

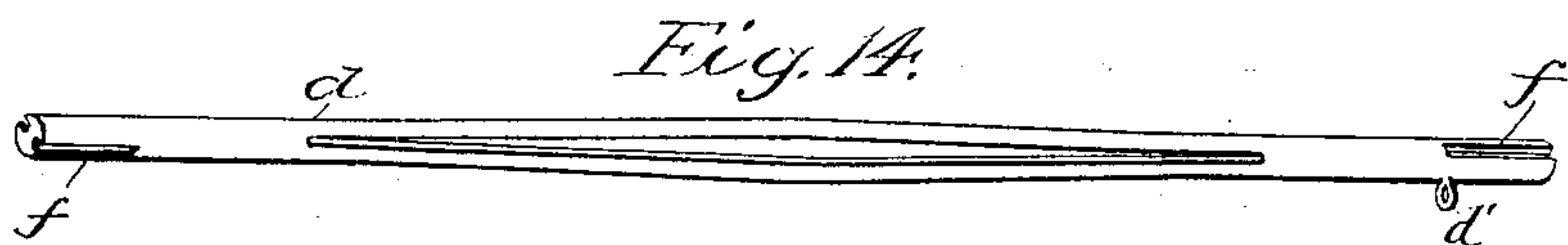
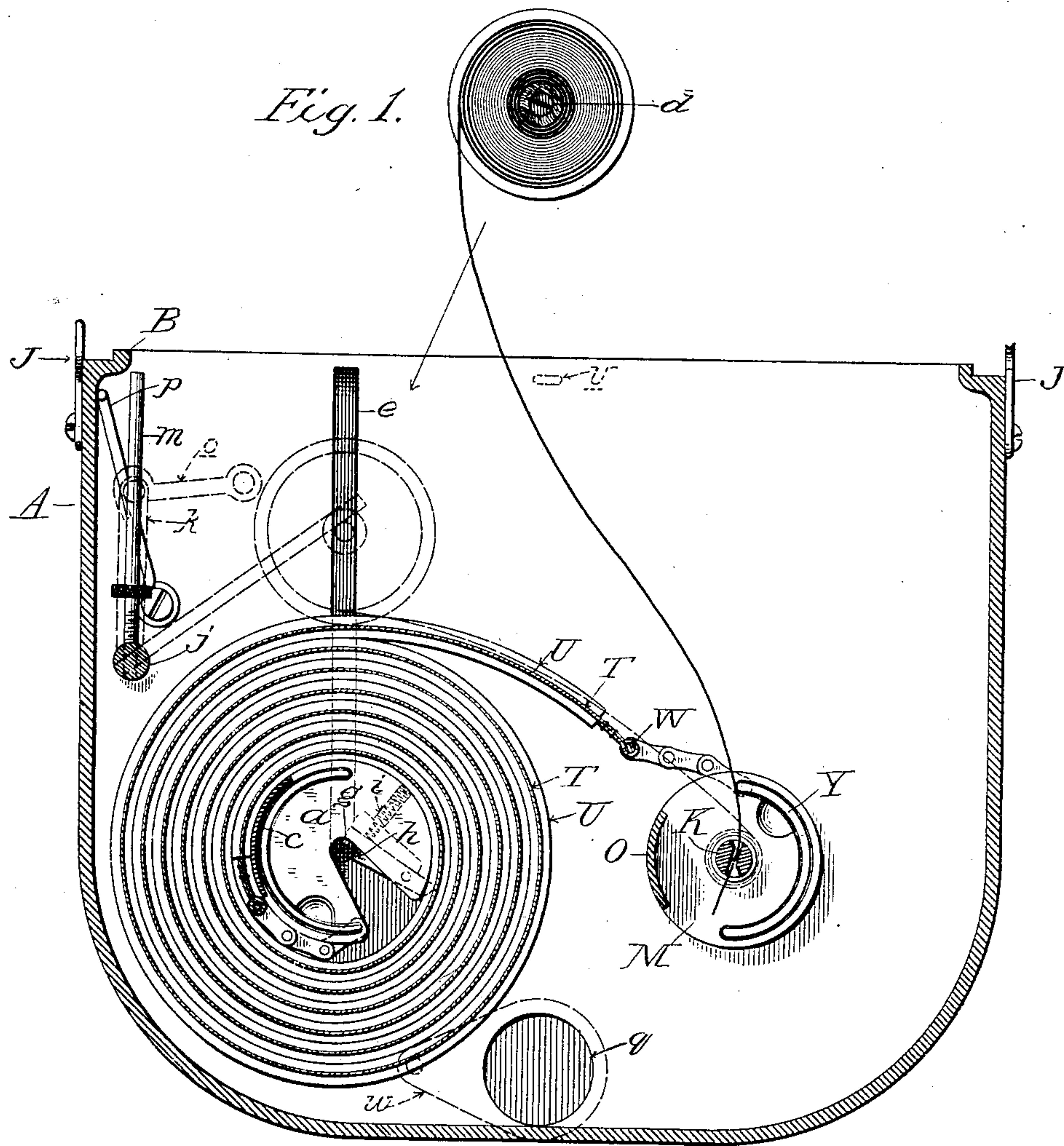
A. W. McCURDY.

APPARATUS FOR DEVELOPING PHOTOGRAPHIC FILMS.

(Application filed Mar. 29, 1900.)

(No Model.)

7 Sheets—Sheet 1.



Attest;
C. C. Birdine
D. E. Birdine

Inventor;
Arthur W. McCurdy,
by Dodge and Sons,
Attys.

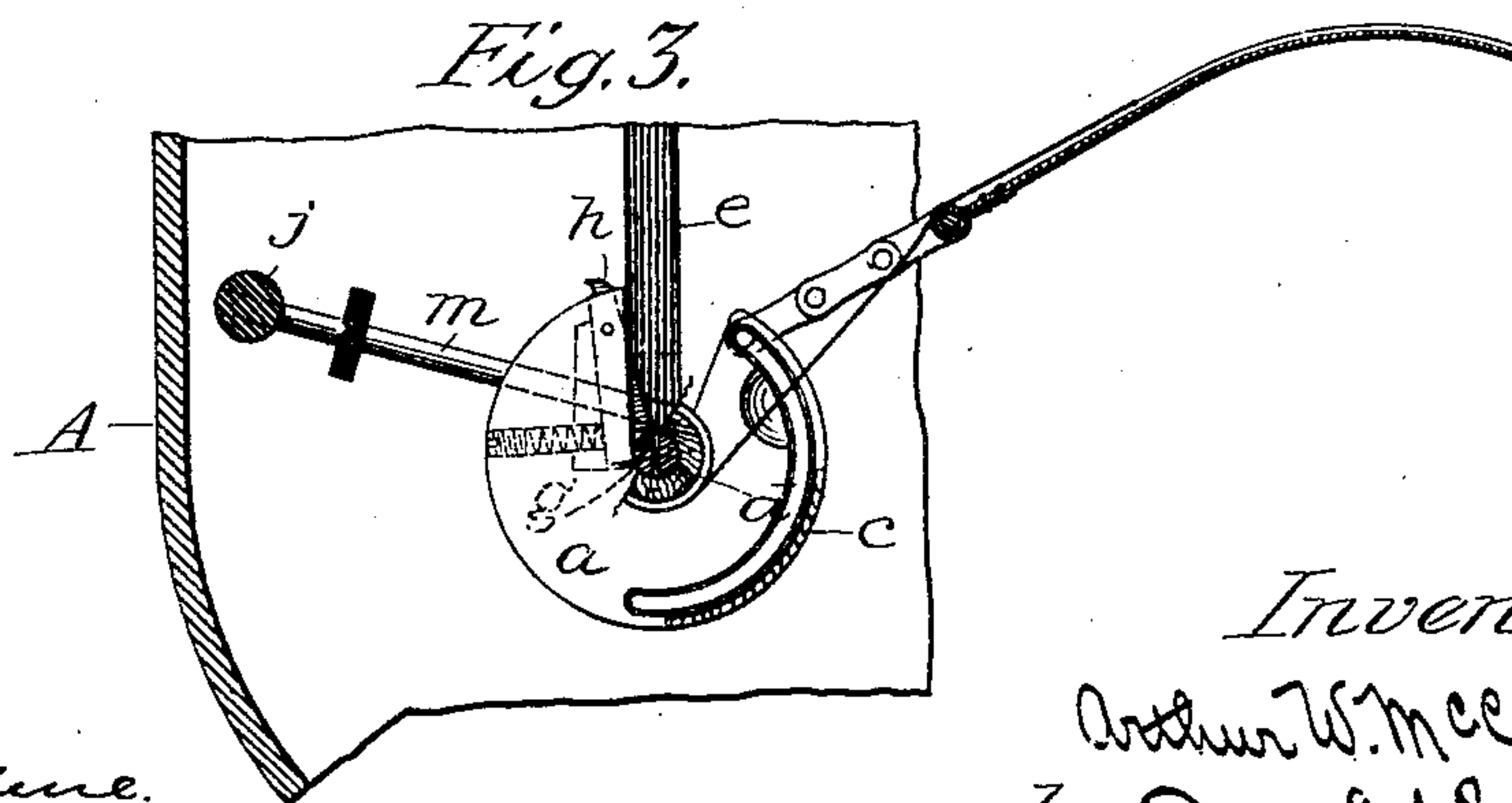
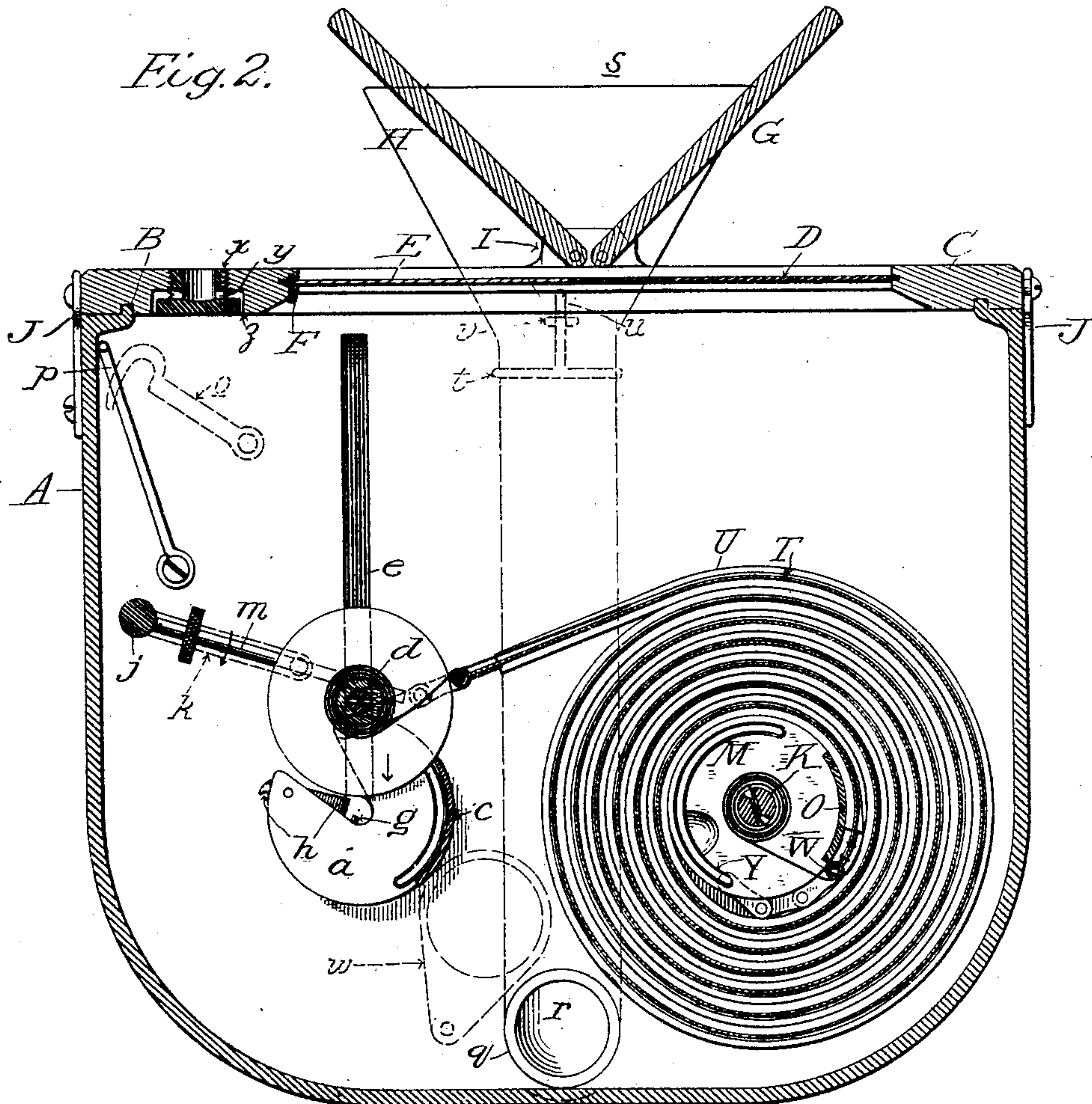
A. W. McCURDY.

