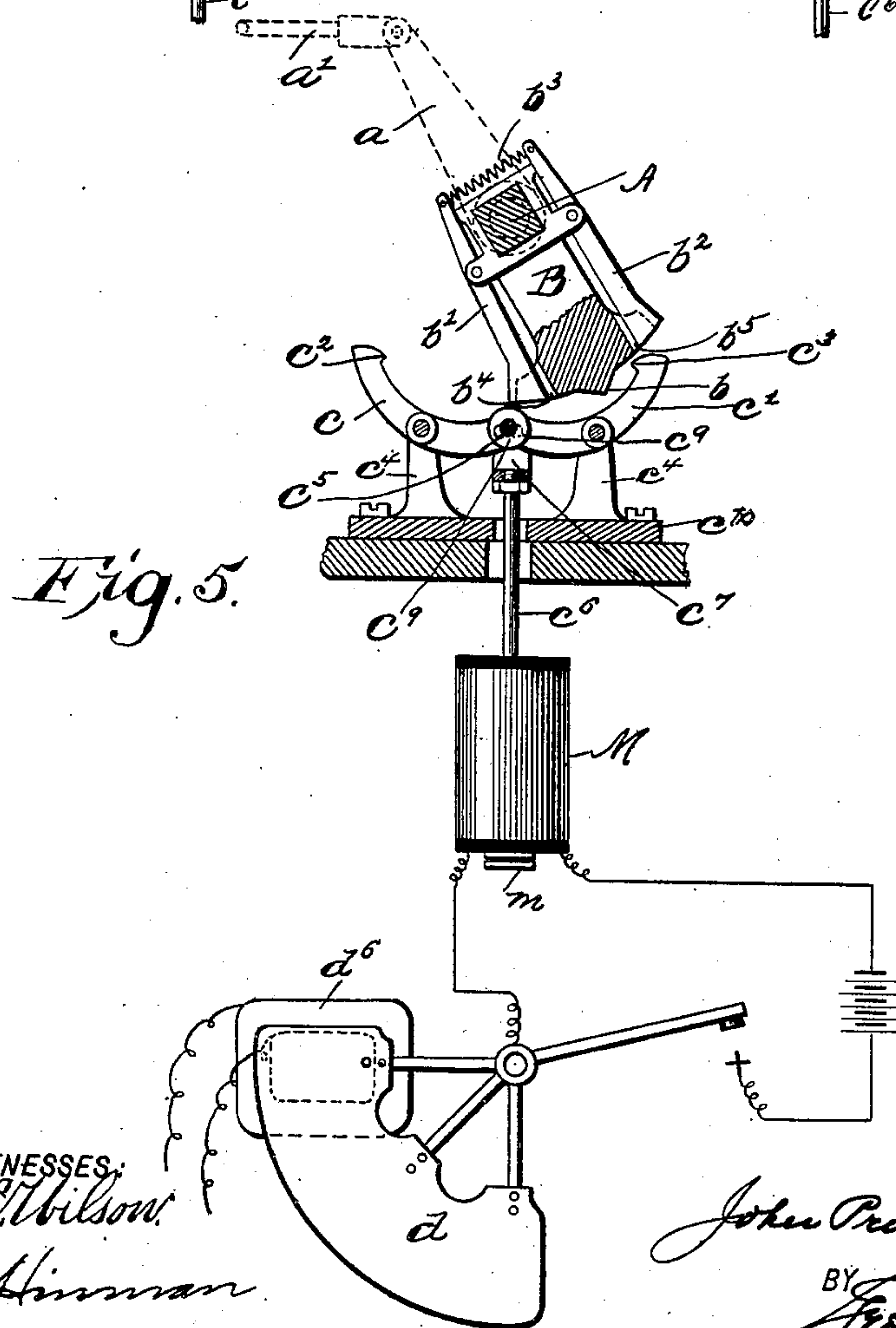
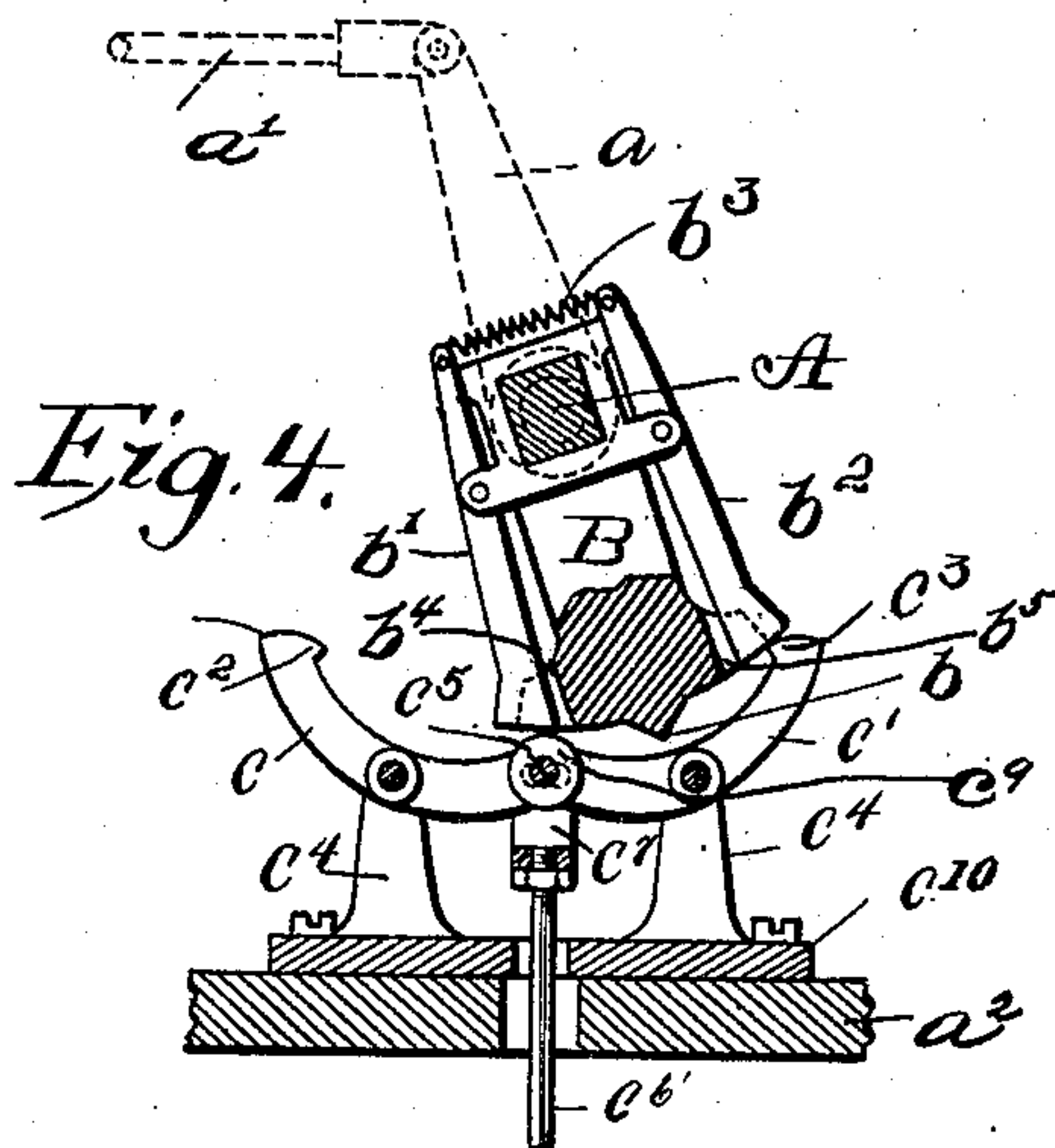
