

(Model.)

2 Sheets—Sheet 1.

W. R. McDONALD & W. E. McALLISTER.

Padlock.

No. 228,371.

Patented June 1, 1880.

Fig. 1.

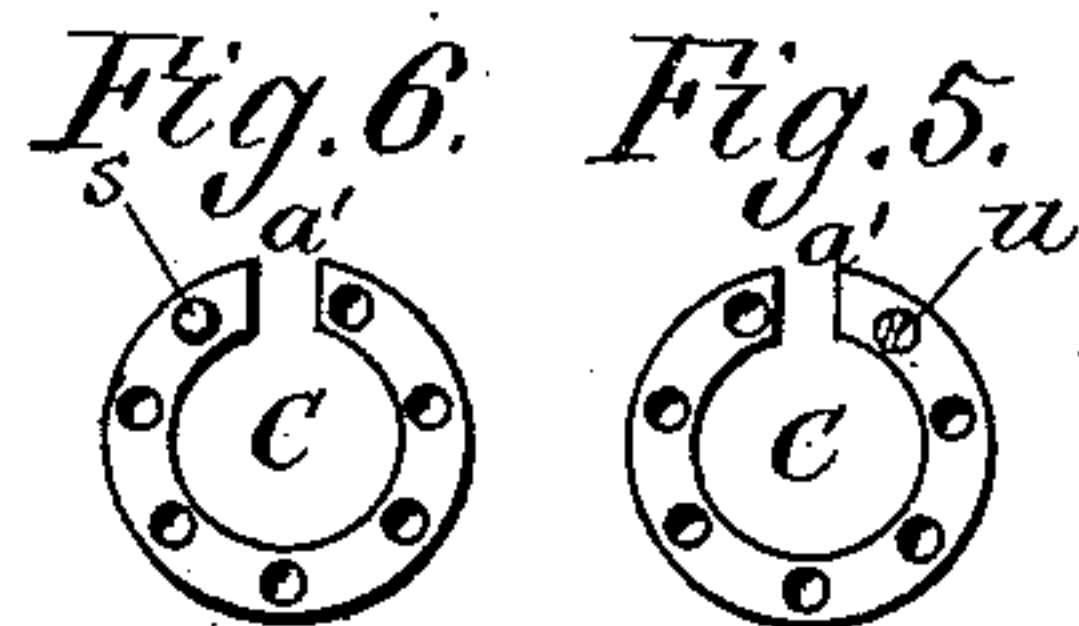
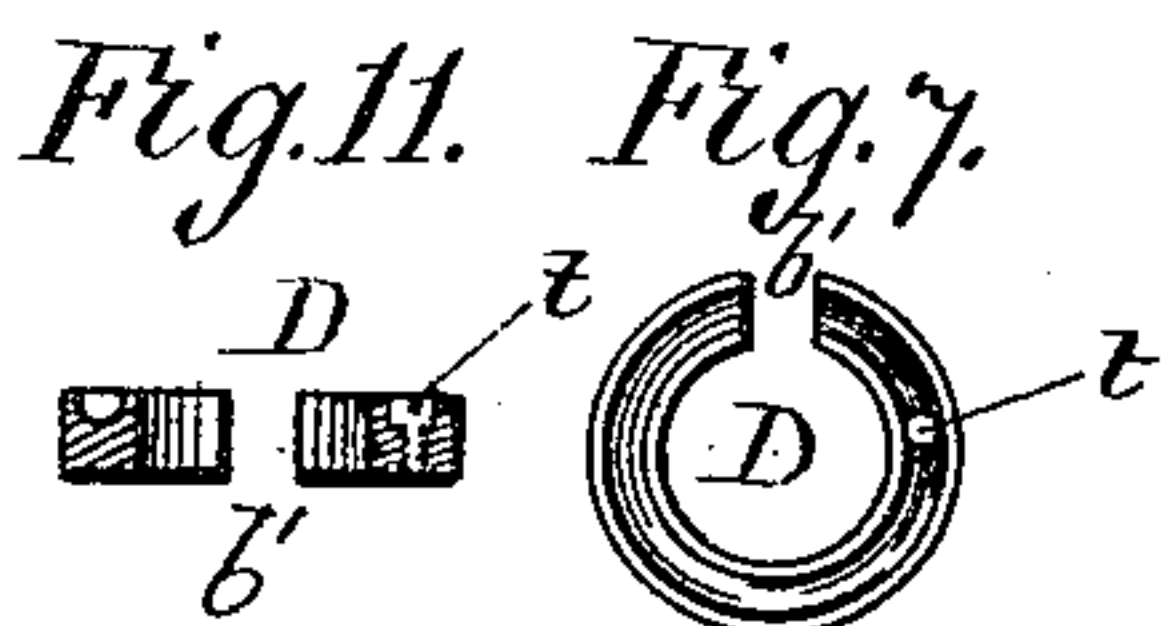
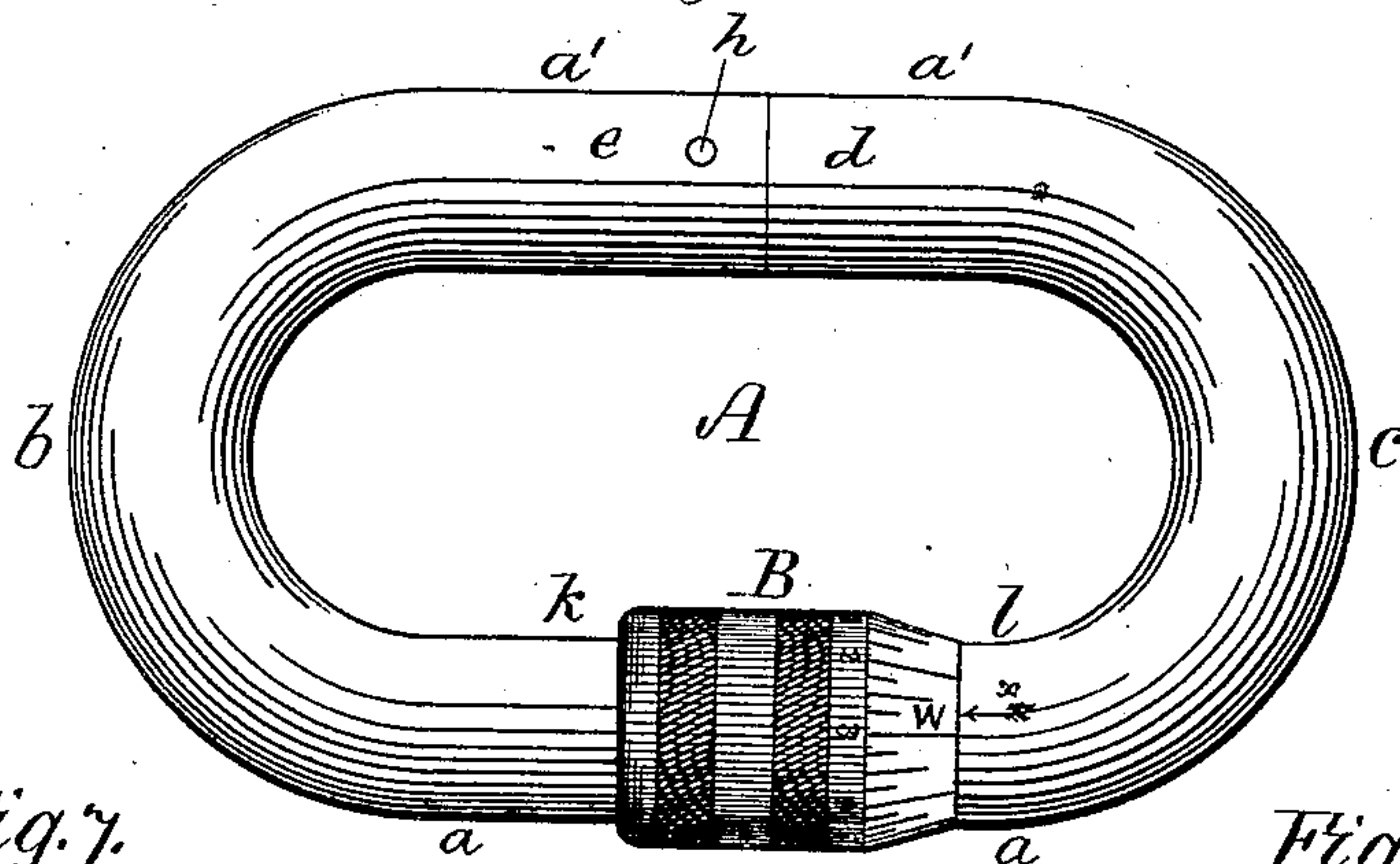


