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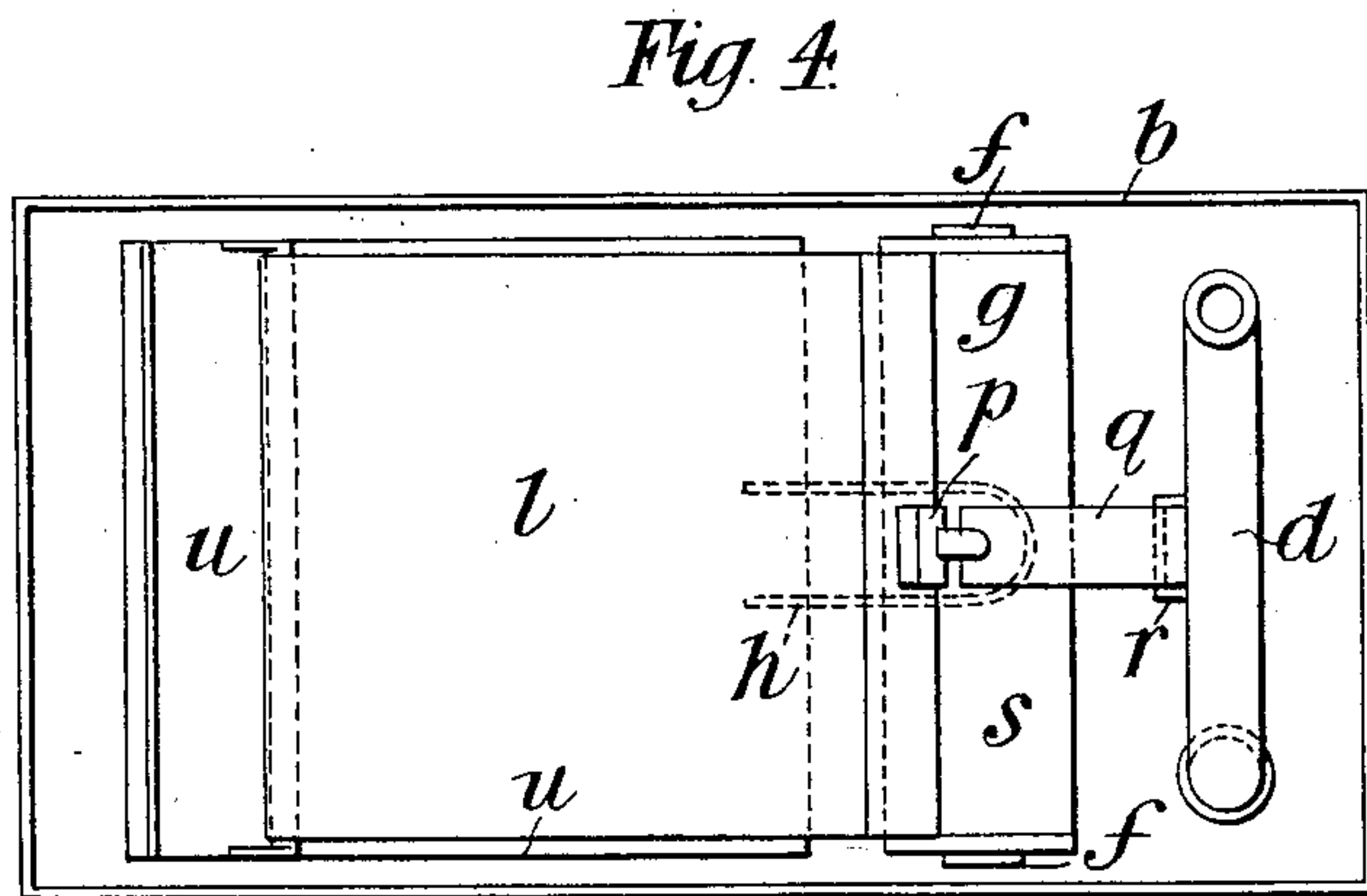
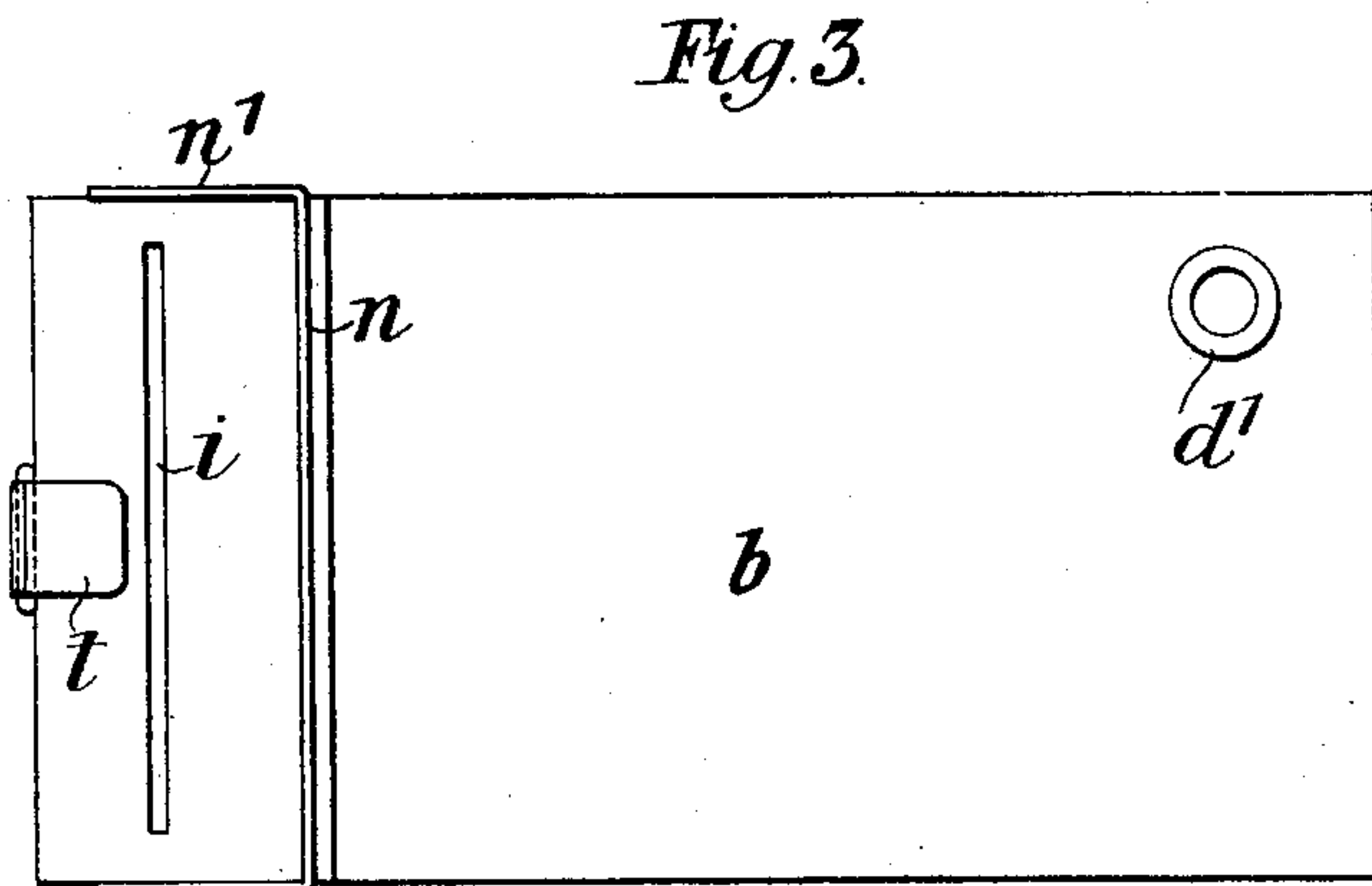