APPARATUS FOR DEVELOPING PHOTOGRAPHIC FILMS.

(Application filed Mar. 29, 1900.)

(No Model.)

7 Sheets—Sheet 2.



Attest;
 C. C. Burdine.
 D. E. Burdine.

Inventor;
 Arthur W. McCurdy,
 by Dodge and Son,
 Attys.

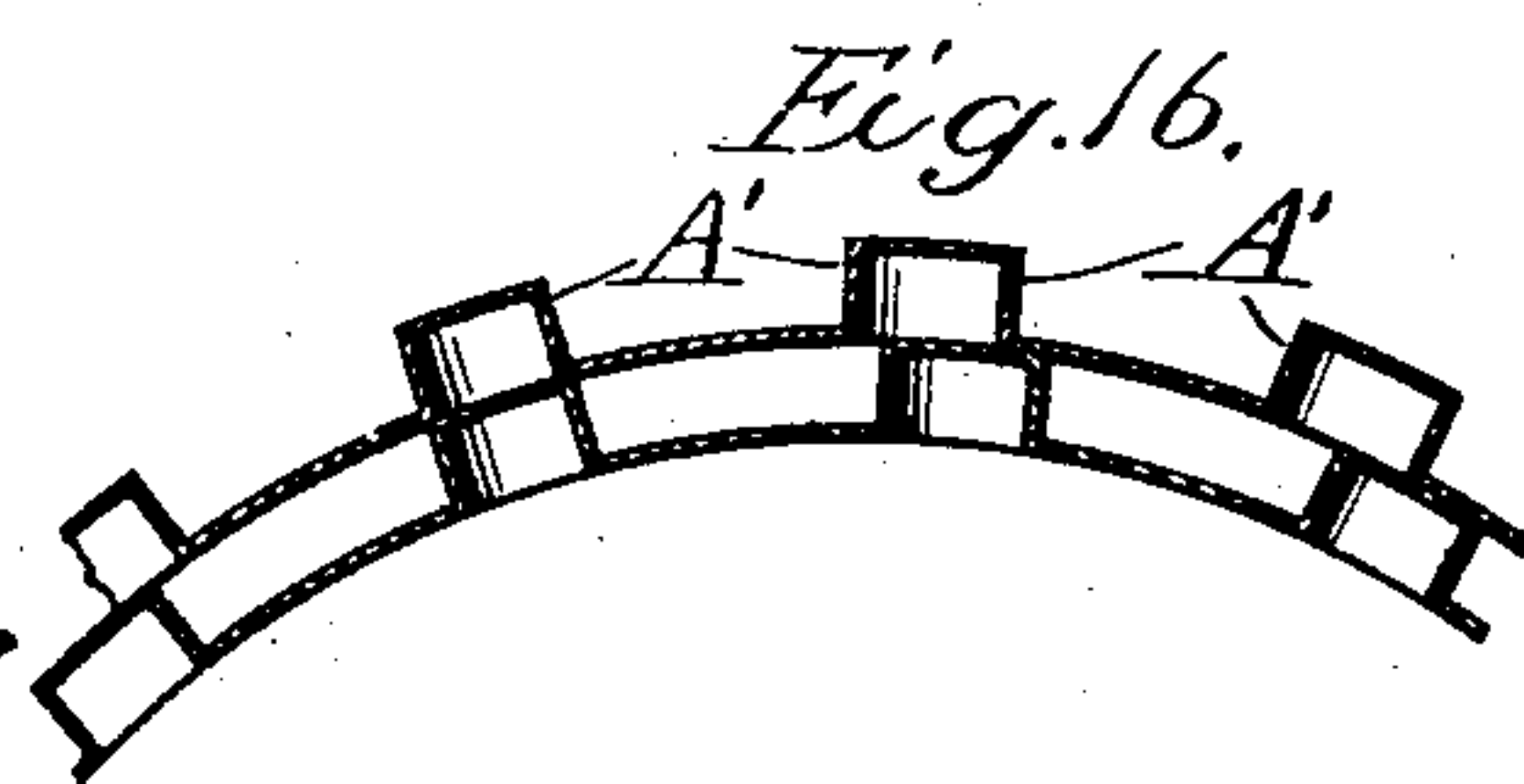
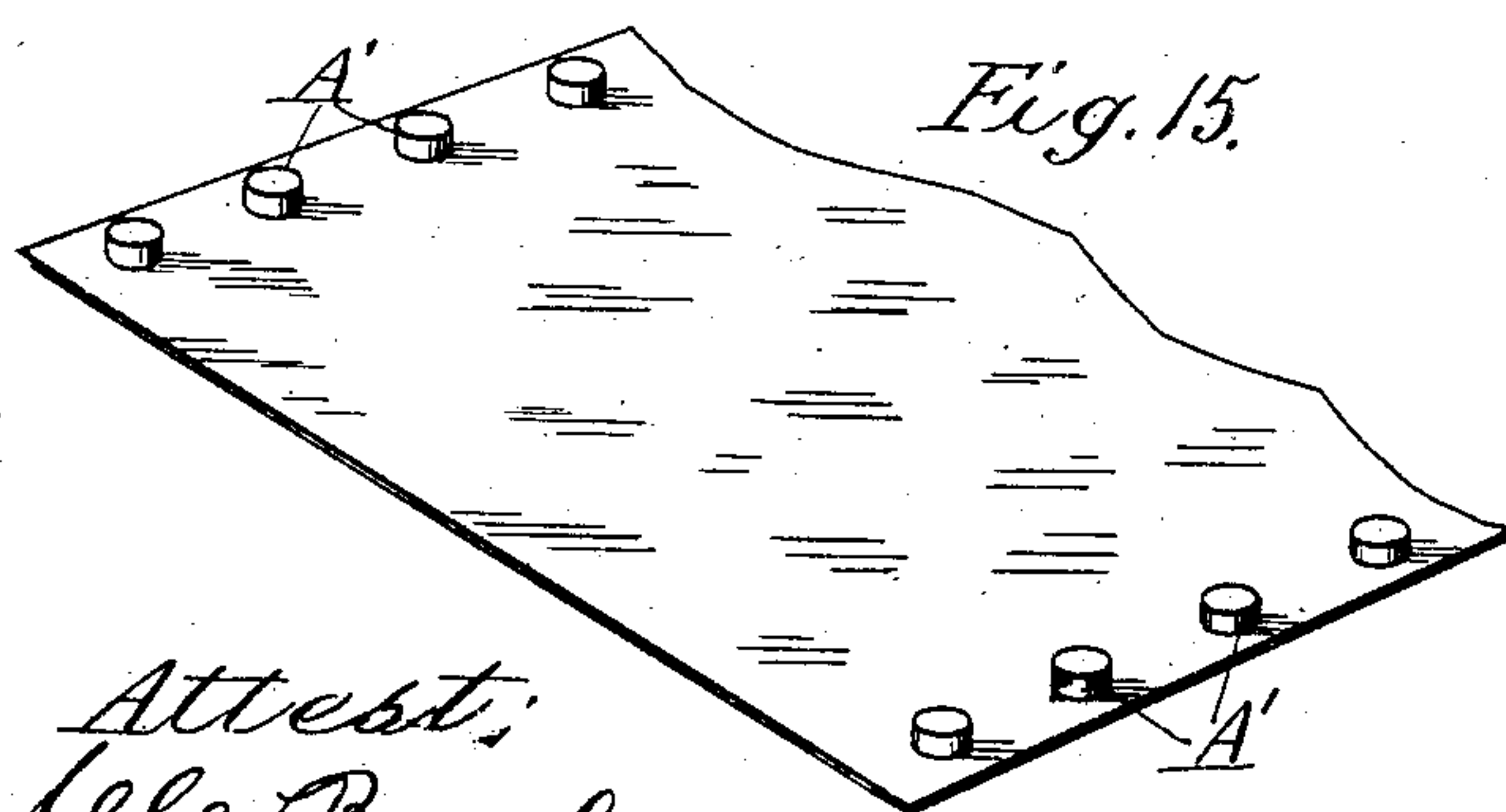
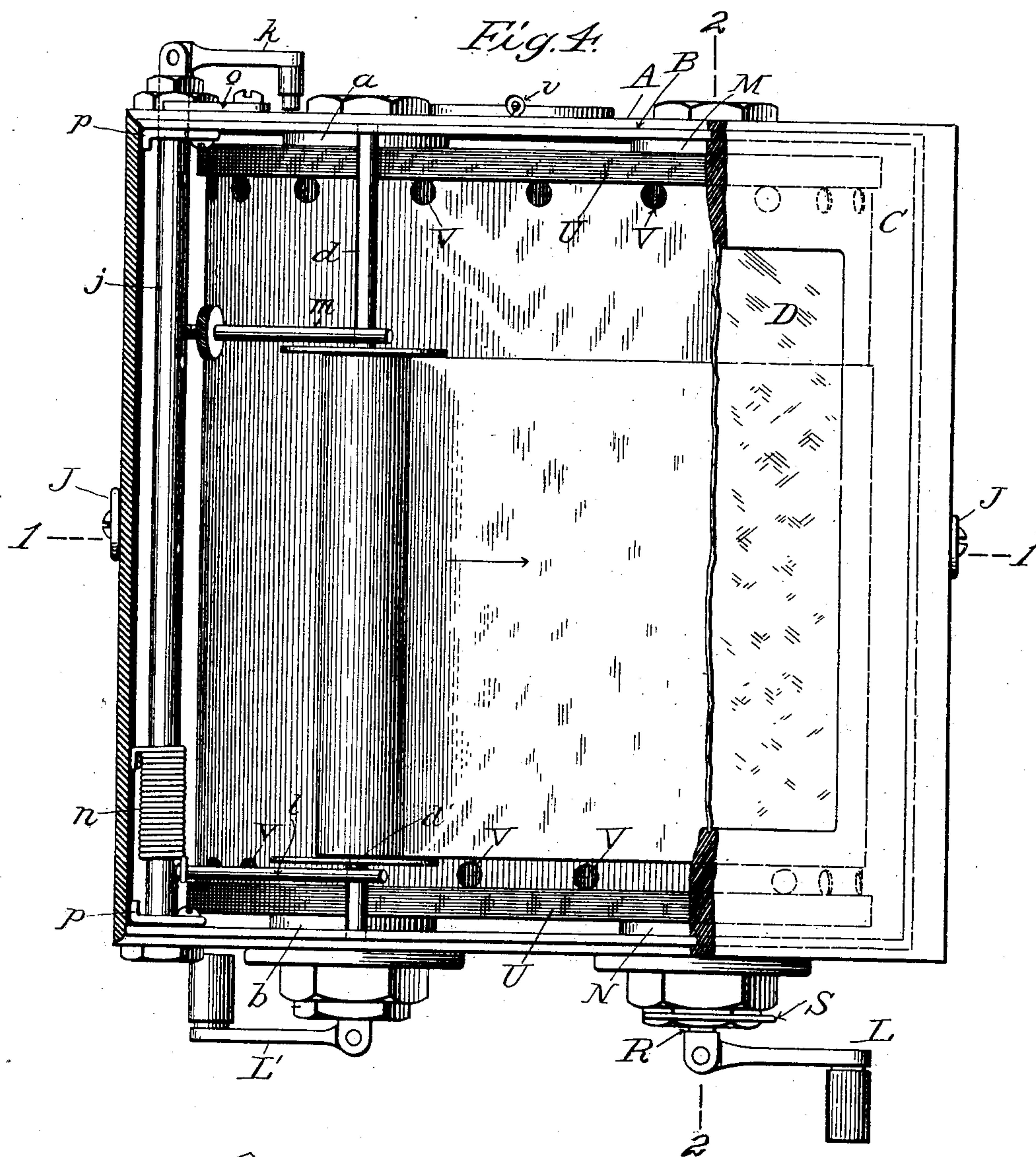
A. W. McCURDY.