Fig. 2.

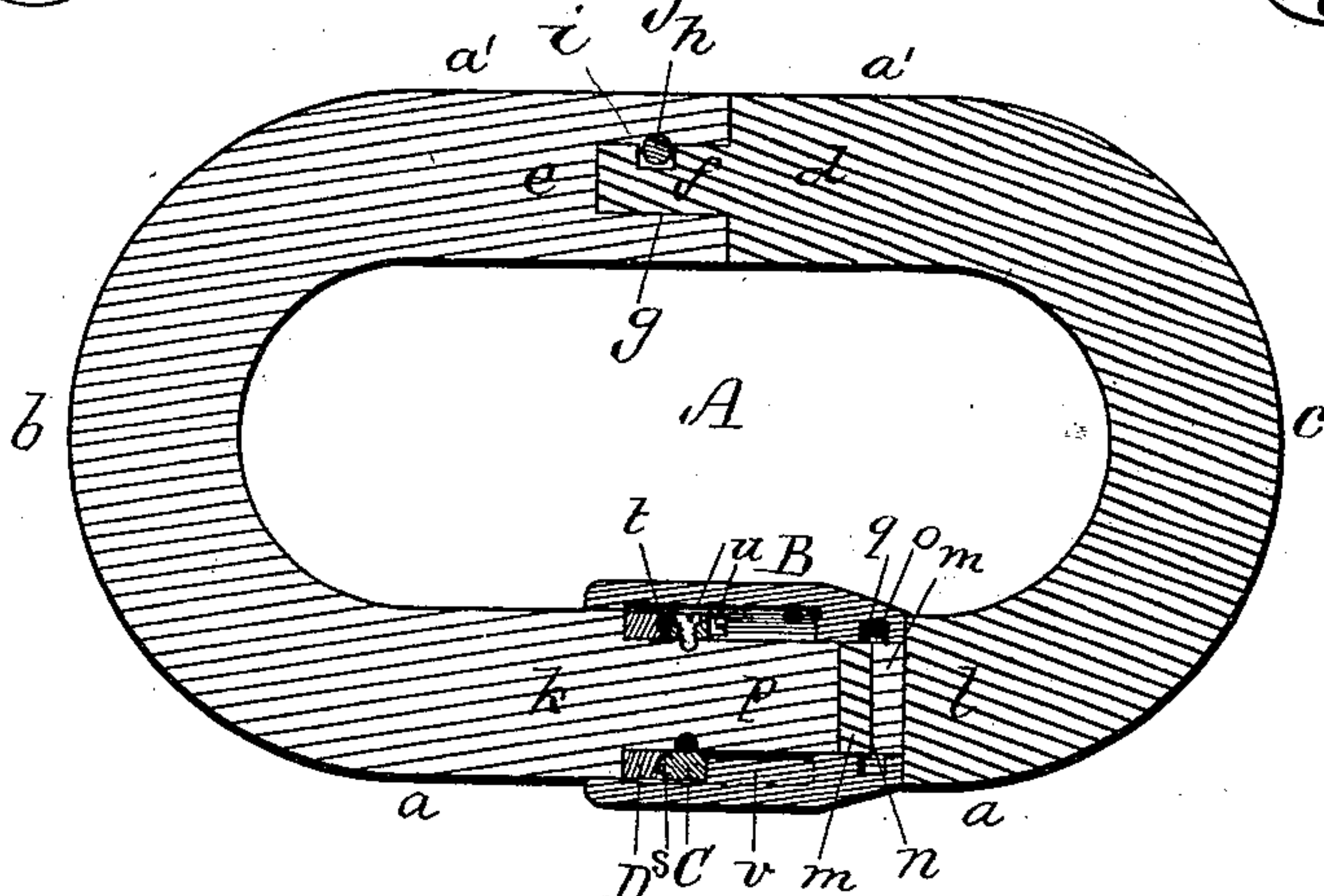


Fig. 8.

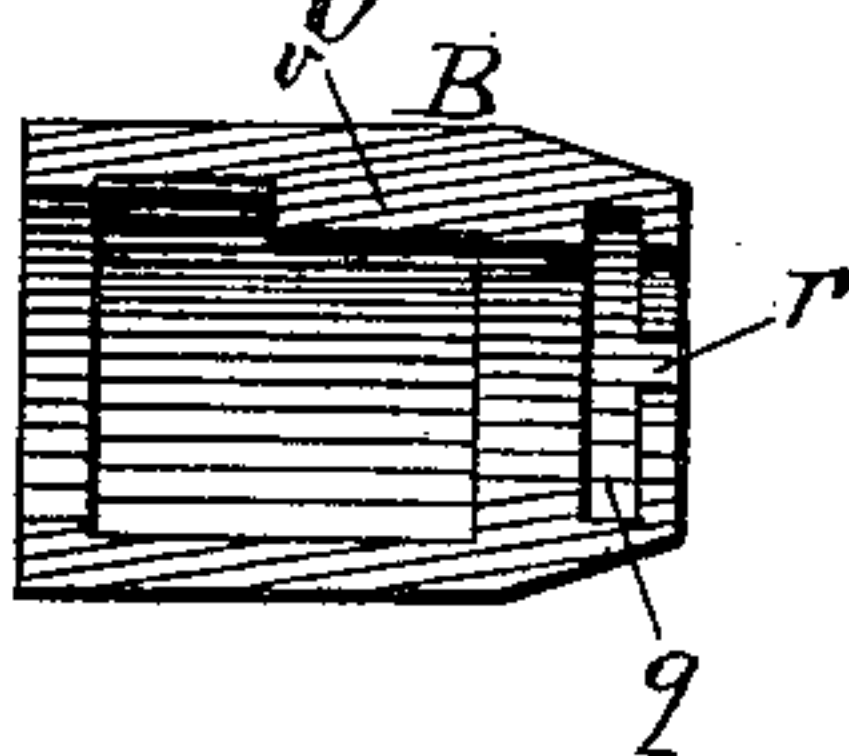


