

No. 720,708.

PATENTED FEB. 17, 1903.

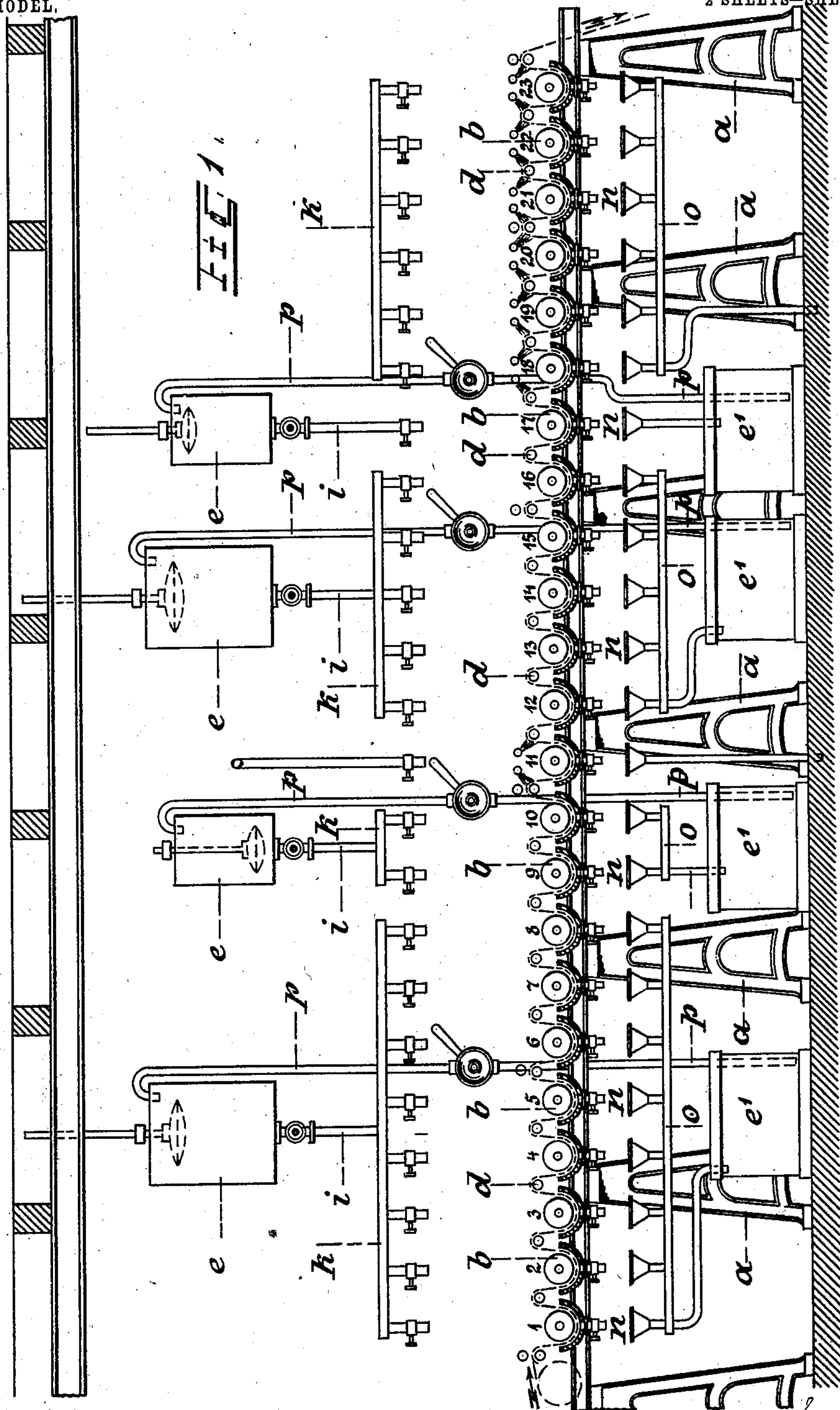
P. LATTA.

APPARATUS FOR DEVELOPING, FIXING, AND TONING KINEMATOGRAPHIC
OR OTHER PHOTOGRAPHIC FILMS.

APPLICATION FILED APR. 7, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses:
J. C. Hebert.
A. Kitt.

Inventor:
Paul Latta.
By *W. H. de Vries.*
Attorney.