APPARATUS FOR DEVELOPING PHOTOGRAPHIC FILMS.

(Application filed Mar. 29, 1900.)

(No Model.)

7 Sheets—Sheet 3.



Attest:
W. E. Burdine
D. E. Burdine

Inventor;
Arthur W. McCurdy,
by Dodge and Sons,
Att'ys

A. W. McCURDY.

APPARATUS FOR DEVELOPING PHOTOGRAPHIC FILMS.

(Application filed Mar. 29, 1900.)

(No Model.)

7 Sheets—Sheet 4.

Fig. 5.

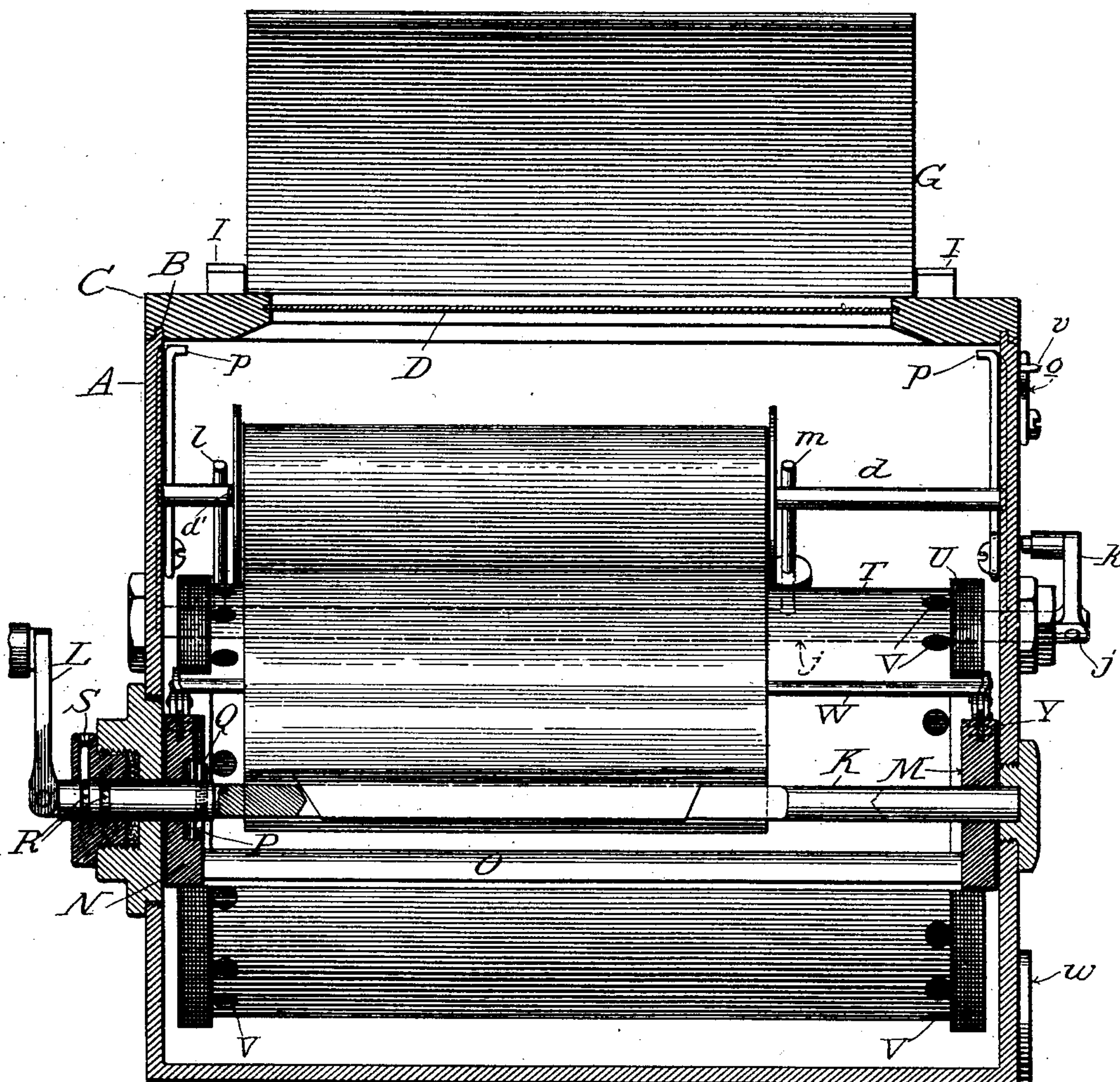
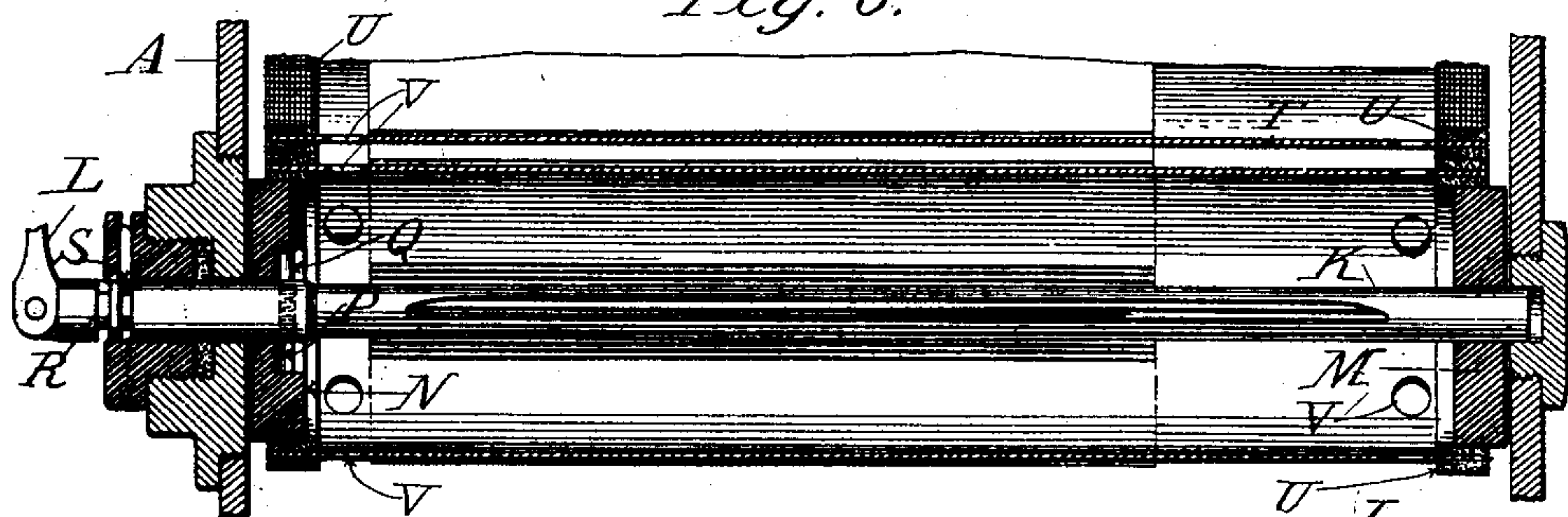


Fig. 6.



Attest,
 W. C. Burdine
 J. E. Burdine.

Inventor:
 Arthur W. McCurdy,
 by Dodge and Sons,
 Attys.

A. W. McCURDY.

APPARATUS FOR DEVELOPING PHOTOGRAPHIC FILMS.

(Application filed Mar. 29, 1900.)

(No Model.)

7 Sheets—Sheet 5.

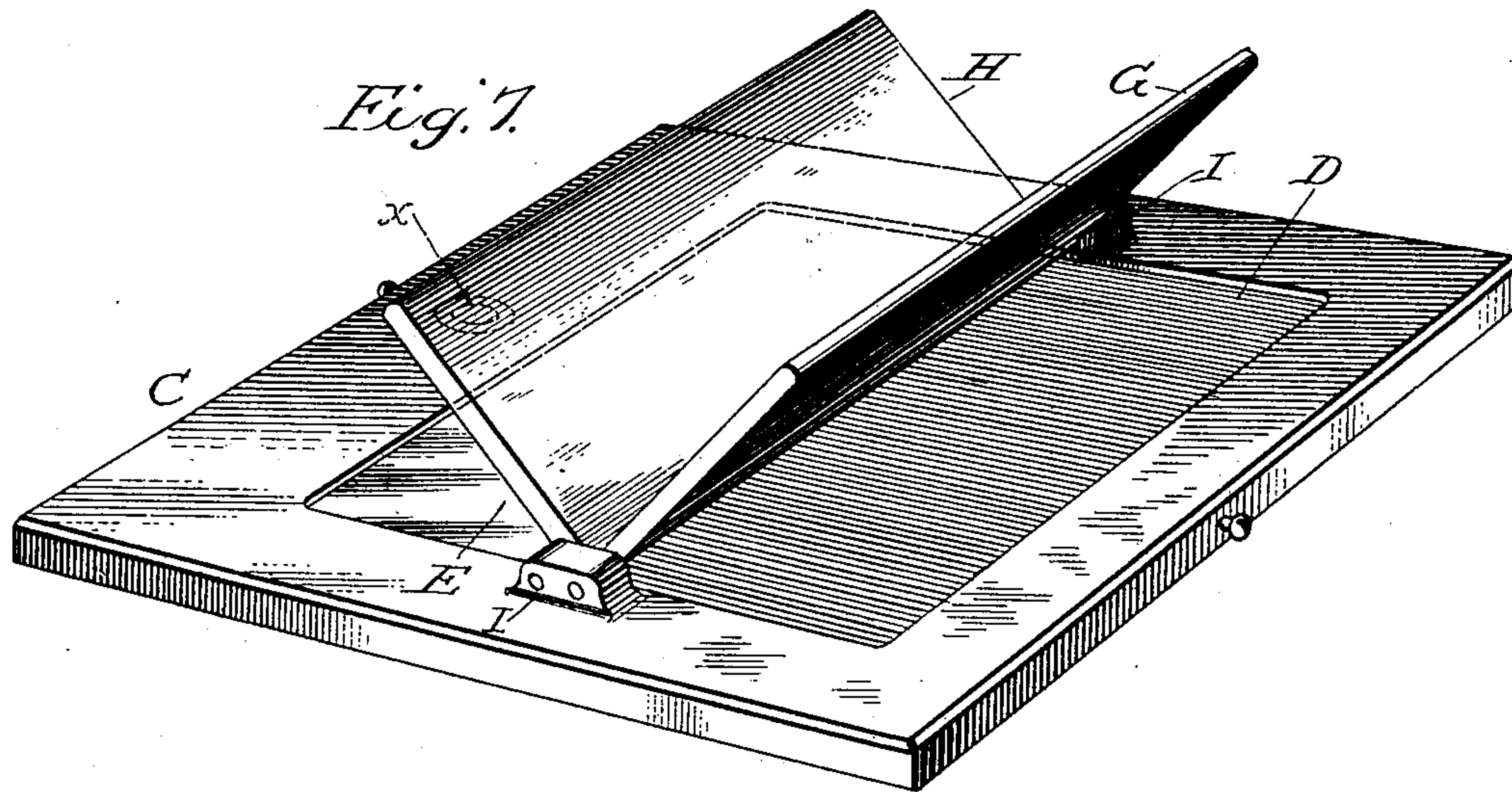


Fig. 8.