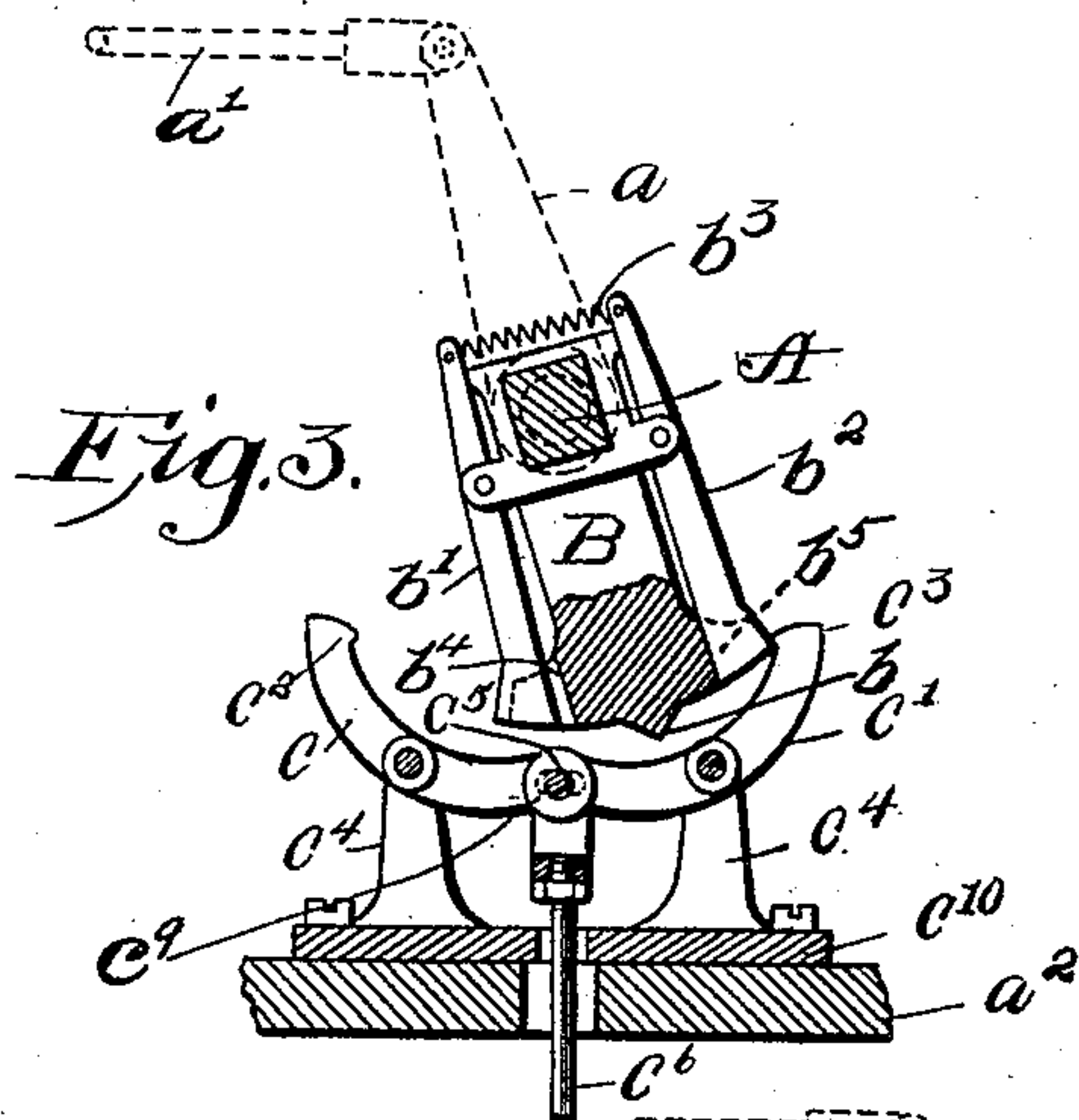
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2 SHEETS—SHEET 2.