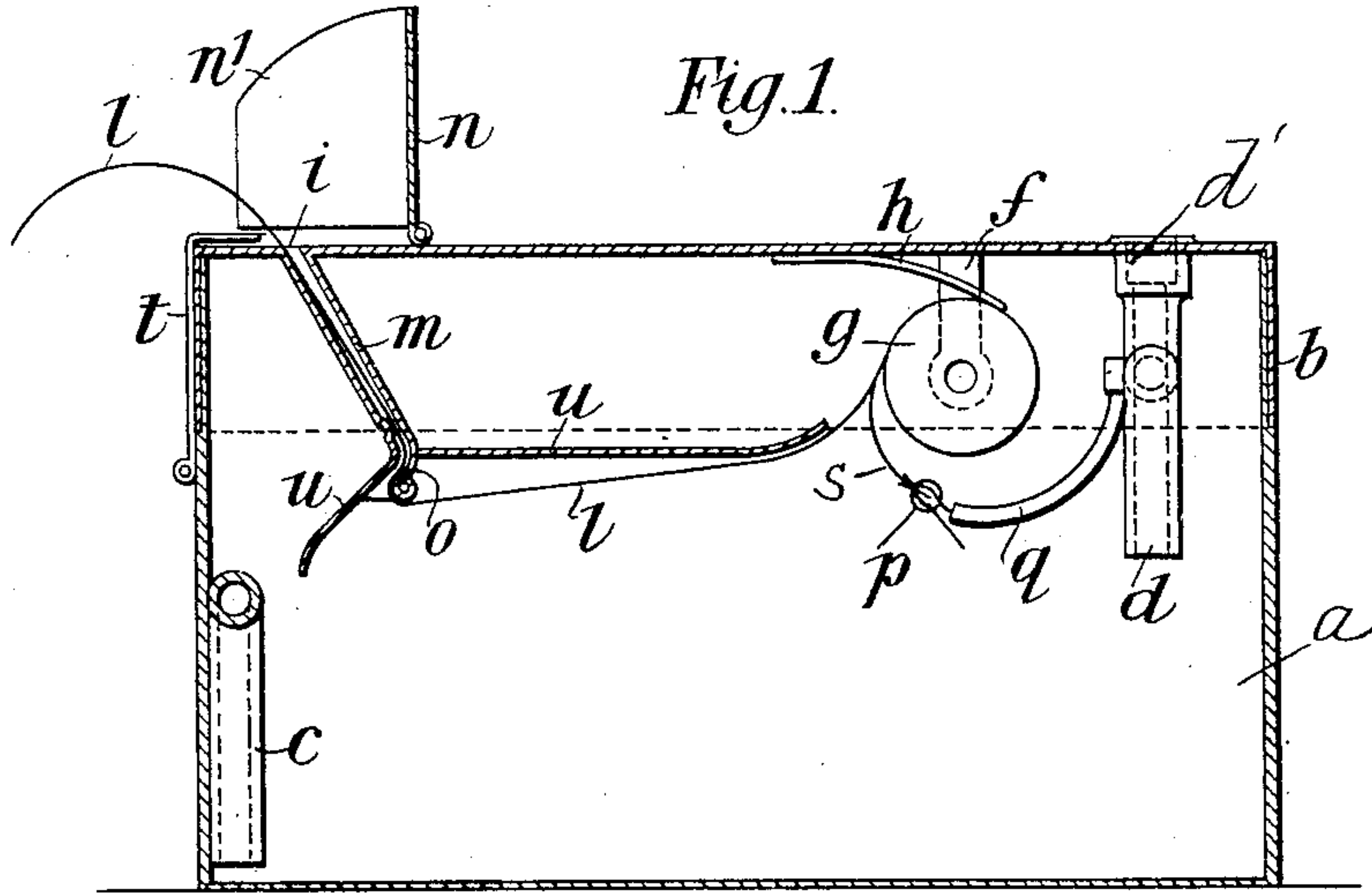
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APPARATUS FOR DEVELOPING AND FIXING CARTRIDGE PHOTOGRAPHIC FILMS.

