To all whom it may concern:

Be it known that I, GEORGE HANLON, a citizen of the United States, residing at Shawneetown, Illinois, have invented a certain new and useful Improvement in Developing and Fixing Tanks for Photographic Films, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

My invention relates generally to photography and more particularly to a tank for developing, washing and fixing roll films.

The principal object of my invention is to provide a comparatively simple apparatus with which roll films can be easily and quickly developed and fixed, said apparatus being very compact so that it will occupy comparatively little space when packed for transportation and which apparatus is provided with means which will permit the developing, the fixing and the washing operations to be practised in daylight, thereby doing away with the necessity of a dark room in which to completely finish the development of the films.

A further object of my invention is to provide a film carrier, or holder, with means which support the film in proper position while the same is in the tank and which supporting means can be readily unfolded or swung outward from the holder in order to facilitate the removal of said film from said holder.

With the foregoing and other objects in view, my invention consists in certain novel features of construction and arrangement of parts, hereinafter more fully described, claimed and illustrated in the accompanying drawings in which—

Figure 1 is a vertical section taken through the center of a developing and fixing tank of my improved construction.

Fig. 2 is a perspective view of the film holding frame removed from the tank, said frame being inclosed within a flexible light-proof sleeve or cover.

Fig. 3 is a plan view of the tank, a portion thereof being in horizontal section and the light-proof covering removed.

Fig. 4 is a vertical sectional view of the film carrier with parts thereof swung outward into position to facilitate the removal of the film.

Fig. 5 is a vertical section taken through the upper portion of my improved tank.

Fig. 6 is a vertical section of a modified form of the film carrier.

Referring by numerals to the accompanying drawings, 10 designates the body of a container or tank preferably constructed of sheet metal, the upper portion 11 of which is slightly enlarged, and there being a horizontal shoulder 12 formed between the body and said enlarged upper portion.

The upper portion of one of the walls of the enlarged upper end 11 is cut away to form an opening 13.

The film holder or carrier which is removably positioned in tank 10 comprises a rectangular box-like structure 14, preferably formed of sheet metal and depending from the end portions thereof are legs 15 preferably formed of sheet metal.

Formed in the bottom of the member 14 and between the legs 15 is an opening 16, and supported by the end walls of member 14 immediately above the center of this opening is a rod 17 upon which is loosely mounted a roller 18.

Removably positioned in the upper end of member 14 is a box 19, preferably of sheet metal, and extending upward from the center thereof is a funnel shaped member 20, through which the developing and the fixing solutions are poured when delivered into the tank.

Formed in the bottom of the box 19 and near the ends thereof are openings 21, and located within said box between these openings and the lower end of the funnel 20 are transversely disposed baffle plates 22, which are for the purpose of preventing light from passing between the open lower end of funnel 20 and the openings 21 while the tank is in use.

The upper portion of one of the side walls of the box 19 is cut away to accommodate the corresponding side of box 19 and arranged at the lower side of this cutaway portion is a pair of strips 23 of flexible material such as felt and the space between these strips serves as an opening through which the paper backing strip of the film and the cords which draw the film over the film carrier or holder pass when the film is unwound from the spool.

Pivotedly connected by means of rivets 24 to the lower portions of legs 15 are swinging legs 25 and connected to the ends there-
of by means of a rod 26 is a second pair of swinging legs 27. The ends of this last mentioned pair of legs are connected by a rod 28 upon which is mounted a roller 29.

Loosely mounted upon rod 26 is a roller 30.

Fixed to legs 15 near their upper and lower ends are the lower ends of spring arms 31 and fixed to the outer ends of corresponding pairs of these springs are horizontally disposed rods 32.

When the film holder or carrier is positioned in the tank, these rods bear directly against the inner faces of the side walls of tank 10, as seen in Fig. 1 and when said film holder is removed from the tank these rods move outward under the influence of the springs to hold the flexible light-proof cover away from the legs 15 and the unrolled film which is carried between said legs.

Arranged between the lower ends of legs 15 are rods 33 and loosely mounted thereon are rollers 34.