WITNESSES:
D. C. Wilson
B. A. Hinman

INVENTOR
John Presley Coleman
BY
Ed. E. Bruce
ATTORNEY

UNITED STATES PATENT OFFICE.

JOHN PRESSLEY COLEMAN, OF EDGEWOOD, PENNSYLVANIA, ASSIGNOR
TO THE UNION SWITCH & SIGNAL COMPANY, OF SWISSVALE, PENN-
SYLVANIA, A CORPORATION OF PENNSYLVANIA.

LOCK FOR LEVERS IN INTERLOCKING MACHINES.

SPECIFICATION forming part of Letters Patent No. 763,366, dated June 28, 1904.

Application filed October 8, 1903. Serial No. 176,285. (No model.)

To all whom it may concern:

Be it known that I, JOHN PRESSLEY COLEMAN, a citizen of the United States, residing at Edgewood, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Locks for Levers in Interlocking Machines, of which the following is a specification.

My invention relates to locks for the levers comprised in interlocking machines, which levers either operate directly through mechanical connections switch-rails or signals or control the operation of power-operated apparatus connected with switch-rails or signals.

My invention particularly relates to electric locks for such levers, especially when the levers are designed to control power-operated apparatus.

I will describe a lock embodying my invention and then point out the novel features thereof in claims.

In the accompanying drawings, Figure 1 is a view, partly in elevation and partly in vertical section, of a lock for a controlling-lever embodying my invention. Fig. 2 is a transverse sectional view taken on the line 2 2 of Fig. 1. Fig. 3 is a detail view of the lock, showing the parts in a different position from that shown in Fig. 4. Fig. 4 is a detail view of the lock, showing the parts in a different position from that shown in Figs. 1 and 3. Fig. 5 is a view of the lock in the position shown in Fig. 1 and a control for an electromagnetic means for actuating the lock.

Similar letters of reference designate corresponding parts in all of the figures.

It will be understood that in interlocking machines the levers therein, whether they operate directly switches or signals, or both, or control either electrically or otherwise power-operated apparatus connected with switch rails or points or signals, or both, are "mechanically interlocked" in a manner well known in the art. This mechanical interlocking is so arranged that a complete movement of one lever may be made to release or lock certain other levers as service conditions may

call for. In addition to this mechanical interlocking in some cases an electric lock is provided for each lever, which electric lock may also serve as an indication means. The lock is adapted to prevent a complete movement of the lever, which would release or lock other levers in the machine until after the signal or switch-rails have been completely moved in response to the preliminary movement of the lever. If the switch-rails or signal have been completely moved, the electric lock on the lever will be released, thereby permitting the lever to be completely moved. The "indication" or "notification" of the movement of the signal or switch-rails is obtained by the actuation of the lock to release the lever. As hereinbefore stated, my invention relates to the electric lock.

Referring now to the drawings, A designates a shaft to which an arm *a* is secured. This arm may itself constitute a lever, as in the well-known type of interlocking machines employed in connection with electropneumatic apparatus, or a separate connection *a'* may be provided between the arm *a* and a lever now shown. The shaft is suitably journaled on a bed or base-plate *a''*, upon which other shafts may be journaled. This arrangement, however, is immaterial so far as my invention is concerned.

B designates an arm which is connected with the lever which is to be locked in some manner as to have movement in response to a movement of the lever, and it is this part which is preferably affected by the lock, though the lock may be made to affect the lever directly rather than indirectly. As here shown, the arm is fast on the shaft A. The arm B is provided with a projection *b* and with two members *b'* *b''*, which I herein term "detents." These detents are suitably pivoted on the arm B intermediate their ends, and a spring *b'''* is joined to the detents at their upper ends. The spring tends to rock the detents on their pivots in such manner as to throw their lower ends outward away from the arm B. The arm B is also preferably provided

with laterally-extending lugs $b^4 b^5$, which are recessed to receive the lower ends of the detents $b' b^2$.

$c c'$ designate latches or locking-dogs. The latches are provided with hooks $c^2 c^3$ at one of their ends, which hooks are adapted to alternately engage the arm B in certain of its positions. Each latch is suitably pivoted intermediate its ends between a pair of standards c^4 . As shown, the standards are integral with a base-plate c^{10} , which is suitably secured to the bed-plate a^2 . The other ends of the latches $c c'$ are suitably and loosely secured together by means of a pin c^5 , the loose connection being obtained, as shown on the drawings, by means of a slot in the end of each latch.

c^6 designates a rod, here shown as being arranged vertically and as extending through openings provided in the plates a^2 and c^{10} . The upper end of the rod is shown as being provided with a yoke c^7 , the members of which receive the ends of the pin c^5 . The lower end of the rod has a loose connection with the movable member d of an electromagnetic device D. The loose connection, as shown, comprises a slot c^8 in the rod into which a pin d' extends, which pin is carried by the movable member.