(Application filed Feb. 3, 1902.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES

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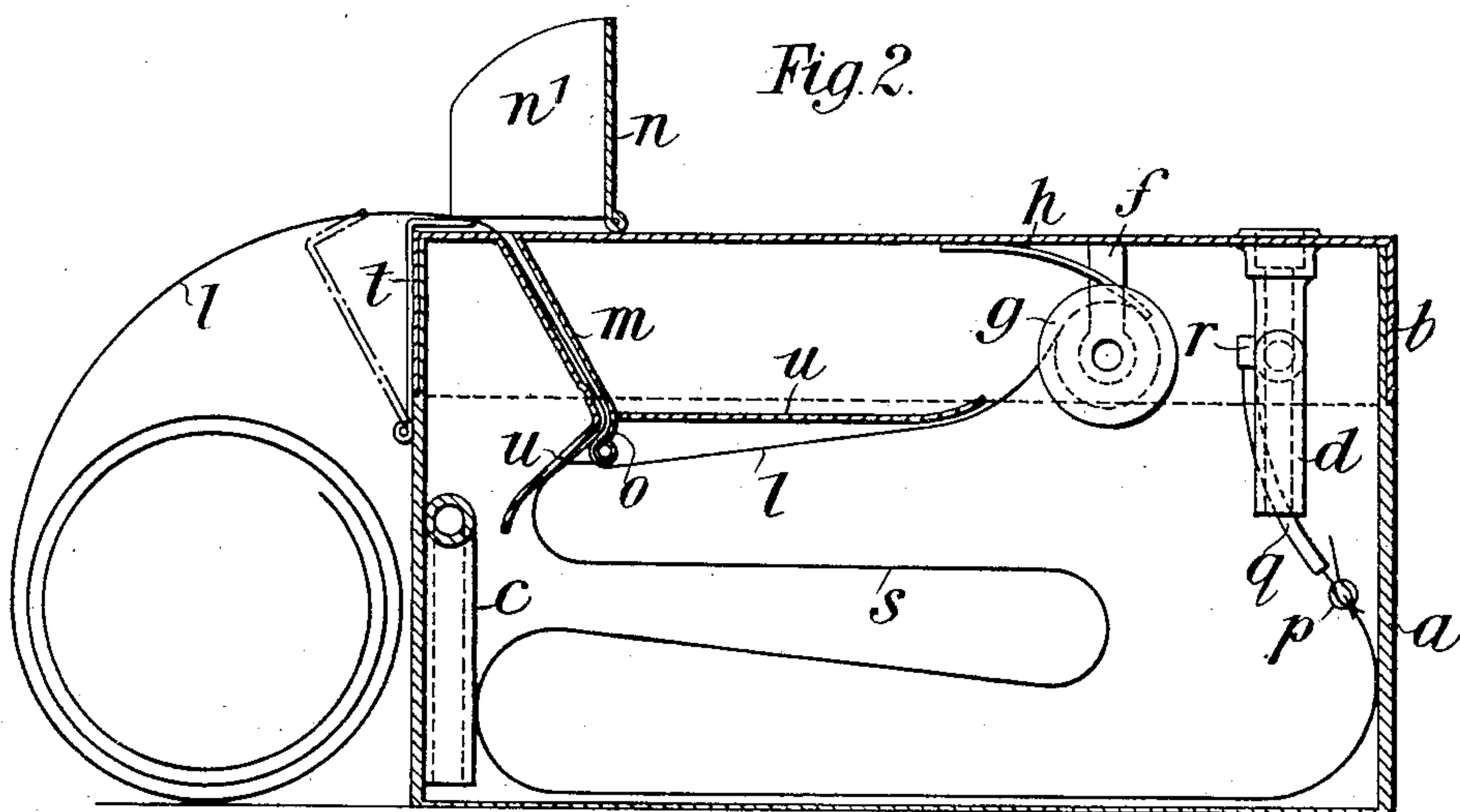
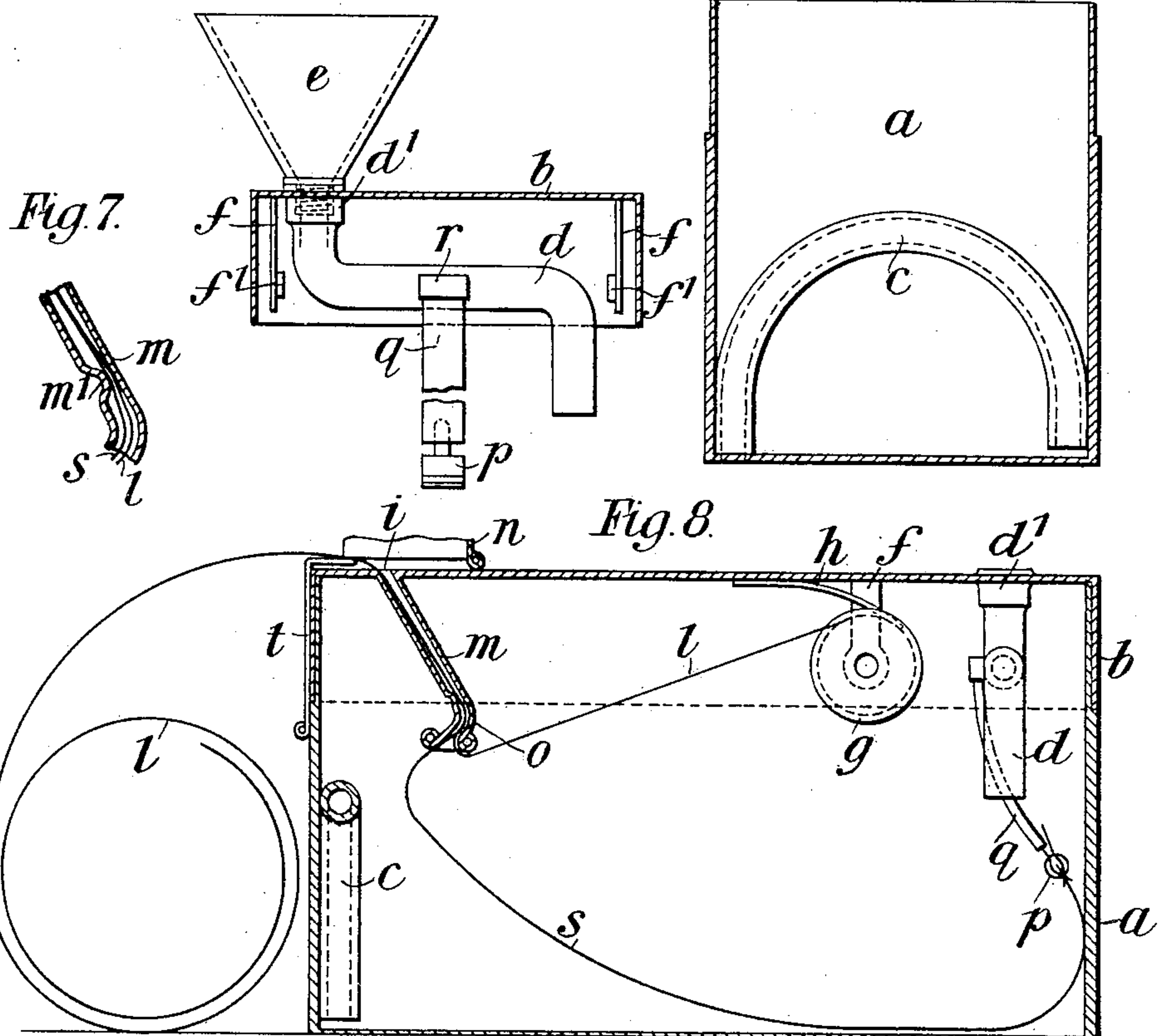