Fig. 9.

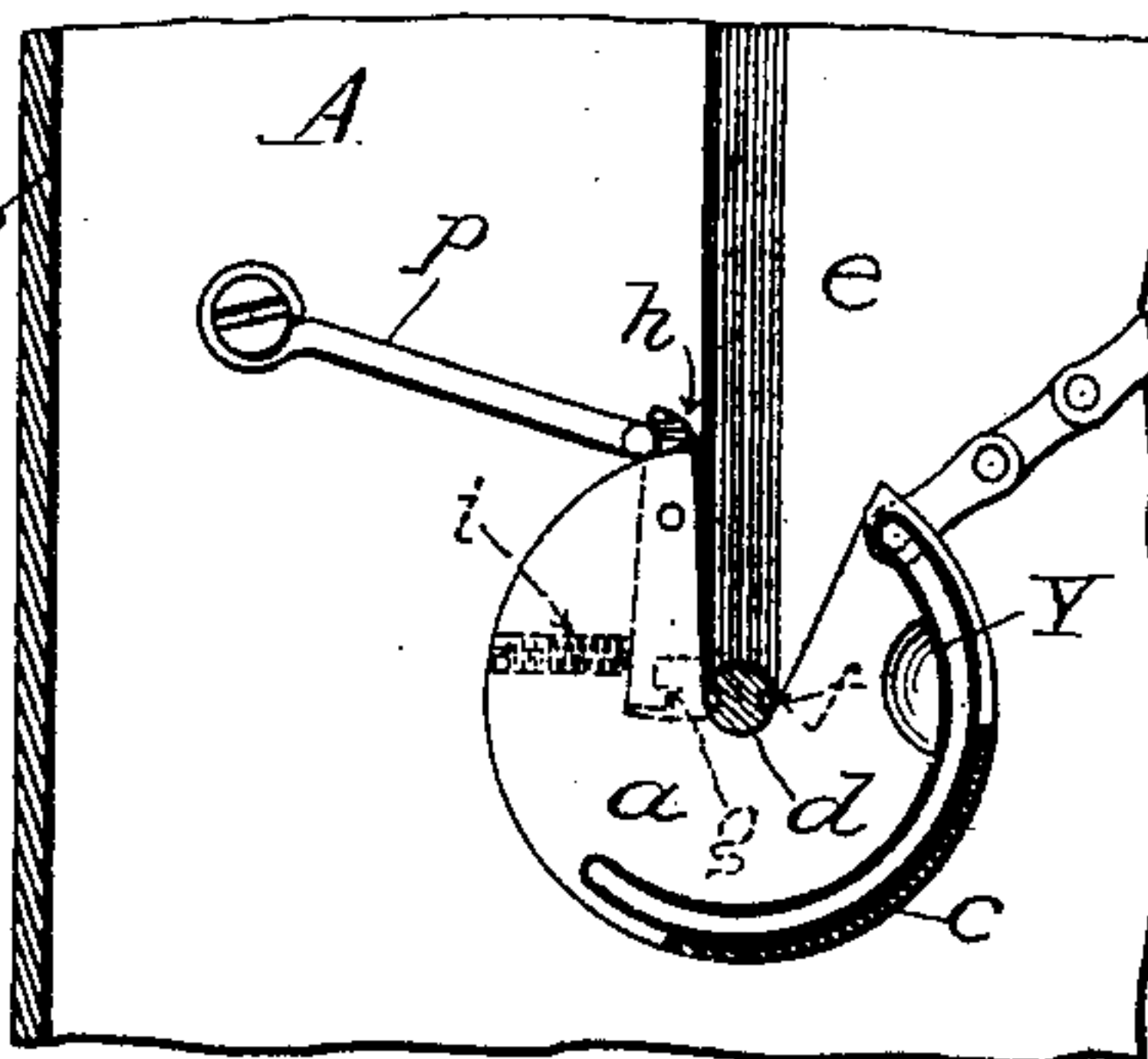
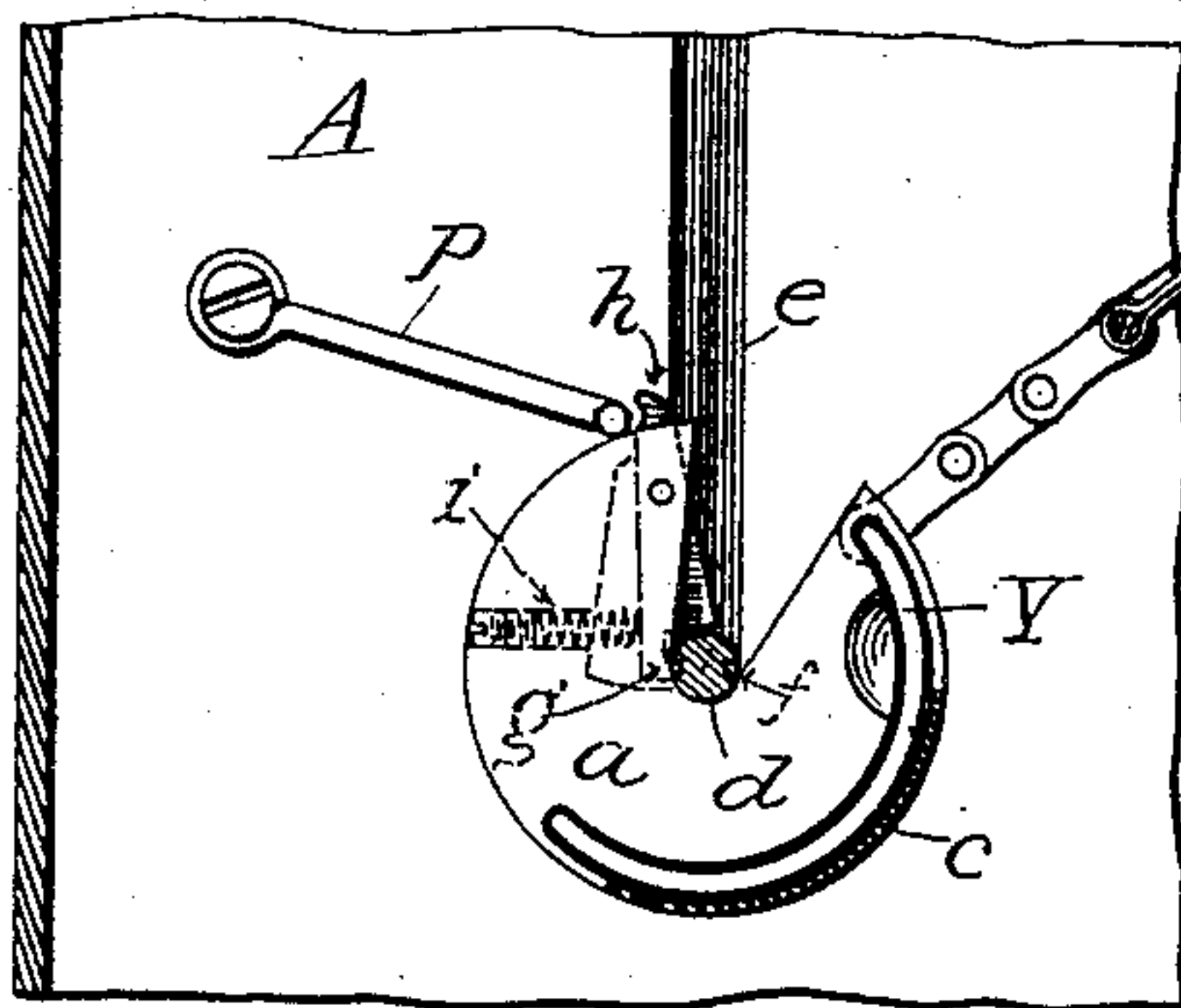


Fig. 13.

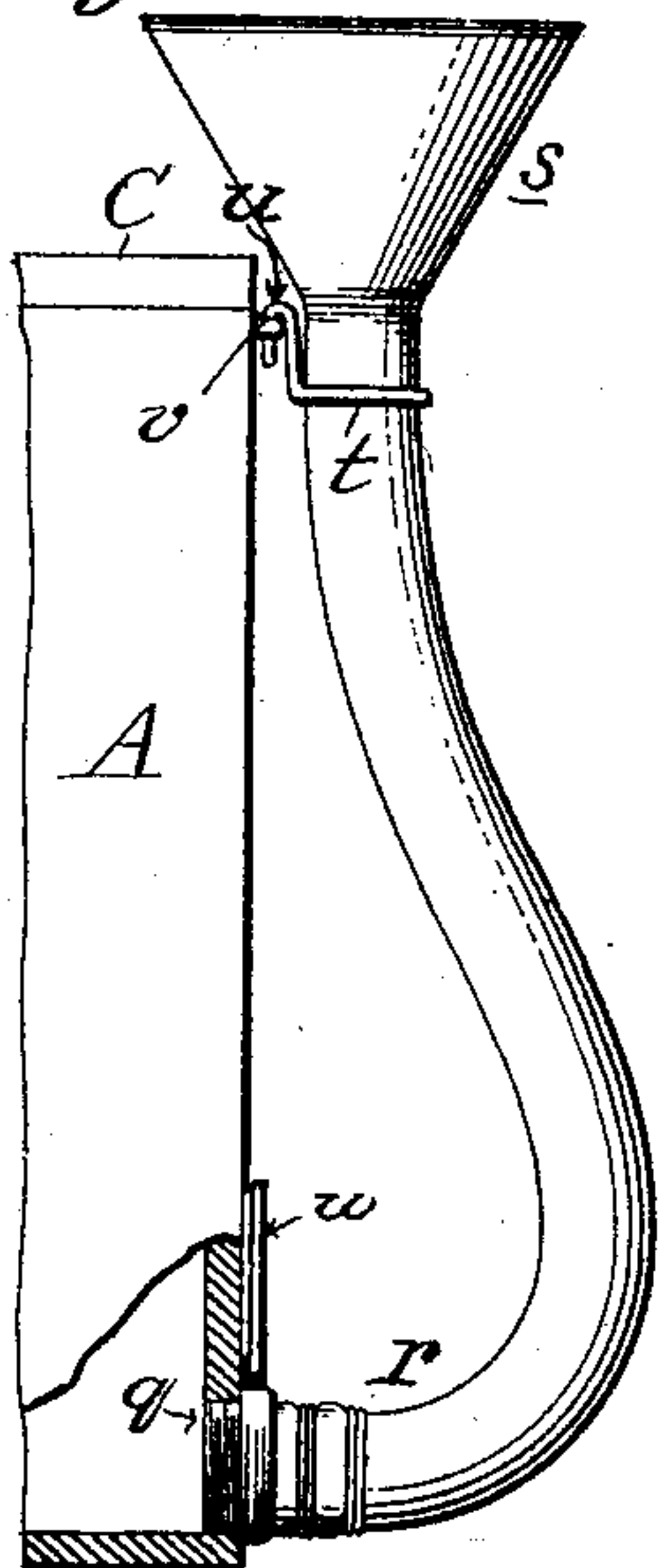


Fig. 10.