Fig. 12.

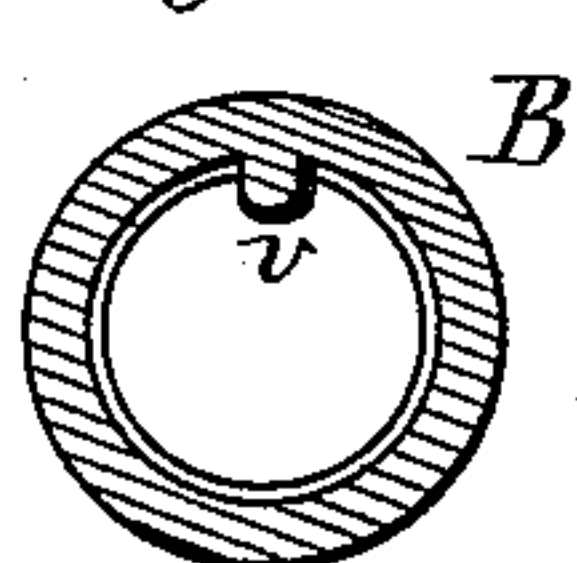
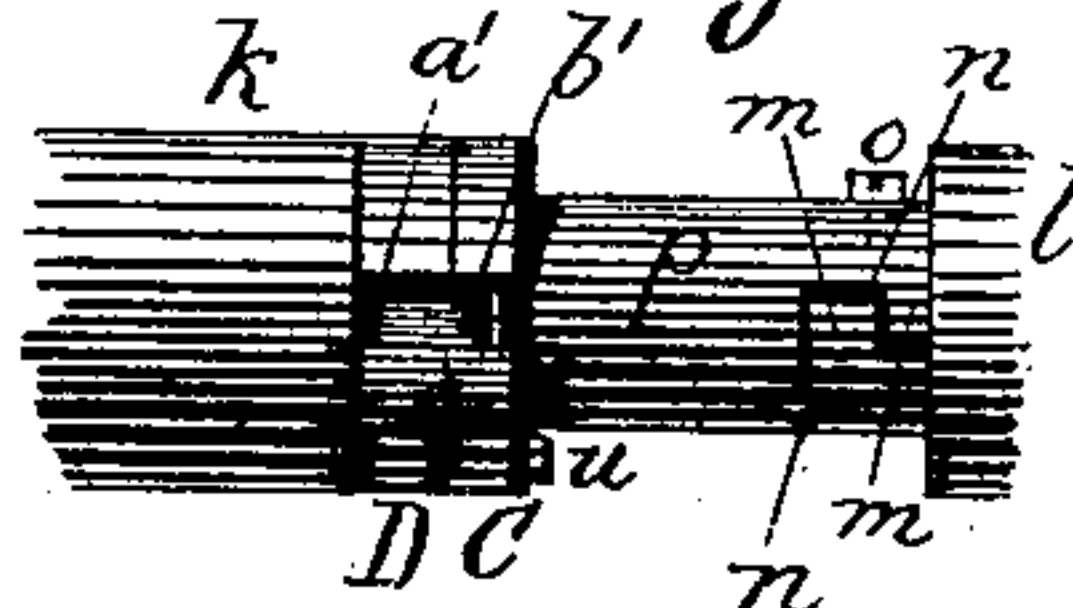