A flexible light-proof cover 35 in the form of an elongated sleeve or tube is adapted to be used in connection with the tank and when this sleeve is applied to the tank one end is secured by means of a string a around the lower end of funnel 20. From thence the body of said light-proof cover extends downward to the lower end of tank 10, thence upward and its end is secured in any suitable manner to the body of tank 10 immediately beneath shoulder 12.

Arranged within this cover and secured thereto in any suitable manner are rectangular loops or rings 36 of metal or like material, which are for the purpose of preventing the cover from collapsing and stripping against the film when the film holder or carriage is elevated from the tank, which action is necessary for the change of solutions necessary for the proper development of the film.

At a point on this sleeve or cover, when positioned on said carrier immediately below the lower end of the legs 15 is a drawing string 37 to be used to close the sleeve below the end of the film holder or carriage when it is elevated above the end of tank 10 to exclude the light from the film when the lower end of the sleeve is detached from the tank 10 as shown in Fig. 2.

The numeral 37 designates the used spool or cartridge upon which the photographic film 38 and the usual light excluding backing strip 39 are wound.

The means utilized for pulling the film in position on the holder or carriage as the film is unwound comprises a suitable gripper 40, the jaws of which are adapted to engage the free end of the film and attached to each end of said gripper 40 is a cord 41.

In the use of my improved developing and fixing tank the various parts thereof are assembled in the relative positions seen in Fig. 1, with the roll of film to be developed located within box 14 to one side of roller 18.

Before the film spool or cartridge is positioned within box 14 the paper backing is unwound until a short piece of the free end of the film is exposed. The jaws of the gripper 40 are then firmly attached to said end of the film, the end of the backing strip is passed under roller 18 and thence out through opening 23, and the cords 41 are passed down through the opening 16 in bottom of box 14 and the spool or cartridge is dropped into position in box 14. The free ends of cords 41 are pulled down immediately adjacent to legs 15 under rollers 34, thence up and over roller 30, thence down and under roller 29, thence up through opening 16 in bottom of box 14 and out through the opening between the flexible strips 29, with the backing strip.

After the cords and backing strip are thus arranged and the film holder positioned in the tank, the operator engages the outer ends of cords 41 and the end of the backing strip and pulls said cords and backing strip simultaneously and as a result the film is unwound from the spool 37 and said film is drawn downward beneath rollers 34, thence upward over roller 30, thence downward beneath roller 29, and thence upward to a point near upper roller 30, and as a result the entire length of the film or so much thereof as the operator may desire to develop is in position for the action of the developing and fixing solutions.

When the film is in position on the holder or carrier, the developing solution is poured into the funnel 20 and after passing through the spaces between baffle plates 22, said solution discharges through apertures 21, and passes thence through opening 16 down along the folds of the film into the body of the tank 10, thus subjecting every part of the film to the action of the fluid at practically the same moment.

The flexible cover 35 is secured to the lower end of funnel 20 as shown in Figs. 1 and 2 and when the film has been left in the developing solution the required length of time, the operator then lifts the film holder comprising members 14 and 19 and parts carried thereby from the tank 10 until the lower ends of legs 15 are in a plane above the top of said tank and the body of the flexible cover is now brought together and tied at a point beneath the lower ends of said legs. The lower portion of said cover may now be disengaged from tank 10.

Thus, the upper portion of the cover wholly incloses the film holder and excludes the light from the film and while in this condition, the rings 36 and spring-carried rods 32 prevent the flexible cover from com-
ing in contact with the film which is sup-
ported between legs 15.  
The film thus inclosed within the flexible
cover may be properly washed by permit-
ting running water to flow freely through
the funnel 20 over the film, or it may be
placed in a larger vessel of water.

In positioning the film holder in the tank
to complete the development of the film,
the lower end of the sleeve or cover is put
over the upper end of tank 10 and securely
fastened, after which the tie is removed from
the central portion of the flexible cover and
the film holder is again positioned within the
tank.

The fixing and subsequent washing opera-
tions are similar to the developing opera-
tions.

After the fixing operation has been con-
cluded, the upper end of the cover is de-
tached from funnel 20 and dropped down
over the tank and the film holder is now re-
moved from said tank.