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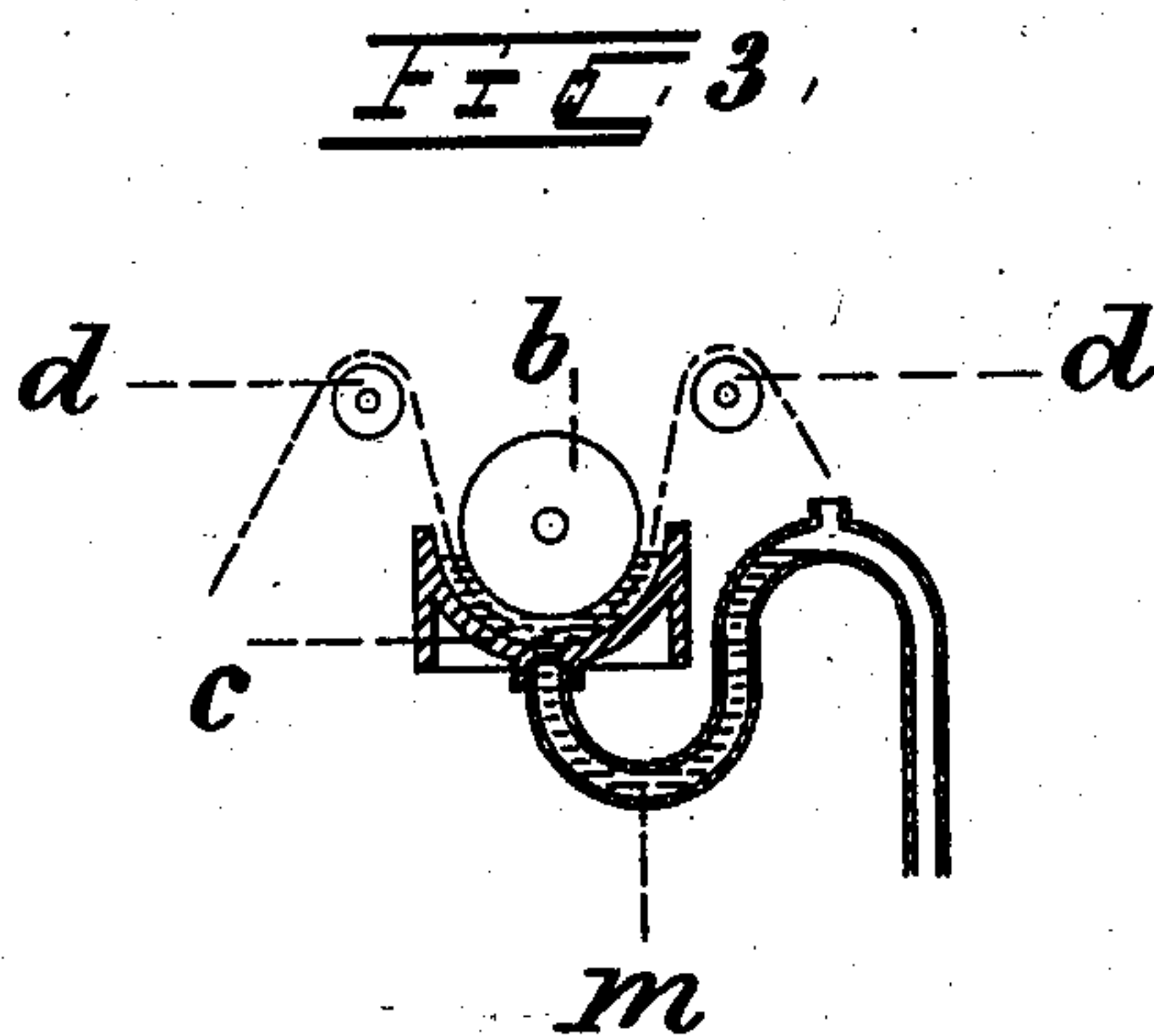
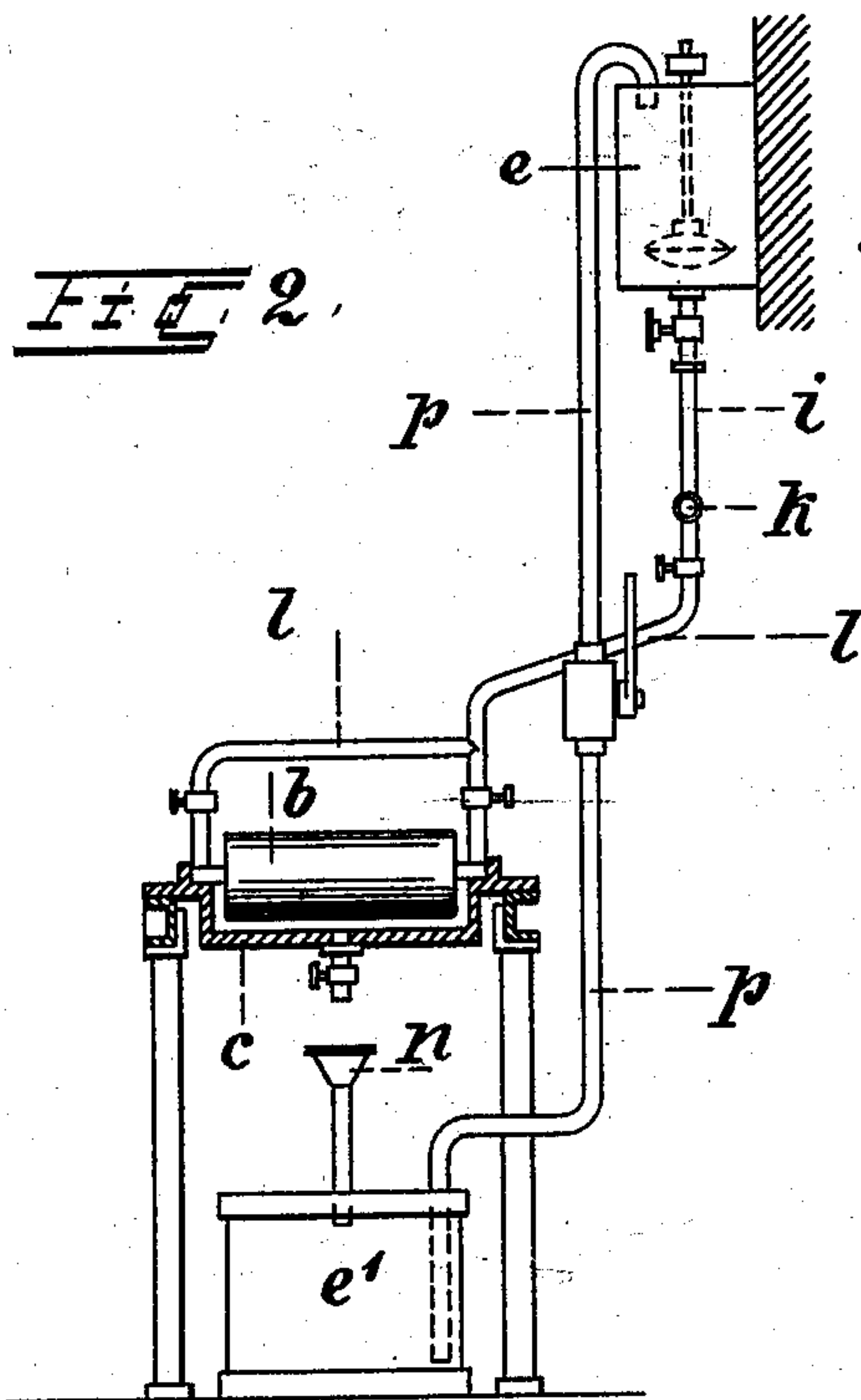
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APPARATUS FOR DEVELOPING, FIXING, AND TONING KINEMATOGRAPHIC
OR OTHER PHOTOGRAPHIC FILMS.