Fig. 4.



Witnesses.
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J. H. Blair.

Inventors.
W. R. McDonald.
W. E. McAllister.
J. Curtis, Atty.

(Model.)

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Fig. 9.

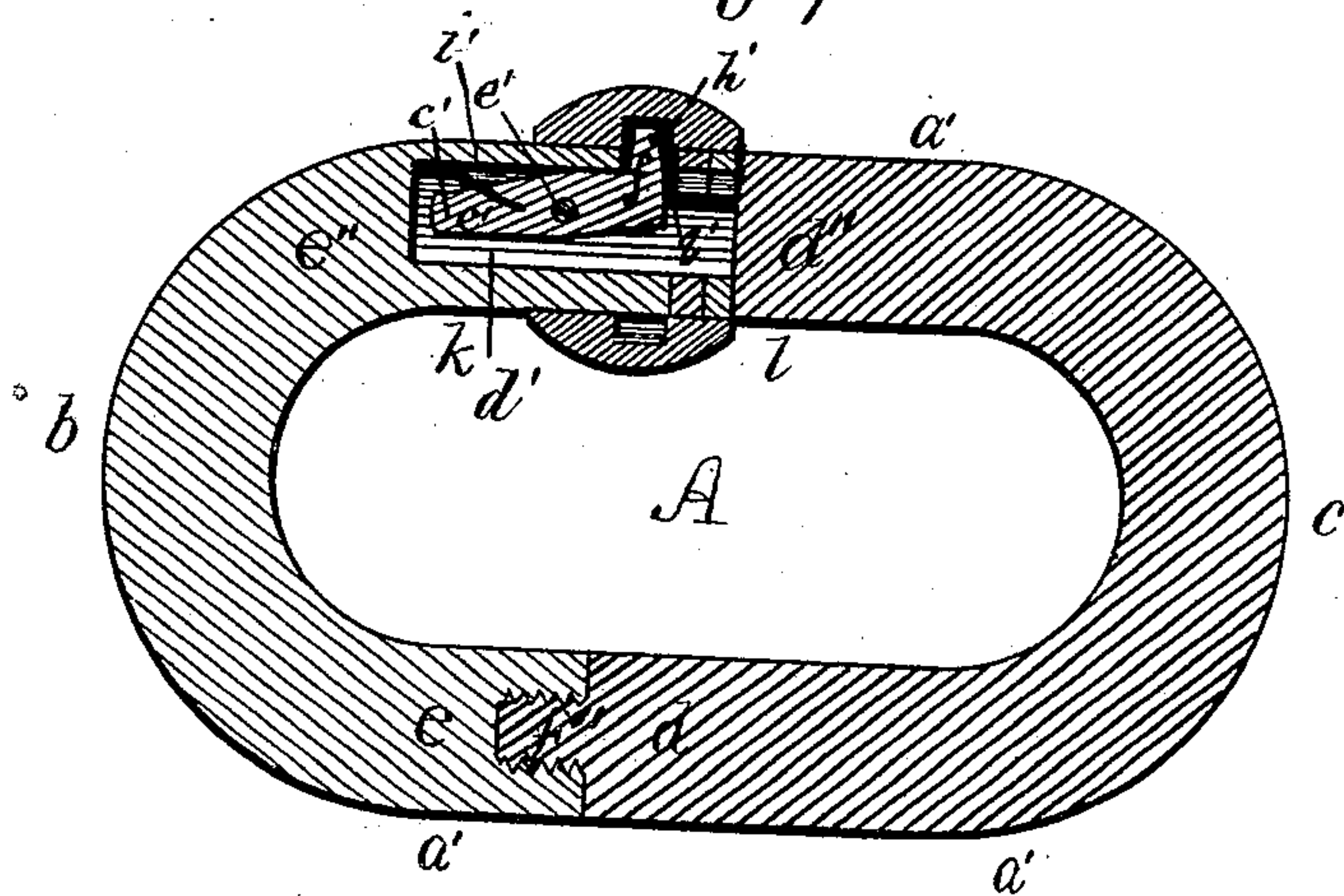


Fig. 3.