Fig. 5.

Fig. 6.



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# UNITED STATES PATENT OFFICE.

MAX REICHERT, OF LONDON, ENGLAND.

APPARATUS FOR DEVELOPING AND FIXING CARTRIDGE PHOTOGRAPHIC FILMS.

SPECIFICATION forming part of Letters Patent No. 706,852, dated August 12, 1902.

Application filed February 3, 1902. Serial No. 92,418. (No model.)

*To all whom it may concern:*

Be it known that I, MAX REICHERT, traveler, a subject of His Majesty the King of Great Britain and Ireland, residing at 11 Burgoyne road, South Norwood, London, England, have invented certain new and useful Apparatus for Developing and Fixing Cartridge Photographic Films; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object of this invention, which relates to means or apparatus for developing and fixing cartridge photographic films for daylight loading, is to enable an exposed cartridge-spool arranged within a developing-box made light-tight by a detachable lid or cover to be unrolled and its film suitably exposed or extended for development after the box has been closed and without admitting light by the single operation of drawing the backing-paper from off the spool. The same light-tight developing-box is also adapted for fixing and washing the developed films, as will hereinafter appear, means being provided for introducing and drawing off liquids without admitting light to the box. My invention permits a film many times the length of the box to be extended in the latter ready for development, as will hereinafter appear. The well-known principle of time development is adopted—viz., that for a given actinometer-measured exposure and a given strength of developer a certain time of development is needed. My invention renders it unnecessary for the operator to enter a dark room, and he can perform the developing and subsequent operations while in daylight or other actinic light.