The electromagnetic device D, as here shown, comprises a laminated and substantially C-shaped core d^2 , between the ends of which the non-magnetic segmental and movable member or plate d oscillates, it being suitably mounted on a shaft d^3 , which is suitably journaled at its ends in the casing d^5 . A metallic band d^4 is placed around a part of each end portion of the core, and an energizing-coil d^6 is also mounted on each end of the core. The coils d^6 are in series with each other and are included in a circuit or circuits which is established upon each complete operation of the device or apparatus connected with switch-rails or signal. The circuit or circuits just referred to also include a source of alternating-current supply. Reference may be had to my copending application, filed the 7th of October, 1903, Serial No. 176,079, for patent on railway switching apparatus for an example of such circuit or circuits and a source of alternating-current supply.

The electromagnetic device herein described is responsive only to alternating current for the effective operation of the member d , the construction being such that when alternating current is passed through the energizing-coils d^6 a shifting field is set up, which has the effect of causing a rotation of the member d between the ends of the core. In other words, the principle involved in the electromagnetic means is similar to the principle involved in the Tesla alternating-current motors and some alternating-current-measuring instruments. Any other electromagnetic means responsive only to alternating current may be employed to give longitudinal or other

operative movement to the rod c^6 . Instead of using an electromagnetic device responsive only to alternating current electromagnetic devices responsive to direct current or to both kinds of current may be employed. Also any device not operated by an electric current may be used.

In Fig. 5 I have shown diagrammatically how the rod c^6 may be operated by a direct current. M designates a magnet which is included in a circuit which may be a local one. This circuit is controlled by means of the movable member d . The rod c^6 extends through the magnet M and is connected with the armature m .

The operation of the lock is as follows: Fig. 1 designates the position of the parts after a complete operation of the power or other apparatus or device controlled or operated from the lever. When the apparatus or device is again to be operated, the controlling or operating lever is moved, and with it the arm B, to have the arm B in position shown in Fig. 3. Upon the movement of the arm to this position the latches will be free to move on their pivots under the influence of the rod c^6 to bring their hooked ends toward the arm B. With the latches in this position the lock is in what may be termed its "set" or "operative" position. To insure the latches being moved to the position shown in Fig. 3 upon a movement of the arm B, the projection b will engage the joint formed at the pin c^5 or an antifriction-roller c^9 , carried by the pin c^5 , and depress the rod c^6 and rock the latches on their pivots. With the latches in this position the arm B, and therefore the lever with which it is connected, is prevented from having a complete movement in response to an attempt to make a complete movement of the lever connected with the arm B in either direction. The lever and arm B, however, may have a limited movement in either direction, and this limited movement will be sufficient to operate or control the operation of the apparatus connected with the switch or signal in either direction—i. e., from normal to reverse and reverse to normal. With the arm B in the position shown in Fig. 3 as soon as the circuit for the electromagnetic device D is established—and this will be when the apparatus has completely performed its functions—the alternating current from the supply included in the circuit will affect the device D and cause it to rotate the member d on its pivot. As the member d rotates the rod c^6 is moved by it to rock the latches $c c'$ on their pivots away from the arm B to the position shown in Fig. 1 or in Fig. 4. As this is done the spring b^3 acts to rock or move the detents $b' b^2$ on their pivots and to have their free ends move outward. As their free ends are moved outward one or the other of the detents will move over one or the other of the latches $c c'$, according to which direction

the arm B is moved, and when over a latch the arm B will be free, so that the controlling or operating lever of the arm B can be moved to its complete position, and thus lock or release

5 other controlling-levers, as the case may be. (See Fig. 4.) The advantage of this arrangement of the lock, irrespective of the electromagnetic means, is that a leverman is not required to stand at the controlling lever to move
10 it over when the indication-circuit is closed, as is necessary in some of the interlocking machines now in use. The current for the electromagnetic device need not last but a moment or two, for as soon as the latches move
15 outward the detents are moved outward by the spring. As soon as the current is cut off from the device D the member *d* will fall to the position shown in Fig. 1, this being permitted by the loose connection.

20 Various changes in the shape or arrangement of the several parts of the lock may be made without departing from the spirit of my invention, which, as will be seen, comprises a part (the arm B) movable with a controlling
25 or operating lever of an interlocking machine having means which when a lock is moved or operated by electromagnetic or other means from its set or operative position will prevent the lock from again moving to its set
30 position until the part (arm B) is again moved in response to its lever.