Fig. 11.

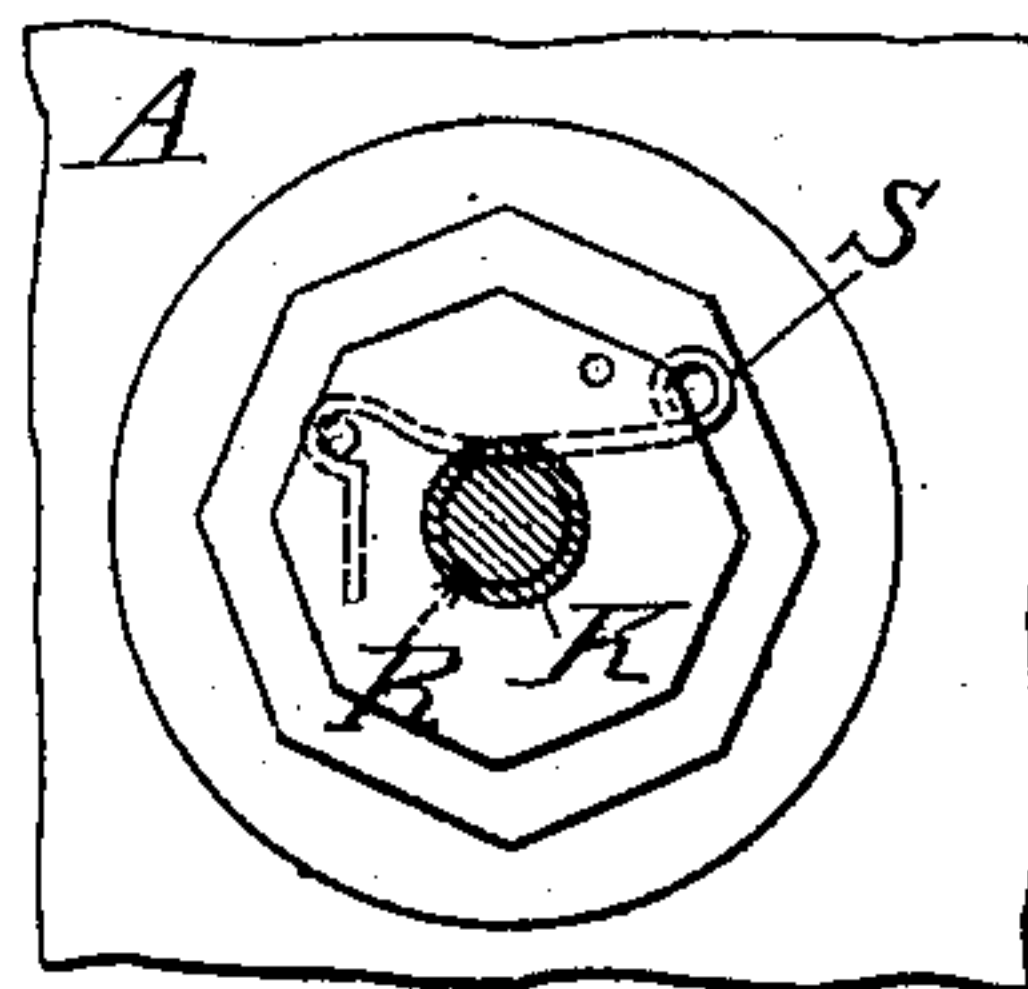
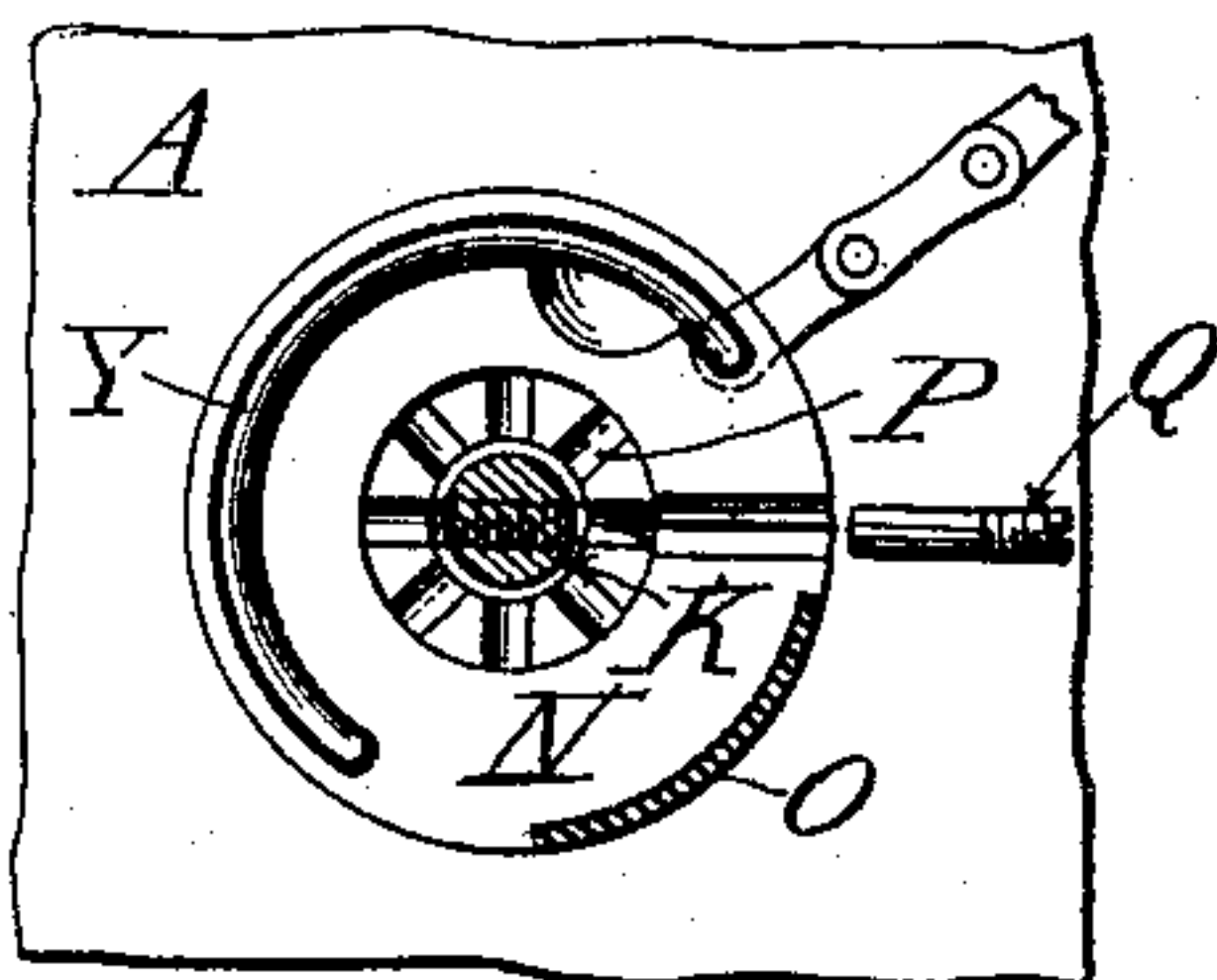
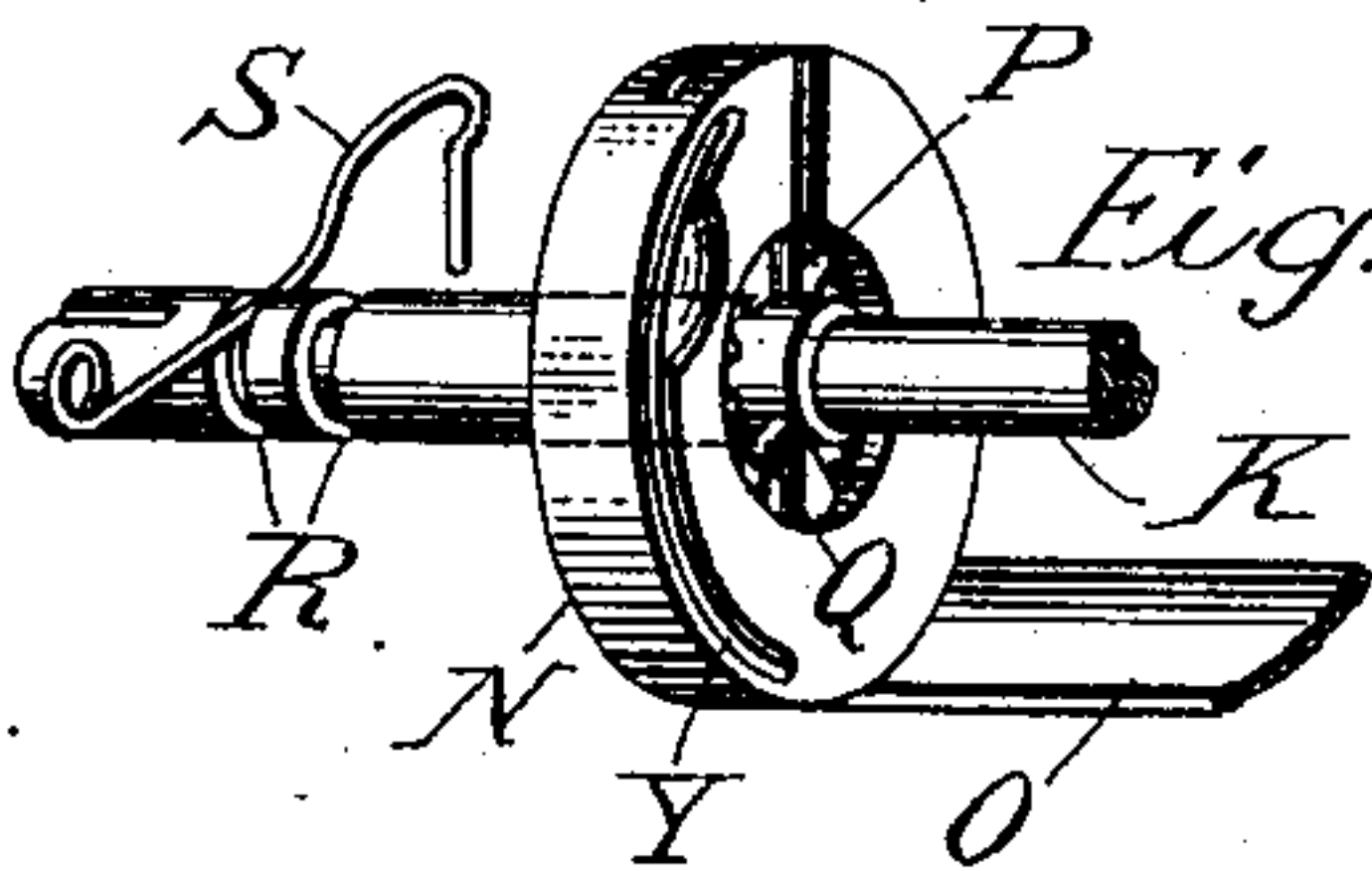


Fig. 12.