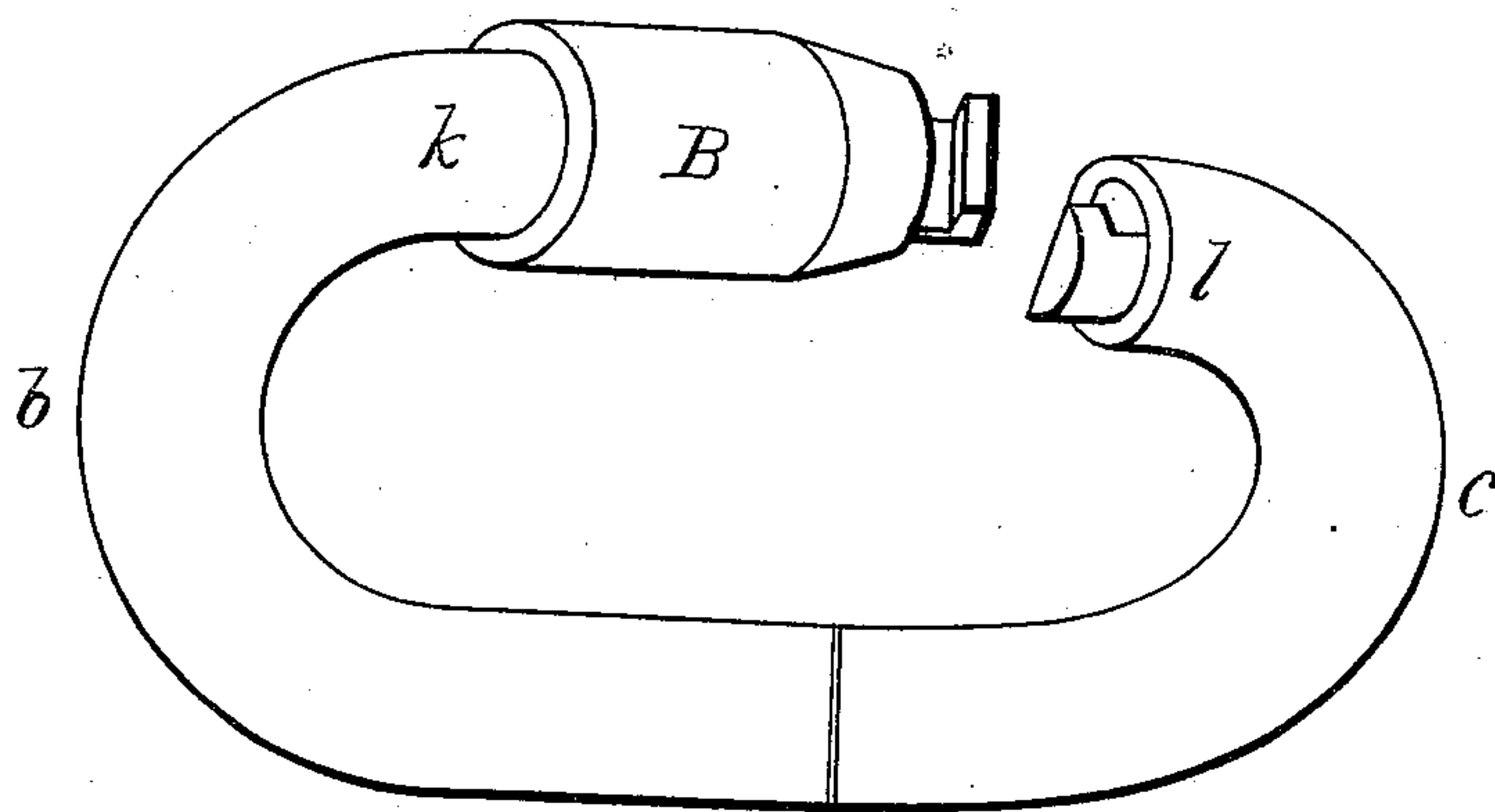
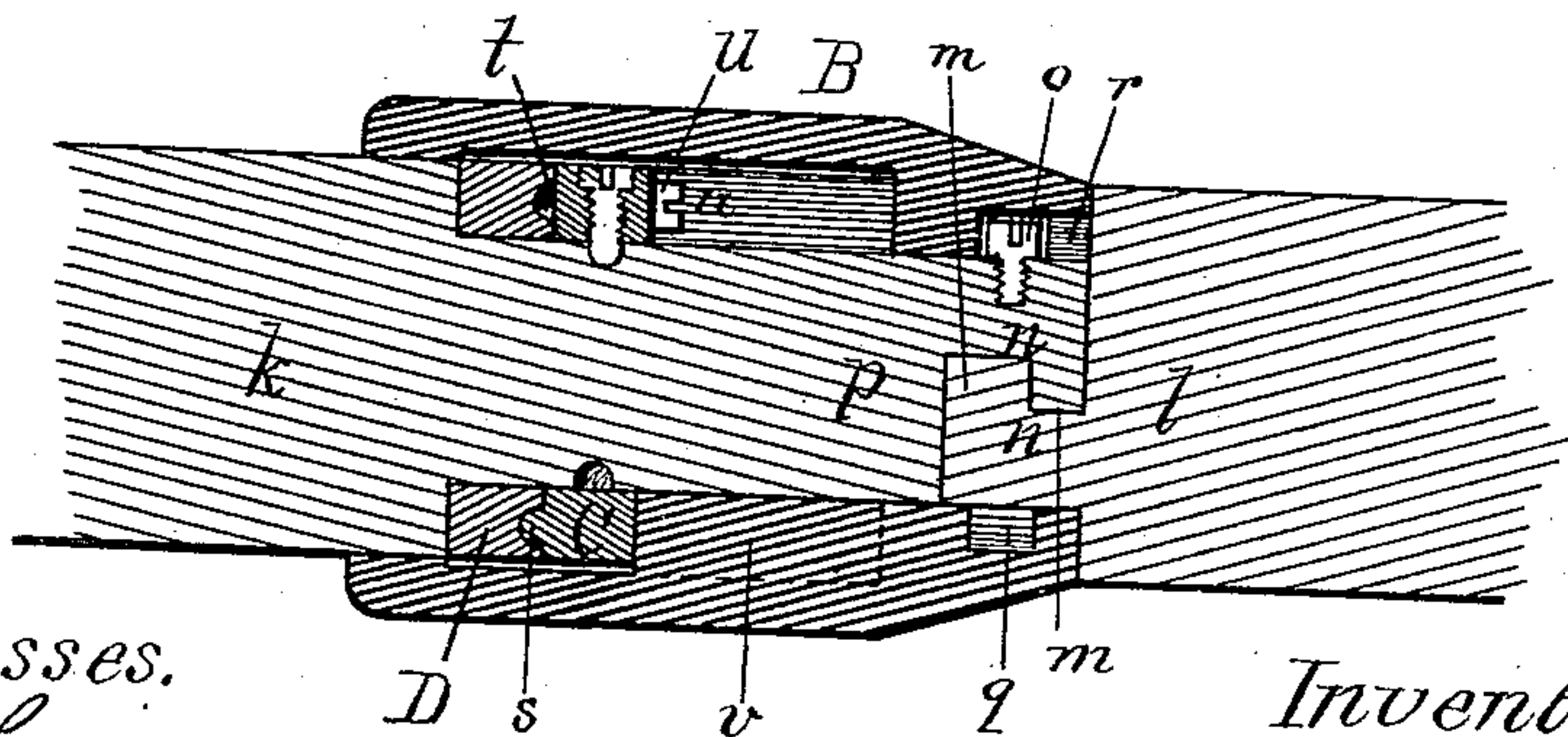