APPLICATION FILED APR. 7, 1902.

2 SHEETS—SHEET 2.

NO MODEL.



Witnesses:
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Inventor:
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UNITED STATES PATENT OFFICE.

PAUL LATTA, OF DRESDEN, GERMANY.

APPARATUS FOR DEVELOPING, FIXING, AND TONING KINEMATOGRAPHIC OR OTHER PHOTOGRAPHIC FILMS.

SPECIFICATION forming part of Letters Patent No. 720,708, dated February 17, 1903.

Application filed April 7, 1902. Serial No. 101,628. (No model.)

To all whom it may concern:

Be it known that I, PAUL LATTA, a subject of the German Emperor, residing and having my post-office address at Pfotenhauerstrasse 16, Dresden A, Germany, have invented certain new and useful Improvements in Apparatus for Developing, Fixing, and Toning Kinematographic or other Photograph Films, of which the following is a specification.

The present invention relates to a new or improved apparatus for developing, fixing, and toning kinematographic and other photographic films, by which not only a considerable saving in developing liquid and the like is effected, but more particularly an entirely uniform action of the bath on the whole length of the exposed strip of film is obtained.

In the annexed drawings, Figure 1 represents a side view of the apparatus; Fig. 2, a front view thereof, and Fig. 3 a section of one of the baths.

In the known machines for developing and otherwise completing films of this nature it is usual to use baths of considerable size, one or two baths for each process to which the strip of film is subjected, the said baths being filled with a large quantity of the liquid in use, which remains therein until used up. The strip of film moving through a large number of windings or passages is caused to pass through the baths. The result of these known processes is that the first part of the strip of film entering the bath finds liquid which has a more powerful effect than the liquid which the latter part of the film finds, and since the strip is moved through the baths at a uniform speed the action of the bath upon it is most powerful at the beginning and then becomes gradually weaker.