Attest;
W. E. Binding.
D. E. Binding

Inventor;
Arthur W. McCurdy,
by Dodge and Sons,
Attys.

No. 707,791.

Patented Aug. 26, 1902.

A. W. McCURDY.

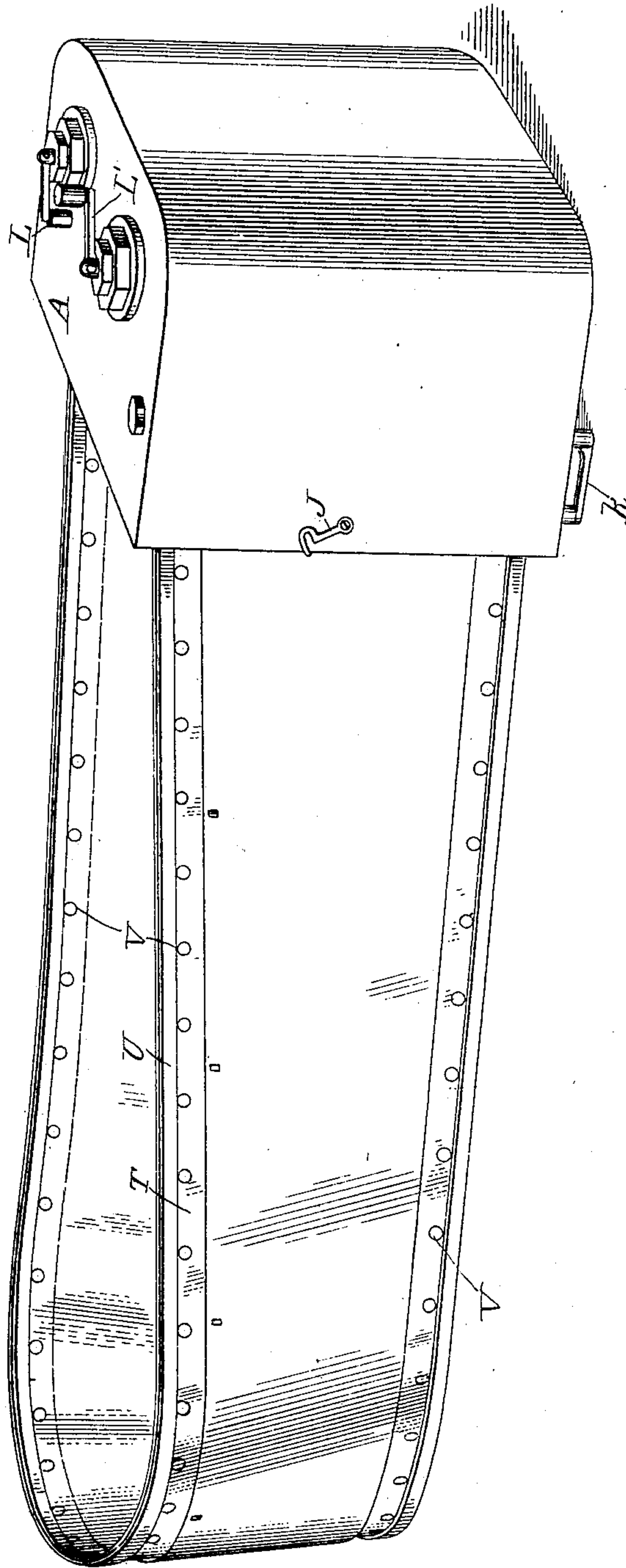
APPARATUS FOR DEVELOPING PHOTOGRAPHIC FILMS.

(Application filed Mar. 29, 1900.)

(No Model.)

7 Sheets—Sheet 6.

Fig. 17.



Attest:
C. C. Burdine
D. E. Burdine

Inventor:
Arthur W. McCurdy,
by Dodge and Sons,
Att'ys.

No. 707,791.

Patented Aug. 26, 1902.

A. W. McCURDY.

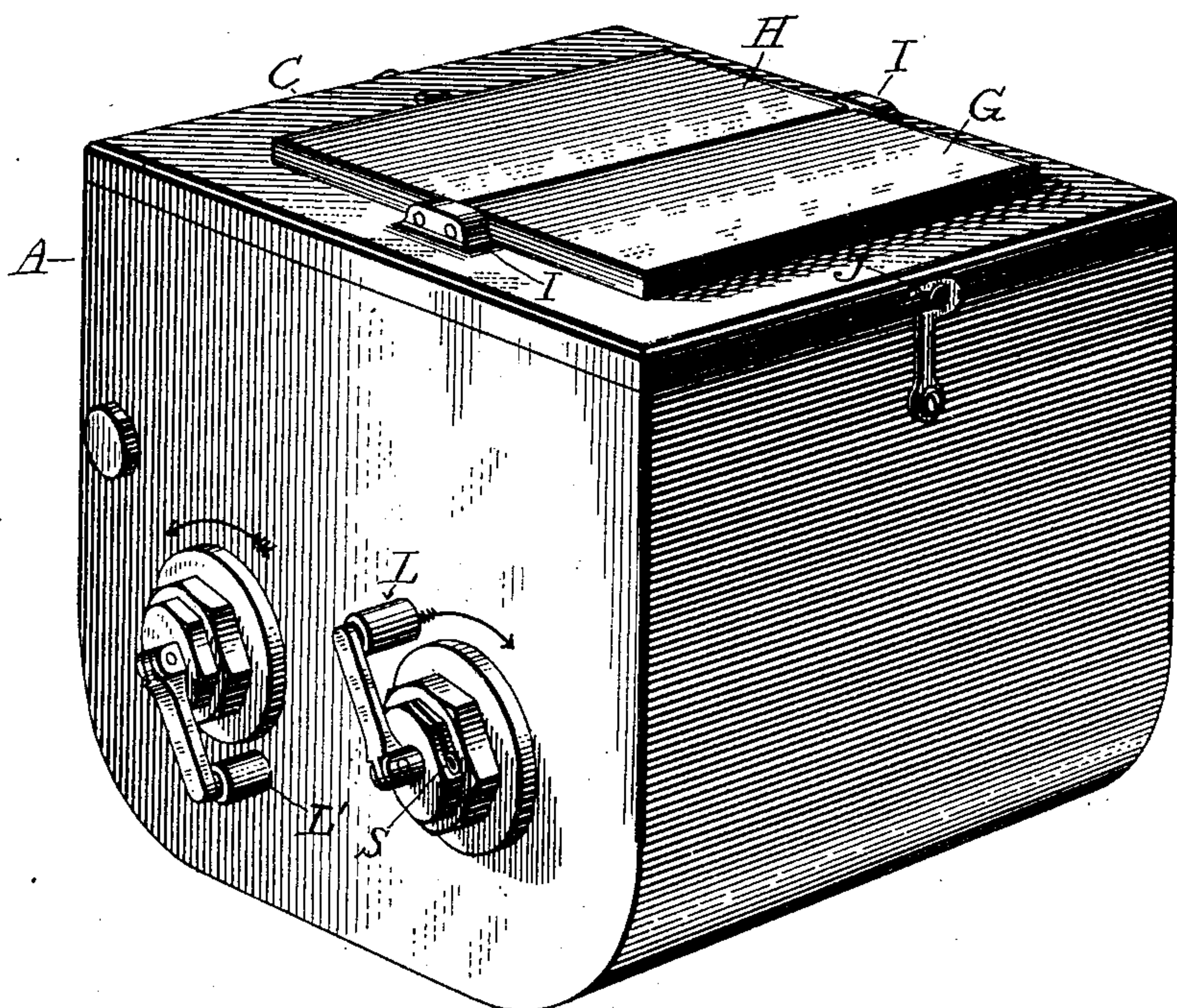
APPARATUS FOR DEVELOPING PHOTOGRAPHIC FILMS.

(Application filed Mar. 29, 1900.)

(No Model.)

7 Sheets—Sheet 7.

Fig. 18.



Attest;
C. C. Burdine.
D. E. Burdine.

Inventor;
Arthur W. McCurdy,
by Dodge and Sons,
Attys.

UNITED STATES PATENT OFFICE.

ARTHUR W. McCURDY, OF WASHINGTON, DISTRICT OF COLUMBIA,
ASSIGNOR TO EASTMAN KODAK COMPANY, OF ROCHESTER, NEW
YORK, A CORPORATION OF NEW YORK.

APPARATUS FOR DEVELOPING PHOTOGRAPHIC FILMS.

SPECIFICATION forming part of Letters Patent No. 707,791, dated August 26, 1902.

Application filed March 29, 1900. Serial No. 10,663. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR W. McCURDY, a citizen of Canada, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Apparatus for Developing Photographic Films, of which the following is a specification.

My present invention relates to an apparatus for developing photographic films, and is in part an improvement upon the invention set forth and claimed in my Patent No. 647,900, dated April 17, 1900, application for which was filed April 4, 1899, Serial No. 711,723.

In the accompanying drawings, Figure 1 is a longitudinal sectional view on the line 1 1 of Fig. 4, the top or cover being removed; Fig. 2, a similar view with the cover in place; Fig. 3, a detail view showing the axle or spool support locked in position; Fig. 4, a top plan view, the top or cover being partly broken away; Fig. 5, a transverse sectional view on the line 2 2 of Fig. 4; Fig. 6, a similar view illustrating several layers of the endless apron as they appear when the apron is partially wound about the front axle; Fig. 7, a perspective view of the lid or cover; Figs. 8 and 9, detail views illustrative of the means employed for releasing the locking devices for the spool-support; Fig. 10, a detail view showing the means employed for attaching the front axle to the disk or head and said head in turn to the endless apron; Fig. 11, a face view with the axle in section of one of the stuffing-boxes or bearings; Fig. 12, a perspective view of a portion of the front axle and its attendant parts; Fig. 13, a detail view of a portion of the box, showing the relation of the filling and emptying tube thereto; and Fig. 14, a perspective view of the spool or cartridge supporting axle; Fig. 15, a perspective view of a portion of a modified form of the apron or support; Fig. 16, a sectional view of two layers of said modified form of apron; Fig. 17, a perspective view of the box, showing the flexible apron or support drawn out therefrom with the film thereon in a position where the film may be dried without removal from the apron or support; and Fig. 18, a perspective view of the apparatus as a whole shown in its closed position.

The primary object of my invention is, as stated in my former application, to provide a portable actinic-proof apparatus wherein a flexible photographic film or cartridge may be placed and treated, thus doing away with the necessity of a dark room and all its attendant inconveniences.

The subsidiary object of the case is to provide a better means for carrying out the main object just stated.