Fig. 13.



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J. Curtis. Atty.

UNITED STATES PATENT OFFICE.

WILLIAM R. McDONALD AND WILLIS E. McALLISTER, OF CALAIS, ASSIGN-
ORS OF ONE-HALF OF THEIR RIGHT TO PRENTISS LORING, OF PORT-
LAND, MAINE.

PADLOCK.

SPECIFICATION forming part of Letters Patent No. 228,371, dated June 1, 1880.

Application filed April 26, 1880. (Model.)

To all whom it may concern:

Be it known that we, WILLIAM R. McDON-
ALD, of Calais, county of Washington and
State of Maine, and WILLIS E. McALLISTER,
5 a subject of Great Britain, at present residing
in Calais, county of Washington and State of
Maine, have invented certain Improvements
in Padlocks, of which the following is a speci-
fication.

10 These improvements relate to a class of
padlocks composed of a rod or bar of metal
bent into the form of a ring or link, (having at
least one straight side,) in two parts, pivoted
together in such manner as to be capable of
15 being separated at one side to open the ring
to permit of attachment to or removal from
the staple or other object to which the lock
is attached, the separable ends of the ring
being provided with a suitable locking device,
20 which when closed completes the continuity
of the ring and closes the lock.

Our improvement consists in the devices
and combinations of devices hereinafter de-
scribed for securing and protecting the joint
25 between the separable ends of the padlock-
body.

The drawings accompanying this specifica-
tion represent, in Figure 1, an external view,
and in Fig. 2 a longitudinal section, of a pad-
30 lock containing our improvements, the lock
in such figures being closed. Fig. 3 is a view
of a portion of the padlock in an open or un-
closed state. Fig. 4 is a view of the rings or
annular tumblers of the combination-lock and
35 the shank of the lock-frame upon which they
rotate. Fig. 5 is a plan, and Fig. 6 a bottom
view, of the outer tumbler of the lock, while
Fig. 7 is a plan of the inner tumbler. Fig. 8
is a section of the sleeve. Fig. 9 is a section
40 of the lock, showing a simple key-lock. Fig.
10 is a side view of the outer tumbler, and
Fig. 11 a like view of the inner tumbler, while
Fig. 12 is a cross-section, on an enlarged scale,
of the tumblers and adjacent parts.

45 In these drawings the frame or body of the
padlock is shown at A as generally in the
form of a ring, which may be rectangular, ob-
long with rounded ends, or polygonal in out-
line, so long as one side, say *a a*, is straight,

the said ring being formed from a rod or 50
bar of metal, and in two parts or bows, *b c*,
the arms *d e* of one side of which abut at
their inner extremities, and are jointed to-
gether in any suitable manner to permit of
one turning axially upon or with respect to 55
the other, the joint in this instance being a
cylindrical tenon, *f*, upon the arm *d*, entering
a corresponding socket, *g*, in the other, the
tenon being secured in the socket by a pin, *h*,
passing transversely through the arm *e* and 60
intercepting a peripheral groove, *i*, in the
tenon *f*, such pin and groove permitting of
rotation of one arm with respect to the other,
but preventing endwise separation of the
two. 65

We do not confine ourselves to this method
of uniting the two arms, as various joints
would suggest themselves to a skilled me-
chanic; and in lieu of a joint of this or equiv-
alent construction the bows may be united by 70
a flexible connection—such as a chain, for in-
stance; but it will be essential that the bows
b c be preserved, or so much of the same as
shall be necessary to provide a straight shank
for reception of the sliding sleeve, to be de- 75
scribed.