After the film is developed and fixed it can
be readily removed from the holder by
swinging the legs 26 and 27 outward into
position seen in Fig. 4 and disengaging the
gripper from the two cords, which will per-
mit the film to be removed from the holder
to be dried in any suitable manner.

In the modification illustrated in Fig. 6,
the folding legs 25 and 27 are dispensed with
and the film when unrolled extends from the
spool downward around a single roller 42
located between the lower ends of legs 15
and thence upward to a point near the top
of tank 10.

Where this construction is employed, the
tank is necessarily much longer than the
form of tank which utilizes folding legs.

My improved developing tank is compara-
tively simple, can be made very compact so
as to occupy little space when packed for
storage or transportation, and eliminates
the necessity for a dark room or the like in
which to perform the developing and fixing
operations.

It will be readily understood that minor
changes in the size, form and construction
of the various parts of my improved devel-
oping tank can be made and substituted for
those herein shown and described, without
departing from the spirit of my invention,
the scope of which is set forth in the ap-
pended claims.

I claim:

1. In a developing tank, the combination
with a tank body, of a roll film carrier re-
movably positioned in said body, pivotally
connected folding legs on said carrier, roll-
ers on said legs, means for unwinding the
film and drawing the same around the rollers
on said legs, and a flexible light-proof cover
adapted to be secured to the film carrier and
to inclose the same when withdrawn from
the tank.

2. In a developing tank, the combination
with a tank body, of a roll film carrier re-
movably positioned in said body, pivotally
connected folding legs on said carrier, roll-
ers on said legs, means for unwinding the
film and drawing the same around the rollers
on said legs, a flexible light-proof cover
adapted to be secured to the film carrier and
to inclose the same when withdrawn from
the tank.

3. In a developing tank, the combination
with a tank body, of a roll film carrier re-
movably positioned in said body, pivotally
connected folding legs on said carrier, roll-
ers on said legs, means for unwinding the
film and drawing the same around the rollers
on said legs, a flexible light-proof cover
adapted to be secured to the film carrier and
to inclose the same when withdrawn from
the tank.

4. In a developing tank, the combination
with a tank body of a roll film carrier re-
movably positioned in said body, means
pivotedly mounted on said carrier for sup-
porting the unwound film, and a flexible
light-proof cover adapted to be secured to
the film carrier for inclosing the same when
it is removed from the tank.

5. In a developing tank, the combination
with a tank body, of a roll film carrier re-
movably positioned in said body, means
pivotedly mounted on said carrier for sup-
porting the unwound film, a flexible light-
proof cover adapted to be secured to the film
carrier for inclosing the same when it is
removed from the tank, and a plurality of
rings secured to the body of said cover for
holding the same in extended condition.

6. In a device of the class described, a
tank, a roll film holder removably positioned
in said tank, resilient members projecting
outwardly from both sides of said film-
holder for engaging the walls of the tank
and holding said holder in a central position
within said tank, pairs of pivotally con-
ected legs hinged to said film holder, and
film supporting rollers loosely mounted on
said legs.

7. In a device of the class described, a
tank, a roll film holder removably positioned
in said tank, pairs of pivotally connected
legs hinged to said film holder, film sup-
porting rollers loosely mounted on said legs,
and a flexible light-proof cover adapted to
be connected to the tank and to the film
holder for inclosing the same when removed
from the tank.

8. In a developing tank, the combination
with a tank body, and a film carrier remov-
ably positioned therein, of a flexible cover
adapted to be secured to the carrier and tank
for inclosing said carrier when the same is
removed from the tank and means for pre-
venting the holder from coming in contact
with the carrier and the film carried thereby when said carrier is removed from the tank.

9. In a developing tank, a tank body, a roll film holder removably positioned therein, a pair of legs forming a part of said film holder, and folding film supports pivotally connected to said legs, and means for unrolling the film and drawing the same around said film supports.

In testimony whereof I hereunto affix my signature in the presence of two witnesses, this 19th day of January, 1916.

GEORGE HANLON.

Witnesses:

EARL GALLOWAY,

RAY E. JENKINS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."