According to my invention the exposed spool-cartridge is arranged across the upper part of the developing-box aforesaid in a convenient holder and is unrolled when the box is closed by drawing off its backing-paper through a slot provided near the upper part of the box and furnished with a light-excluder. By this means the object aimed at may be attained—viz., to draw off or unroll the backing-paper without admitting light to the box and to keep it at the

same time clear of the lower portion or developing-space of the latter. The spool is so placed in its holder that the film unrolls downward as the backing-paper is drawn off, and a device for holding or engaging the free end of the film is provided, whereby as the latter is unrolled from the spool it is prevented from recurving into a spiral and caused to descend into and settle in the developing-space of the box in a more or less extended condition, which allows the developing and other solutions to have free access to all parts of its surface. The developing and other solutions or liquids are introduced through a funnel, (which may be detachable,) said funnel communicating with the interior of the box by a pipe or passage which is bent or made tortuous, so as to form a light-trap, and an ordinary draw-off siphon-tube is also provided for emptying the box.

In order that my invention may be clearly understood, I will now describe apparatus constructed and arranged in accordance therewith, having reference to the annexed drawings, in which similar letters refer to corresponding parts in all the figures, and wherein—

Figure 1 is a sectional side elevation of such apparatus, showing the exposed cartridge-spool adjusted ready for the film to be unrolled by drawing off the backing-paper. Fig. 2 is a similar view showing the film fully unrolled. Fig. 3 is a plan of the apparatus. Fig. 4 is a plan view of the under side of the lid, Fig. 1. Fig. 5 is a cross-section of the lid, showing the funnel and inlet-pipe, the spool-holder, and the film-clip. Fig. 6 is a cross-section of the box-body, showing the draw-off siphon. Fig. 7 is a detail; and Fig. 8 is a view of similar character to Figs. 1 and 2, showing slightly-modified apparatus suitable for the development of films of short length.

*a* is the body of the developing-box, from which all light is excluded by the detachable closely-fitting lid *b*.

*c* is the draw-off siphon, of ordinary construction, and *d* the inlet-pipe, which is bent or cranked to exclude the passage of light. A detachable filling-funnel *e*, Fig. 5, may screw into a socket *d'* on the end of said in-



let-pipe, or the latter may lead from a well sunk in the lid, as considered preferable.

The spool-holder arranged at the upper part of the developing-box, so as to be clear of the developing-space, comprises two spring-arms  $f$ , attached to the lid and provided with short trunnions  $f'$ , Fig. 5, adapted to enter the bore of the spool  $g$ , which is sprung into position between said arms. A spring  $h$  is preferably provided, adapted to bear lightly on the circumference of the spool, so as to resist the natural tendency of the latter to uncurl and keep it closely coiled.

Transversely of the lid  $b$  is formed the slot  $i$ , Fig. 3, which is of sufficient length to permit the passage through it of the backing-paper  $l$  of the cartridge. From the slot  $i$  aforesaid a tube  $m$ , of flat rectangular section, like a wick-tube, leads downward, and the backing-paper passes up this tube on its way to the exit-slot  $i$ .

$n$  is a safety-flap hinged to the lid and having side cheeks  $n'$ . This flap may be folded down over the exit-slot  $i$ , so as to exclude light therefrom, and may be held in its closed position by the hinged clip-piece  $t$ . As an additional security against any ray of light entering the box through the tube  $m$  I preferably bend round the lower end of the latter, so as to provide a flange or light-baffle  $o$ , which lying across the line of the tube absolutely prevents the entrance of any light-rays when the backing-paper is passed over it and up the tube, since the backing-paper then seals the space between the flange  $o$  and the tube-mouth.

$p$  is a small clip of any suitable construction, preferably arranged to open by compression and close by spring action and adapted to grip the free edge of the film  $s$ . This clip is secured to one end of a flexible attachment or band  $q$ , of which the other extremity is suitably attached to some part of the lid. In the drawings it is shown as held in a clip or socket piece  $r$ , fixed to the side of the inlet-pipe  $d$ . The clip attachment  $q$  must be of sufficient length to permit the clip  $p$  to be applied to the film edge when just sufficient has been unrolled to take hold of.

The apparatus is used in the following manner: The lid having been removed from the box, the exposed cartridge-spool is sprung into position between the arms of the spool-holder. The backing-paper  $l$  is then partially unrolled, and its end is passed over the edge of the flange  $o$ , up the tube  $m$ , and out of the exit-slot  $i$ . The spool must be so placed in the holder that the unrolled backing-paper will be above the film or nearest the lid, Fig. 1. The backing-paper is drawn through the exit-slot  $i$  until the end of the film  $s$  just appears, and the clip  $p$  is applied to said end. Since a waste margin is always left at the end of the film, the exposure of the extreme end to actinic light is of no consequence. The box should now be filled with water to just