The ends of the opposite arms *k l* may sim-
ply meet; but we prefer to interlock them by a
joint which shall tend to resist any longitudi-
nal strain upon the lock, and to this end we 80
adapt the ends to lap when they meet, and
we form upon the contiguous face of each a
transverse rib or spline, *m*, and a rabbet or
groove, *n*, which interlock when the arms are
closed and effect the result above named. 85
This method of connecting the ends, how-
ever, may be varied to a wide degree—as, for
instance, a tapering spur or tenon may pro-
ject inward from one to enter a corresponding
socket in the other. 90

The sleeve or tubular hub, to which allusion
has been made, is shown at B as mounted
upon and capable of traversing the end of the
arm *k*, and adapted to inclose the latter, as
well as the end of the adjacent arm *l*, such 95
sleeve being prevented from escape from the
arm by a stud or screw-head, *o*, projecting
from the end of the arm, or the shank *p*, of re-

duced diameter, in which such arm terminates, such stud entering a bayonet-connection, $q\ r$, formed in the inner periphery of the end of the sleeve. (See Figs. 2 and 8 of the drawings.)

The sleeve B slides to and fro upon the arm k , with respect to the opposite arm, l , to such an extent as to permit of such arm l being uncovered or exposed and turned away from the arm k in the act of unlocking and opening the lock; and as the sleeve must also rotate upon the arm k , it is essential that the outer end of the latter be cylindrical, straight, and of uniform diameter.

In lieu of the stud-and-bayonet connection for preventing accidental separation of the sleeve and arm, other means may be employed. For instance, the nose of a lever within the arm may project through the periphery of the latter when the lock is unlocked and intercept the sleeve.

As before stated, the sleeve serves to inclose the opposite ends of the arms $k\ l$, and in so doing completes the continuity of the ring and closes the lock, and by removing the sleeve from about one of such ends the lock is opened.

To prevent opening of the lock, except by the consent of the owner or the possessor of the key, (or combination, should a combination-lock be used,) we combine with the sleeve and the arm upon which it slides a lock of suitable construction.

We prefer a combination or permutation lock for obvious reasons, and we have shown in the accompanying drawings one form of a combination-lock which is adapted to the ring A, as it is strong and simple in construction, as well as one susceptible of a large number of combinations.

The elements of this lock are, first, the sleeve before named; second, a series of flat rings or annular tumblers inclosing the shank p , and surrounded and operated by a spline upon the inside of the sleeve, each ring having a peripheral notch adapted to receive the spline, and the entire series of notches, when in alignment, constituting a pathway to permit of movement of the sleeve upon the arm to open the lock by uncovering the separable ends of the arms.

The combinations of the lock are effected by the inner end of the spline of the sleeve operating the outermost ring by a stud upon the outer face of the latter, while the second ring in turn is actuated by a stud upon the inner side of the outer ring engaging a stud upon the outer face of the next succeeding ring, and so on throughout the series of rings, the possible changes or multiplications of the combinations being greatly increased with each additional ring employed.

In the present instance we have employed but two rings wherewith to represent the combination, and these rings are shown at C and D in the drawings as formed each with a peripheral notch, a' or b' , and inclosing the shank

of p with sufficient friction to prevent their accidentally or prematurely turning upon the latter, while to prevent escape of the rings altogether from such shank we extend through the outer one a screw, the inner end of which enters a peripheral groove in the shank.

For the sake of clearness, this lock and the parts with which it is connected and operates are shown in longitudinal central section in Fig. 13, the plane of section being at right angles to that in Fig. 2.

The two rings C and D are connected and caused to rotate together at certain times by a stud, s , from the inner face of the outer ring, C, engaging or operating with a stud, t , upon the outer face of the inner ring, D, while the outer ring, C, is rotated by the inner end of the spline of the sleeve acting upon a stud, u , projecting from the outer face of the outer ring, C.

The spline of the sleeve is shown at v as secured to or formed upon the inner wall of such sleeve, and this spline is of such length as when the sleeve is retracted to its extreme limit in opening the lock it shall enter the notches of the entire series of rings, and in so doing prevent displacement of such rings, and when the sleeve is pushed outward to its limit in closing the lock the inner end of the spline shall stand outside of or out of engagement with the outer ring, and in a position to engage the spur u of such ring when brought to it.

The usual scale of division common to combination or permutation locks is engraved upon the exterior of the sleeve at its outer end, as shown at w in the drawings, and this scale of divisions subdivided each into half and quarter divisions. This scale w operates with a zero mark upon the adjacent part of the arm l , as shown at x , and when the rings are put upon the shank in arranging the combination they are to be placed with their notches in alignment.

In order to increase the number of changes of combinations of which the lock is capable we tap in the outer face of the ring C a series of concentric holes, and we employ, interchangeable with such holes, a screw, the head u of which constitutes the outer stop of the said ring C, before alluded to. By changing the position of the screw u of the ring C with respect to the notch of such ring the combination of the lock is accordingly changed, since this necessitates a change in the relative positions of the two rings and of the scale upon the sleeve with respect to the zero-mark upon the arm—that is to say, the combination is changed with respect to the first two numbers.

The stop or screw o in the shank p , in addition to the function it performs in preventing escape of the sleeve, also contributes an important factor in the combination, since the sleeve cannot be pushed outward upon the shank to close the lock until the portion r of the bayonet connection or passage $q\ r$ coincides

with this stop; hence the conjoint or coinciding notches of the two rings must always take the same relative position with respect to this stop and to the zero-mark upon the arm *l*, with which such stop coincides.