Referring to the drawings, A represents the main body of the box, which is preferably formed of hard rubber or similar material in one piece. The upper edge of the box is, as indicated in Figs. 1, 2, 4, and 5, provided with an upstanding rim B, adapted and designed to enter a groove or channel formed in the under face of the cover C and to make a tight fit therewith. Said cover has an opening formed therein, which opening is closed by actinic-proof material, preferably colored celluloid, having one portion, D, ground, so as to diffuse any light which may pass through it, while the other half, E, is left plain. This celluloid, preferably in the form of a sheet, is sprung into a groove or channel formed in the cover and is secured in place by a small screw F, Fig. 2, which passes back of one edge thereof when the sheet is in place. To protect this sheet when not in use and also to assist in the proper entrance of the non-actinic light-rays through said sheet when the apparatus is in use, I employ two lids or supplemental covers G H, Figs. 2, 5, and 7. These lids are pivotally connected at their proximate edges to blocks or projections I, extending up from or secured to the cover. When not in use, these lids may be swung down, entirely covering the celluloid sheet, as in Fig. 18; but when a film is in the apparatus and it is desired to watch the operation of its development the lids may be swung up to the positions indicated in the figures just noted, so that non-actinic rays will enter through the ground portion D, being diffused thereby, but admitting sufficient light to permit the operation to be viewed through the plain portion E of the sheet. The light-rays which pass through the ground portion are broken up and disseminated and thor-

oughly illuminate the interior of the box, so that the film may be readily and clearly seen. By reason of having the lids stand at an angle to each other the light which passes through the ground portion D will be reflected from the film through the plain portion E. In other words, the angle of incidence is equal to the angle of reflection. In using the apparatus the lid G should be held toward the source of light. The inclination of the lid H also facilitates proper inspection of the film by cutting off practically all reflection from the surface of said plain portion, inasmuch as any light-rays which strike its surface must of necessity be in a line parallel to the line of vision, or practically so. Hence there can be no rays reflected back from its surface. The amount of light admitted to the apparatus can be readily gaged by adjusting the lids up or down, as the case may require. Suitable fastening devices, such as hooks J, are employed for holding the cover down to its place.

Mounted in the front portion of the box or closure is an axle K, one end of which is seated in a suitable bearing, while the opposite end extends out through a stuffing-box or packing-gland and has connected to it a crank L. Said axle has loosely mounted upon it two disks or heads M N, which are connected to each other by a cross bar or member O, so that when one head or disk is turned the other must partake of the same rotary movement. Disk N, Figs. 10 and 12, has formed in its face a series of notches P, which are designed and adapted under certain conditions to receive a pin Q, carried by the axle K, and to lock the disk and axle together. The axle K may be moved longitudinally to bring the pin into engagement with one of the notches P, Fig. 6, or when moved into the position shown in Fig. 5 to free the pin from the notches and to permit the axle to be rotated independently of the disks or heads. To secure the axle in these two positions, it is provided with grooves or channels R, into which enters a spring locking device S, mounted, as shown, in the nut or packing-gland of the stuffing-box through which the axle extends. By simply lifting the free end of the spring-arm S it is withdrawn from one or the other of said grooves, and the axle may be moved inward or outward, as occasion may require. The axle K is provided with a slot which extends through from side to side throughout the major portion of its length, and to provide for the more easy insertion of the end of the film or the protecting-covering which is wound thereabout the body of the axle is cut away or beveled upon each side of the axle adjacent to one side of the slot, as is best indicated in Figs. 1 and 6.

A flexible apron, web, or support provided with raised edges is employed for supporting and holding the film when it is placed in the apparatus for treatment. As illustrated in Figs. 1, 2, 4, 5, and 6, the apron or support

is formed of a sheet of celluloid T, having secured to its side edges, on each face thereof, narrow strips or bands U, of rubber or other suitable flexible material, and adjacent to said bands or strips is formed a series of openings V, Figs. 4 and 5, in the main body of the celluloid apron. The forward end of the apron or support is connected to a cross bar or member W, which in turn is connected by a series of links to the disks M and N. Preferably and in practice the rubber strips U are sewed to the celluloid, and the same means is employed for connecting the ends of the apron to the rod W, as will be noted upon reference to Fig. 1, the end of the apron being passed around the rod and doubled back upon itself. To provide a simple means for securing these links to the disks, the disks are cut out slightly to permit the entrance of the end of the links, and one end of a spring-arm Y, secured to the disk, is passed through the head or disk and the opening in the link projecting into the disk. The disks are, as shown in Figs. 1, 8, 9, and 10, cut away slightly near the free end of the spring arm or member Y in order to facilitate the easy disengagement of the parts by simply passing the finger or a suitable tool under the arm and withdrawing it from its engagement with the link. The opposite end of the flexible apron or support is connected to two disks or heads *a* and *b* in a manner similar to the connection of the other end with the forward disks. The disks are journaled or have bearings formed in the side walls of the box or closure and are connected to each other by a cross member *c*. The axle of the disk *b* extends out through its bearing and has connected to it a suitable crank *L'*. These disks are designed to receive and hold the axle or other supporting device upon which a spool is mounted or a film wound. In the drawings I have illustrated the axle or support *d* in connection with the usual spool for holding a photographic film. The heads or disks *a b* are, as shown, cut away or provided with a slot which extends from the periphery thereof toward the center, and these slots are adapted and designed to receive the ends of the supporting-axle *d* when it is passed down therein. To provide for proper entrance of the axle into the slots, there is formed in each of the side walls of the box a groove or channel *e*, into which the ends of the axle are placed when the spool or cartridge is put in the apparatus, as will be hereinafter more fully described. The axle, Fig. 14, is preferably slitted and spring out at its center in order to provide sufficient friction between it and the spool which is placed thereon. The ends of the axle are also formed with grooves or channels *f*, which when the axle is seated within the disks or heads *a b* are engaged by a projecting tongue *g*, formed upon a lever or locking-detent *h*, pivoted in the head or disk *a*. The opposite disk or head *b* is also provided with a lever

or locking-detent. These detents or levers prevent the axle from turning independently of the heads or disks and also prevent the axle from being withdrawn from said heads or disks until released. A suitable spring *i* is seated within the heads and forces the lower or inner end of the lever or detent out into the slot in the heads or disks into a position where it will always engage the axle when it is forced down into the disks. To provide means for forcing the axle into place and at the same time holding the spool in close contact with the flexible apron as it is wound forward, and thereby laying the film flat and taut upon the apron, there is mounted at the rear of the box a cross-shaft *j*, one end of which extends out through the side of the box and has connected to it a crank or arm *k*, Fig. 4. This shaft *j* has secured to it near one end an arm *l* of a length sufficient to extend out in line with the slots or channels *e*, and also a second arm *m*, which is adjustably secured to the shaft, as is best indicated in Fig. 4. This adjustability may be secured by threading one end of the arm and providing the shaft with a series of threaded openings into which the arm may be screwed as desired. A spring *n* encircles the shaft and has one end connected to the rear of the box, while its opposite end is passed around the arm *l* and tends to rotate the shaft and force the arms *l* and *m* downward toward the disks or heads *a b*.

While I have shown the arms *l* and *m* as bearing upon the axle or support *d*, the arms may, if so desired, be brought to bear upon the cartridge, and in either instance, whether they bear upon the axle or cartridge, act as brakes to prevent the film from unwinding or springing out into loose coils, thereby permitting light to affect the film before the cover is placed upon the box or the film to lie loosely on the apron or support as the two are wound forward. While I have shown the arms as bearing on the axles, it is manifest that they may bear upon the spool equally as well, and it is for this reason that the arm *m* is made adjustable.

To hold the arms *l* and *m* in their upright position, there is placed upon the outer face of the box a hook or other fastening device *o*, which may be brought into engagement with the inwardly-projecting end of the arm or crank *k*, thereby holding the shaft against rotation and maintaining the arms in their upright position.

After all the operations necessary to the treatment of a film have been completed and it is desired to remove the film from the apparatus it is of course necessary to unlock the axle or support *d* from the disks or heads *a b*, and to this end I employ two arms *p*, one pivotally mounted upon each side of the box, which may be swung down into the position indicated in Fig. 8 and brought into engagement with the upper ends of the locking levers or detents *h*. Then by simply turning the

heads or disks *a b* slightly backward the locking levers or detents are brought into the position indicated in Fig. 9, wherein it will be seen that they are free from their engagement with the axle, and said axle may be withdrawn from the box.

To provide for introduction into the apparatus of the liquids necessary to the development and fixing of the film, there is formed near the bottom of the box at one side an opening *q*, into which may be screwed a coupling connected to a rubber tube or hose *r*, carrying at its upper end for convenience a funnel *s*, Fig. 13. The tube *r* is made sufficiently long to extend up above the top of the box, and to hold it in this position when liquid is in the apparatus I employ a ring *t*, provided with a hook *u*, which may be brought into engagement with an eye *v*, secured to the box. Of course when the operator is not using the apparatus the tube may be unscrewed and placed within the box out of the way. When it is desired to empty the box, all that it is necessary to do is to unhook the ring from the eye and let the liquid run out through the tube into any desired receptacle. When the apparatus is not in use, it is preferable that the opening *q* be closed against the entrance of extraneous matters, and to this end I employ a swinging or pivoted cover or closure *w*, which may be moved down over the opening when the tube is withdrawn. Inasmuch as the cover fits the box practically air-tight, means must be provided for the escape of the air as the liquid enters the box. To provide for this, a screw-plug is fitted in the cover, as shown in Fig. 2, the stem *x* of the plug being made hollow, as shown, and provided with lateral openings *y*, which communicate with a space *z* left intermediate the head of the plug and the surrounding wall of the opening formed in the cover. It will be noted that no light-rays can enter the interior of the box or closure through the passage thus formed nor through the filling-tube.

In Figs. 15 and 16 I have shown a modified form of apron or support formed of a sheet of celluloid having upon one face thereof, near each of the side edges, a series of projections or protuberances *A'*, the upright walls of which are substantially vertical to the face of the apron. In Fig. 16 two layers of an apron so formed are shown in position, and it will be noted that the projections separate the layers in a manner similar to the rubber strips referred to in connection with the other form hereinbefore described. The present construction is advantageous in that it not only separates the layers, but also provides openings between the layers at the outer edges thereof, so that the liquids used in the treatment of the film may have ready access to each layer of the film. This does away with the necessity of forming perforations or openings in the body of the apron.

In Fig. 17 I have shown the apparatus laid upon its side, with the flexible apron or sup-

port wholly unwound therefrom in the form of a loop, with the film which has been previously treated left thereon. It will be noted that the film and apron are free from all wrinkles and that the parts may be left in this position until the film has become thoroughly dry. This is advantageous in that it does away with the necessity of having to withdraw the wet film from the apparatus and place it on a separate support or holder for the purpose of drying.