I wish it understood that wherever I use the term "lever" in the claims I mean a lever which either directly operates an apparatus or device to move a switch or signal or
35 controls the operation of an apparatus for moving a switch or signal.

What I claim as my invention is—

1. The combination with a lever of an interlocking machine, an arm suitably connected
40 with said lever, a lock which when in its set position limits the movement of the arm, and detents carried by said arm to prevent the return of the lock to its set position after being
45 operated.

2. The combination with a lever of an interlocking machine, of an arm suitably connected with said lever, a lock which when in its set position limits the movement of the arm, means
50 for operating the lock from its set position, and detents carried by the arm for preventing the lock returning to its set position until after a movement of the arm.

3. The combination with a lever of an interlocking machine, of an arm suitably connected with said lever, a lock which when in its set position limits the movement of the arm, electromagnetic means for operating the lock from
55 its set position, and detents carried by the arm for preventing the lock returning to its set position until after a movement of the arm.

4. The combination with a lever of an interlocking machine, of an arm suitably connected with said lever, a lock which when in its set
65 position limits the movement of said arm,

means for operating the lock from its set position, and detents for preventing the lock returning to its set position until after a movement of the arm.

5. The combination with a lever of an interlocking machine, of an arm suitably connected with said lever, a lock which when in its set position limits the movement of said arm, electromagnetic means responsive only to alternating current, for operating the lock from
70 its set position, and means for preventing the lock returning to its set position until after a movement of the arm.

6. The combination in a lock for a lever of an interlocking machine, of a pair of pivoted
80 latches adapted to permit of a limited movement of the lever when in their set position, and electromagnetic means for rocking them on their pivots from their set position.

7. The combination in a lock for a lever of an interlocking machine, of a pair of pivoted
85 latches connected with each other at one of their ends and adapted when in their set position to permit of a limited movement of the lever, and electromagnetic means for rocking
90 the latches on their pivots from their set position.

8. The combination in a lock for a lever of an interlocking machine, of a pair of pivoted
95 latches connected with each other at one of their ends and adapted when in their set position to permit of a limited movement of the lever, a rod connected with the latches and through which they are moved, and means for
100 moving the rod.

9. The combination with a lever of an interlocking machine, of an arm connected with said lever, a pair of pivoted latches adapted when in their set position to permit of a limited movement of said arm, means for operating
105 said latches to move them from their set position, and a pair of detents carried by said arm for engaging said latches.

10. The combination with a lever of an interlocking machine, of an arm connected with
110 said lever, a pair of pivoted latches adapted when in their set position to permit of a limited movement of said arm, means for operating said latches to move them from their set position, and a detent carried by the arm for
115 engaging a latch.

11. The combination with a lever of an interlocking machine, of an arm connected with said lever, a pair of pivoted latches adapted when in their set position to permit of a limited movement of said arm, means for operating
120 said latches to move them from their set position, a pair of pivoted detents carried by said arm, one for each latch, for engaging the latches, and a spring connecting said detents.

12. The combination with a lever of an interlocking machine, of an arm connected with said lever, a lock for said arm adapted to be held in inoperative position by the arm when
125 the arm is in its final position, and to move to
130

a set position when the arm is moved from its final position to then permit of a limited movement of the arm, means for operating the lock from its set position to free the arm, and
5 means for preventing a return of the lock to set position after its operation by said means.

13. The combination with a lever of an interlocking machine, of an arm connected with said lever, a lock for said arm adapted to be
10 held in inoperative position by the arm when the arm is in a final position and to move to a set position when the arm is moved from its final position to then permit of a limited movement of the arm, means carried by the arm
15 for insuring the set position of the lock, means for operating the lock from its set position to free the arm, and means for preventing a return of the lock to set position after its operation by said means.

14. The combination with a lever of an interlocking machine, a lock for said lever adapted to be held in inoperative position by the lever when the lever is in its final position and to move to a set position when the lever is moved from a final position, a device
20 for operating the lock from its set position, and means for preventing the operation of the lock to its set position after an operation by said device and before a movement of the lever.
30

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN PRESSLEY COLEMAN.

Witnesses:

W. L. McDANIEL,
GEO. E. CRUSE.