below the level of the top of the siphon  $c$  and the lid replaced. The arrangement of the film and backing-paper at this period is clearly seen in Fig. 1. The safety-flap  $n$  may now be closed down over the slot  $i$ . The backing-paper  $l$  is then carefully drawn out through said slot as far as possible, and the film  $s$ , held at its end by the clip  $p$ , descends face upward to the bottom of the box, folding over on itself in a series of loops as it unrolls. (See Fig. 2.) It will thus be seen that the single operation of drawing off the backing-paper causes the film to arrange itself in the box in a more or less extended condition ready for development. The junction of the film and the backing-paper will be just within the tube  $m$ , (see Fig. 7,) hereinafter more fully referred to. The water is now siphoned off by tipping the box so as to start the siphon, and a sufficient quantity of developing solution is introduced through the funnel  $e$ . The box is now rocked broadwise and lengthwise, so as to cause the developer to flow across and along the film until development is completed, when the developer is siphoned off and the film may be washed or rinsed by placing the funnel  $e$  under a running tap. Finally, the box having been again emptied, fixing solution is introduced and the box rocked until fixation is complete. The lid  $b$  may now be lifted off and the negative examined. The box may then be utilized for the final washing in the manner described with reference to the washing before fixation.

The end of the film is usually connected with the backing-paper by a strip of adhesive paper, and to avoid all risk of this connecting-strip becoming detached by the action of the liquids and perhaps falling on the surface of the film I have devised the following arrangement, see detail Fig. 7:

Across the side of the tube  $m$ , near its lower end, I form an inwardly-projecting rounded rib  $m'$ , as by indenting said tube. The space between the face of the rib and the opposed surface of the tube is only just sufficient to permit the backing-paper to pass freely, so that when the adhesive connecting-strip arrives at this point it will there be nipped or jammed, and even should the adhesive connecting material give way it will not be liable to drop. The flange or light-baffle  $o$  also forms an additional safeguard against the dropping of the adhesive connecting-strip into the box. The said rib  $m'$  also serves as a stop to indicate to the operator when the film has been drawn out far enough.

To prevent the unrolled film from rising to the top of the box out of the reach of the developer and to keep it reasonably near the level of the latter, I preferably provide guard plates or fingers  $u$ , arranged to effect this. These guard plates or fingers may be conveniently attached to the lower end of the tube  $m$ . (See Figs. 1 and 2.)

Where the length of the film does not greatly



exceed that of the box—as in the case of two-exposure films, for example—the film will lie in the box in a single loop, somewhat as shown in Fig. 8, in lieu of in a series of loops, as shown in Fig. 2. In this case guard plates or fingers, such as *u*, are unnecessary. The box might obviously be made much shallower than represented in Fig. 8 when designed for use with these short films, and may even be carried in the pocket.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. In combination, a light-tight box, a spool-holder in the upper part of said box, means whereby the backing-paper may be drawn off from the spool without admitting light to the box and in a direction substantially horizontally and at the upper part of the box, and a device within the developing-box for holding the free edge of the film while that portion of the film intermediate of its ends is being drawn from the spool, the said box having a space beneath the plane of the spool and the drawing-off means to allow the film to fall from said plane into position to be acted on by the developer, substantially as described.

2. A developing-box having a spool-holder therein, a device within the box for holding the outer or free end of the film and means whereby the backing-paper may be drawn off to thus draw off also the main body portion

of the film while both its ends are held one on the spool and the other by the said device, substantially as described.

3. Apparatus for the purpose set forth, comprising a box and a lid wherein is a light-trapped aperture through which the backing-paper may be drawn out, a spool-holder within the box, a clip adapted to grip the free edge of the film close up to the spool, and means for introducing and drawing off liquids without admitting light to the box, both the spool-holder and the clip aforesaid being carried by the lid, whereby the arrangement of the spool for development and its removal after treatment is facilitated, as specified.

4. In apparatus or means for the purpose set forth, the combination of a box made light-tight by a lid wherein is a slot, a tube leading to said slot through which tube and slot the backing-paper is drawn out, a light-baffle to said tube, a clip connected with the lid by a flexible attachment and adapted to be placed on the free edge of the film close up to the spool, and means for introducing and drawing off liquids without admitting light, as specified.

In testimony whereof I affix my signature in the presence of two witnesses.

MAX REICHERT.

Witnesses:

A. E. ALEXANDER,  
A. DIGGLE.