As represented in the accompanying drawings, the portion or passage *r* of the connection *q r* of the sleeve coincides with the $2\frac{3}{4}$ division of the scale upon the sleeve, and this, as well as the relative positions of the passage *r*, the stop *o*, and the zero-mark, remain unchanged; hence the mark $2\frac{3}{4}$ coincides with the passage *r* and with the zero-mark when the sleeve is pushed outward to close the lock.

To adjust the parts, after setting the screw or stop *u* of the outer ring, *C*, to the desired point, place the notches of the two sleeves in alignment, slip the sleeve over the shank *p* and the rings, with its spline *v* entering the conjoint notches, screw in the stop *o* in the shank *p*, and the lock is in readiness to be closed. To close it bring the two arms, *k l*, together, turn the sleeve until its passage *r* coincides with the said stop *o* and with the zero-mark, and then push the sleeve outward to its full extent, in doing which it will inclose the lapped ends of the said arms *k l*, and its spline *v* will leave the notches of the rings *C D* and remain in a position to act upon the stop *u* of the outer ring, *C*, it being observed, as before stated, that at this time the passage *r*, stop *o*, zero-mark and $2\frac{3}{4}$ -mark of the scale upon the sleeve are in alignment or coinciding, while the conjoint notches of the two rings stand in line with or opposite the division or mark $4\frac{1}{2}$ of the scale.

As arranged in the accompanying drawings, the combination is set for the numbers $4\frac{1}{2}$, $1\frac{1}{2}$, $2\frac{3}{4}$.

The sleeve is now turned in any direction, so as to disturb the position of the rings, and the lock is closed or locked, the positions of the notches in the rings being so changed that the spline of the sleeve cannot enter them until they are restored to their original order.

To unlock the combination turn the sleeve to the left a full revolution or slightly more, and, continuing in the same direction, the division $4\frac{1}{2}$ of the sleeve opposite the zero-mark, which brings the upper or outer ring, with its stop *u*, opposite the zero-mark and the stud *o* of the shank, the notch of the inner ring standing at this time the same distance from the zero-mark and the stops *u* and *o*, but upon the opposite side. The sleeve is now turned in the opposite direction—that is, to the right—until its division-mark $1\frac{1}{2}$ has passed once by the zero-mark and arrived opposite the latter a second time, by which the notch of the ring *C* is brought into alignment with that of the ring *D*, and both stand at a point ninety degrees of a circle to the right of the zero-mark, or practically so. The sleeve is now turned in the opposite direction—that is, to the left—a second time, and without effect upon the rings, until its $2\frac{3}{4}$ mark is restored to its normal or original position opposite the zero-mark, the

spline of the sleeve, which, as before stated, is opposite the $4\frac{1}{2}$ division-mark, being by the act brought into coincidence with the two notches. The sleeve is now free to be drawn inward and the abutting ends of the arms uncovered, permitting the lock to be opened.

As before stated, the numbers to which the lock is set—that is, the arrangement of its combination—is determined by the respective positions of the screw or stop *u* and the spline of the sleeve; therefore, these numbers and the combination will be changed by changing the position of the screw.

In lieu of the combination-lock thus made and operating, a key-lock may be employed, and in Fig. 9 of the drawings we have shown one form of such a lock as composed of a swinging lever or latch, *c'*, disposed within a chamber, *d'*, in the arm *k*, and pivoted therein by a pivot, *e'*, the outer end of this lever bearing a nose, *f'*, which extends through a slot, *g'*, in the arm, and enters an annular groove, *h'*, created in the inner periphery of the sleeve. The pivot of the lever extends at one end through the side of the arm, and is to be adapted to be turned by a proper key which fits it, the pivot in this case being fixed to and moving with the lever, but loose in its bearings.

In lieu of this arrangement of the pivot the lever may be loose upon the pivot, and have upon one side, upon opposite sides of said pivot, ears to which a correspondingly-notched key may fit.

The nose of the lever is pressed outward by a spring, *i'*, suitably applied, and we prefer that the lever should be as nearly balanced upon its fulcrum or pivot as possible, in order to prevent its being displaced by thrusts or blows upon the lock.

In lieu of disposing the lever within the arm, and operating with a groove or notch in the sleeve, this arrangement may be reversed, and the lever be contained within the sleeve to operate with a groove or notch in the arm.

In each of the kinds of locks herein shown the sleeve not only slides but rotates, this being the preferred arrangement.

In the permutation or combination lock arrangement the capacity of the sleeve for rotary movement permits it to be employed as the means for operating the lock, and in the ordinary lock arrangement the same capacity permits the use of an annular groove, which the nose of the bolt or latch will readily find without being specially guided thereto.

We claim—

1. The pivoted two-part link or padlock body, with lapping separable ends, in combination with a sliding sleeve movable on one part to cover and uncover the joint or point of meeting of the separable ends, and acting, when inclosing or covering said joint, to prevent lateral movement of the said ends with respect to one another and the sleeve-locking mechanism, substantially as hereinbefore set forth.

2. The sliding and rotating sleeve and the

sleeve-locking mechanism, in combination with the pivoted two-part link or padlock body, substantially as hereinbefore set forth.

3. In combination with the link or padlock
5 body, a sliding locking-sleeve which receives and confines the separable ends of the link, and a permutation or combination lock for locking the sleeve, which is operated through the instrumentality of said sleeve, substantially
10 as hereinbefore set forth.

4. In combination with the two-part link or padlock body, the sliding locking-sleeve B,

with its spline or spur, the rings C D, &c., with their peripheral notches and stops, and the stop *o* upon the arm, the sleeve being pro- 15
vided with its scale of divisions, and a zero-mark being added to the arm, and the whole operating substantially as explained.

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