Operation: In the use of the apparatus the parts are in the position shown in Fig. 1, the filling-tube being screwed into place and the flexible apron or support being wound about itself upon the rear pair of disks *a b*, the raised edges of course coming in contact with each other and forming a series of separated layers. The apparatus is designed to be used more particularly with a photographic film or cartridge having the image-receiving portion or film proper protected by end pieces which are actinic-proof and which are connected or attached to the film in such manner that they will not become separated in the solutions used nor injuriously affect such solutions, or the film may be one in which the protecting or enveloping portion is formed integral with the body of the film. The protecting end is first threaded through the front axle *K* with the spool in such position that when unwound the sensitive face of the film comes uppermost, the axle at this time being disconnected from the heads or disks, so that it may be rotated independently thereof. After the end is threaded in the cartridge, with its axle or support, is placed within the box, the ends of the axle or support *d* extending into the ways or guides *e* and the spool resting upon the flexible apron; or, if desired, the spool may be first put in position in the box and the end withdrawn therefrom and threaded through the front axle *K*. The arms *l* and *m* are then let down into position and bear either upon the spool or cartridge or the axle *d*, acting, as above noted, as a brake and also serving to hold the spool down into close contact with the apron. The cover is now put in position, and the operator continues to turn the axle *K* independently of the disks until the protecting-cover has been entirely withdrawn from the spool and wound about the axle *K*. This can be ascertained by viewing the operation through the inspection-opening formed in the cover and will be indicated by a perforation or other distinguishing means carried by the film. The lids are then closed down and the axle *K* is locked to the disks, as will be understood, and the apron then drawn forward with the film taut thereon intermediate the raised edges, the sensitized face of the film of course being uppermost. This operation of winding the apron and withdrawing the film from the spool is continued until the apron or support is wound about the forward axle or the disks carried thereby, as indicated in Fig. 2, when upon further movement of the parts, as shown

in Fig 3, the axle *d* will pass down into the slots formed in the heads or disks *a b*, and by reason of the spring-pressure exerted through the arms *l* and *m* said axle will be forced down to its seat in the disks and be locked by the spring-actuated levers or detents *h*. To make absolutely sure that the axle or support *d* is brought to its proper position, it may be pressed home by the operator through the agency of the crank *k*. When said axle *d* has been locked in position, the operator raises the arms *l* and *m* to their upright position and locks them there by the hook *j* passing over the crank *k*. When the parts are brought to the position just noted, the liquid is introduced to the closed box or receptacle, the air passing out through the plug in the cover. The operator may now by rotating the disks or heads through the cranks *L L'* in the direction indicated by the arrows, Fig. 18, cause the apron to be traversed back and forth beneath the inspection-openings formed in the cover, and the whole process of development may, if desired, be watched. The openings *V* in the apron in the form shown in Figs. 1, 2, 4, 5, and 6 permit the liquid to circulate freely through the layers of the apron and also permit the escape of air from between the layers as the liquid enters the box, thereby insuring the proper treatment of the film over its entire surface, and this without liability of streaking and the like. With the form of apron shown in Figs. 15 and 16 the liquid enters, of course, between the layers of the apron or support intermediate the projections *A'*. After the film has been developed, fixed, washed, and, if desired, treated with glycerin the cover is removed and the film with the apron or support withdrawn from the apparatus, as indicated in Fig. 17, and left to dry. If it is desired, however, to place the film upon some other support for the purpose of drying it, the arms *p* are thrown down into the position indicated in Fig. 8 to act upon the levers *h*, the disks being rotated into the position indicated in Fig. 9, thereby withdrawing the locking levers or detents from their engagement with the supporting-axle *d*, so that it may be readily withdrawn and the film removed.

The celluloid bed or apron is advantageous for many reasons. It is light, flexible, does not wrinkle or fold, and does not cause the deposition of any of the chemicals used in the solutions employed in the process of developing and fixing.

Shaft *d* is provided with a loop or similar projection *d'*, extending out therefrom near one end, this for the purpose of always bringing the spool to its proper position on the shaft before it is placed within the box.

Having thus described my invention, what I claim is—

1. In a portable apparatus for developing flexible photographic films, the combination of a suitable box or receptacle closed against the admission of actinic rays; a rotary de-

vice mounted therein; a flexible apron connected at one end to said rotary device, said apron consisting of a web provided with means for holding the apron in a series of
5 separated layers when wound up; a rotary device connected to the opposite end of said apron; and means for connecting the ends of a flexible photographic film to said rotary devices and maintaining the film in position
10 upon the apron.

2. In a portable apparatus for developing flexible photographic films, the combination of a suitable box or receptacle closed against actinic rays; a flexible apron or support
15 mounted therein having its body portion formed of a sheet of celluloid and provided with means for holding the apron in a series of separated layers when wound up; and means for winding the apron about itself in
20 opposite directions.

3. In a portable apparatus for developing flexible photographic films, the combination of a suitable box or receptacle closed against actinic rays; a flexible apron or support
25 mounted therein, the body portion of said apron consisting of a sheet of celluloid having openings near its edges; projections extending up from the edges of said apron; and means for winding said apron about itself.

30 4. In a portable apparatus for developing flexible photographic films, the combination of a suitable box or receptacle closed against the admission of actinic rays; a flexible apron or support mounted therein, said apron having
35 its body portion formed of celluloid; projections extending up from said apron near its side edges; means for winding said apron about itself in opposite directions; and means also mounted within the box for holding the
40 ends of a photographic film and maintaining the body of the film proper in close contact with the body of the apron.

5. In a portable apparatus for developing flexible photographic films, the combination
45 of a suitable box or receptacle; a cover therefor having an opening formed therein; actinic-proof material mounted within said opening; and lids G, H, pivotally connected to the cover over said actinic-proof material.

50 6. In a portable apparatus for developing flexible photographic films, the combination of a suitable box or receptacle; a cover therefor having an opening formed therein; a sheet of actinic-proof celluloid mounted in the opening,
55 one portion of said sheet being treated so that it will diffuse the light-rays; and lids pivotally connected to the cover over said celluloid sheet.

60 7. In a portable apparatus for developing flexible photographic films, the combination of a suitable box or receptacle; a cover therefor having an opening therein; a sheet of celluloid mounted in said opening and proof
65 against the passage of actinic rays, one portion of the celluloid sheet being ground; and lids G, H, pivotally mounted upon the cover over said celluloid sheet.

8. In a portable apparatus for developing flexible photographic films, the combination
70 of a suitable box or receptacle; a cover therefor having an opening formed therein; a sheet of celluloid proof against the passage through of actinic rays, one portion of the sheet being ground; and means for cutting off the direct admission of light-rays to the
75 interior of the apparatus through the unground portion while permitting the operator to view the film through said portion.

9. In a portable apparatus for developing flexible photographic films, the combination
80 of a suitable box or receptacle closed against the admission of actinic rays; a flexible apron or support mounted within said box; means for winding said apron about itself with a flexible photographic film thereon; a shaft *j* mounted
85 within the box and provided with outwardly-extending arms, one of said arms being adjustable along the length of the shaft; and a spring for normally rotating said shaft and pressing the arms in a downwardly direction.
90

10. In a portable apparatus for developing flexible photographic films, the combination
95 of a suitable box or receptacle closed against the admission of actinic rays; a flexible apron or support mounted therein; means for winding said apron about itself in a series of separated layers with a flexible photographic film thereon; a shaft *j* mounted within the
100 box and provided with outwardly-extending arms *l, m*, said arm *m* being adjustable lengthwise of the shaft; a spring for normally pressing said arms in a downwardly direction; and means for locking said shaft to hold the arms in an upright position.

11. In a portable apparatus for developing
105 flexible photographic films, the combination of a suitable box or receptacle closed against the admission of actinic rays; means for admitting liquid to said box; and a hollow screw-plug mounted in the box, said plug being
110 formed with an angular or circuitous passage therein to provide for the exit of the air within said box as the liquid enters the same, substantially as and for the purpose described.

12. In a portable apparatus for developing
115 flexible photographic films, the combination of a suitable box or receptacle closed against admission of actinic rays; a shaft *K* mounted therein; disks loosely mounted upon said shaft; means for locking said shaft and the
120 disks together; a flexible apron or support connected at one end to said disks, the body portion of said apron being formed of celluloid and provided with means for holding the same in a series of separated layers when
125 wound up; disks *a, b*, rotatably mounted within the box in rear of said shaft *K* and likewise connected to the opposite end of the apron; and means carried by said disks *a, b*, for holding a spool-axle.
130

13. In a portable apparatus for developing flexible photographic films, the combination of a suitable box closed against the admission of actinic rays; a shaft *K* mounted therein

and having an opening extending there-
through, the body portion of the shaft being
cut away adjacent to said opening, substan-
tially as set forth; disks mounted upon said
5 shaft; means for connecting said disks and
the shaft together; a flexible apron or sup-
port connected to said disks; a second pair
of disks *a, b* mounted in the box in rear of
said shaft and connected to the opposite end
10 of the apron; and means carried by said disks
a, b for engaging and holding a supporting-
shaft for a photographic spool.

14. In a portable apparatus for developing
flexible photographic films, the combination
15 of a suitable box or receptacle closed against
admission of actinic rays; a shaft *K* mounted
therein; disks mounted upon said shaft; a se-
ries of seats or sockets *P* formed in the face
of one of said disks; a pin connected to the
20 said shaft and adapted to enter said sockets
or seats; means for permitting endwise move-
ment of the shaft and holding it in its ad-
justed position; a flexible apron connected to
the disks; a rotatable device mounted in the
25 box in rear of said shaft and connected to the
opposite end of the apron; and means carried
by said rotatable device for holding a support
for a photographic cartridge-spool.

15. In a portable apparatus for developing
30 flexible photographic films, the combination
of a suitable box or receptacle closed against
the admission of actinic rays; a flexible apron
or support mounted therein; a rotatable de-
vice connected to one end of said apron; a
35 second rotatable device connected to the op-
posite end of the apron; means carried by
said second device for engaging a shaft or
axle; and means for unlocking said devices
40 substantially as and for the purpose de-
scribed.

16. In a portable apparatus for developing
flexible photographic films, the combination
of a suitable box or receptacle closed against
45 the admission of actinic rays; a rotatable de-
vice mounted in the forward end of said box;
a flexible apron or support connected at one
end to said device; disks *a, b*, rotatably
mounted in the box in rear of said forward
50 rotary device; locking-levers carried by said
devices; and arms *p* pivotally secured within
the box and adapted and arranged to be
thrown down in line with the outer ends of
the locking-levers, substantially as and for
55 the purpose described.

17. An apron or support for use in the de-
velopment of flexible photographic films con-
sisting of a sheet of celluloid having projec-
tions extending up therefrom adjacent to its
60 side edges.

18. An apron or support for use in the de-
velopment of flexible photographic films, con-
sisting of a sheet of celluloid having strips of
flexible material secured thereto adjacent to
65 its side edges.

19. An apron or support for use in the de-
velopment of flexible photographic films, con-
sisting of a sheet of celluloid having strips or
bands of rubber secured thereto adjacent to
its side edges. 70

20. An apron or support for use in the de-
velopment of flexible photographic films con-
sisting of a sheet of celluloid having perfora-
tions extending therethrough near its side
edges, and a strip of flexible material secured 75
to the face of the sheet intermediate the open-
ings and the edges.

21. An apron or support for use in the de-
velopment of flexible photographic films, con-
sisting of a sheet of celluloid having projec- 80
tions extending up therefrom adjacent to its
side edges, in combination with means for
holding a flexible photographic film thereon
intermediate said raised edges.

22. An apron or support for use in the de- 85
velopment of flexible photographic films, con-
sisting of a sheet of celluloid, having perfora-
tions formed therein near its side edges, and
strips of rubber sewed to the face of said sheet
intermediate the perforations and the edges 90
thereof.

23. In a portable apparatus for developing
flexible photographic films, the combination of
a suitable box or receptacle closed against the
admission of actinic rays; a rotatable device 95
mounted therein; a flexible supporting-web
connected to said rotatable device; means for
holding successive layers of said web in a
separated position; and means for connect-
ing the end of a flexible photographic film to 100
said rotatable device.

24. In a portable apparatus for developing
flexible photographic films, the combination of
a suitable box or receptacle closed against the
admission of actinic rays; a rotatable device 105
mounted therein; a self-sustaining flexible
web connected to said device; means for hold-
ing successive layers of said web in a sepa-
rated position; and means for connecting the
end of a flexible photographic film to said ro- 110
tary device.

25. In a portable apparatus for developing
flexible photographic films, the combination of
a suitable box or receptacle closed against the
admission of actinic rays; a rotatable device 115
mounted therein; a self-sustaining flexible
web connected to said device; means for hold-
ing successive layers of said web in a sepa-
rated position; means for connecting the end
of a flexible photographic film to said rotary 120
device; and means for maintaining a cartridge
in proper position with relation to said web.

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

ARTHUR W. McCURDY.

Witnesses:

.HORACE A. DODGE,
DUDLEY E. BURDINE.