According to this invention the strip of film is caused to pass through a series of baths containing only a small quantity of liquid for each stage of the treatment, the liquid being supplied to the baths from a larger reservoir in order to maintain a constant quantity in the baths and then conducted away from the latter immediately. The liquid coming from the baths belonging to one process is collected in one vessel in order to be used again if and when required. It is obvious that by

this means not only a very uniform action of the liquid on the film is obtained, but that a considerable saving of liquid is also effected.

The treatment of a strip of film in baths containing only a small quantity of liquid, which latter is continuously replaced by fresh liquid of the same strength, insures entirely uniform action of the liquid on the strip of film during the use of each charge of the reservoir, and the collecting in a common receiver of the used liquid continuously coming from the baths renders it possible to bring the said liquid to its former strength, if desired, before it is conveyed back to the reservoir and again conducted to the baths, so that a strip of film of any length can be developed, toned, and fixed with perfect uniformity. It is also possible to completely use up the bath liquid.

The regulation of the time occupied by the passage of the film through the baths may be effected by altering the speed with which the film moves or by providing additional baths or removing some of the latter. The latter courses have been adopted in the present apparatus, in which small baths *b* are arranged in series—for instance, 1 to 8, 9 and 10, 11, 12 to 16, 17, and 18 to 23—in a frame *a*. Each of the baths *c* contains a removable roller *b*, with smaller guide-rollers *d* above it. Instead of the small separate vessels under each dipping roller one common elongated vessel can be used for each series of baths. Above each of these series of baths a reservoir *e* is arranged containing liquid for the series in question. The feed-pipe *i*, Fig. 2, from each of these reservoirs is provided with a cock or the like and supplies a horizontal pipe *k*, from which branch pipes *l* pass to the ends of the baths *c*. The liquid conducted to the baths through the pipes *l* passes through an elbow-pipe *m*, the purpose of which is to maintain the desired level of liquid in the baths, and then into funnels *n*, connected with the collecting-pipes *o*, from which latter the liquid flows to the receivers *e'*. The latter are connected by means of delivery-pipes *p* to the respective reservoirs *e*, so that by the operation of pumps the liquids may be forced from the receivers *e'* through the pipes *p* to the reservoirs *e*.

The pumps, of which one is provided for each receiver, may be operated by hand or machinery as soon as floats in the respective receivers operate signaling devices or start
5 driving mechanism.

The apparatus illustrated may of course be modified in various ways, since the nature of the liquids used for the baths depends upon the nature of the film being treated, and, for
10 instance, the elbow-pipes *m* may be connected directly to the collecting-pipes *o* or to the receivers *e'*.

I declare that what I claim is, in apparatus for developing, toning, and fixing kine-
15 matographic and other photograph films—

1. The combination of a plurality of baths arranged in series and provided with inlet and outlet pipes, a supply-reservoir for each series of baths, means of communication be-
20 tween said reservoirs and each separate bath of a series, a receiving vessel for each series of baths, means of communication between each separate bath of a series and said re-
25 ceiving vessels, means of communication between each receiving vessel and its respective supply-reservoir means for raising the liquid from the receiving vessel to the reservoir and means for guiding the films through said
30 baths substantially as described.

2. The combination of a plurality of baths arranged in series and provided with contin-
uously-operative inlet and outlet pipes, a sup-
ply-reservoir for each series of baths having
an outlet-pipe adapted to fill each separate
35 bath of a series, a receiving vessel for each series of baths, a collecting-pipe for each series of baths leading into the receiving vessel of such series, a pipe connecting each receiv-
ing vessel with its respective supply-reservoir

means for raising the liquid from the receiv- 40
ing vessel to the reservoir, and means for guiding the film through said baths substan-
tially as described.

3. The combination of a plurality of baths of small holding capacity arranged in series 45
and provided with continuously-operative inlet and outlet pipes, a supply-reservoir for each series of baths having an outlet-pipe adapted to fill each separate bath of a series, a receiving vessel for each series of baths, col- 50
lecting-pipes provided with a funnel for each separate bath of a series and leading into the receiving vessel of such series, a pipe connecting each receiving vessel with its respec-
tive supply-reservoir, a pump on said pipe, 55
and means for guiding the film through said baths substantially as described.

4. The combination of a plurality of baths of small holding capacity arranged in series 60
and provided with continuously-operative inlet and elbowed outlet pipes, a supply-reservoir for each series of baths having an out-
let-pipe adapted to fill each separate bath of a series, a receiving vessel for each series of
baths collecting-pipes provided with a funnel 65
for each separate bath of a series and leading into the receiving vessel of such series, a pipe connecting each receiving vessel with its re-
spective supply-reservoir, a pump on said
pipe, and rollers mounted in said baths for 70
guiding the film therethrough substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

PAUL LATTA.

Witnesses:

HERNANDO DE SOTO,
PAUL ARRAS.