(No Model.) 3 Sheets—Sheet 1.

E. J. PALMER.

MACHINE FOR APPLYING PHOTOGRAPHIC EMULSION TO PHOTOGRAPHIC PLATES.

No. 313,761. Patented Mar. 10, 1885.

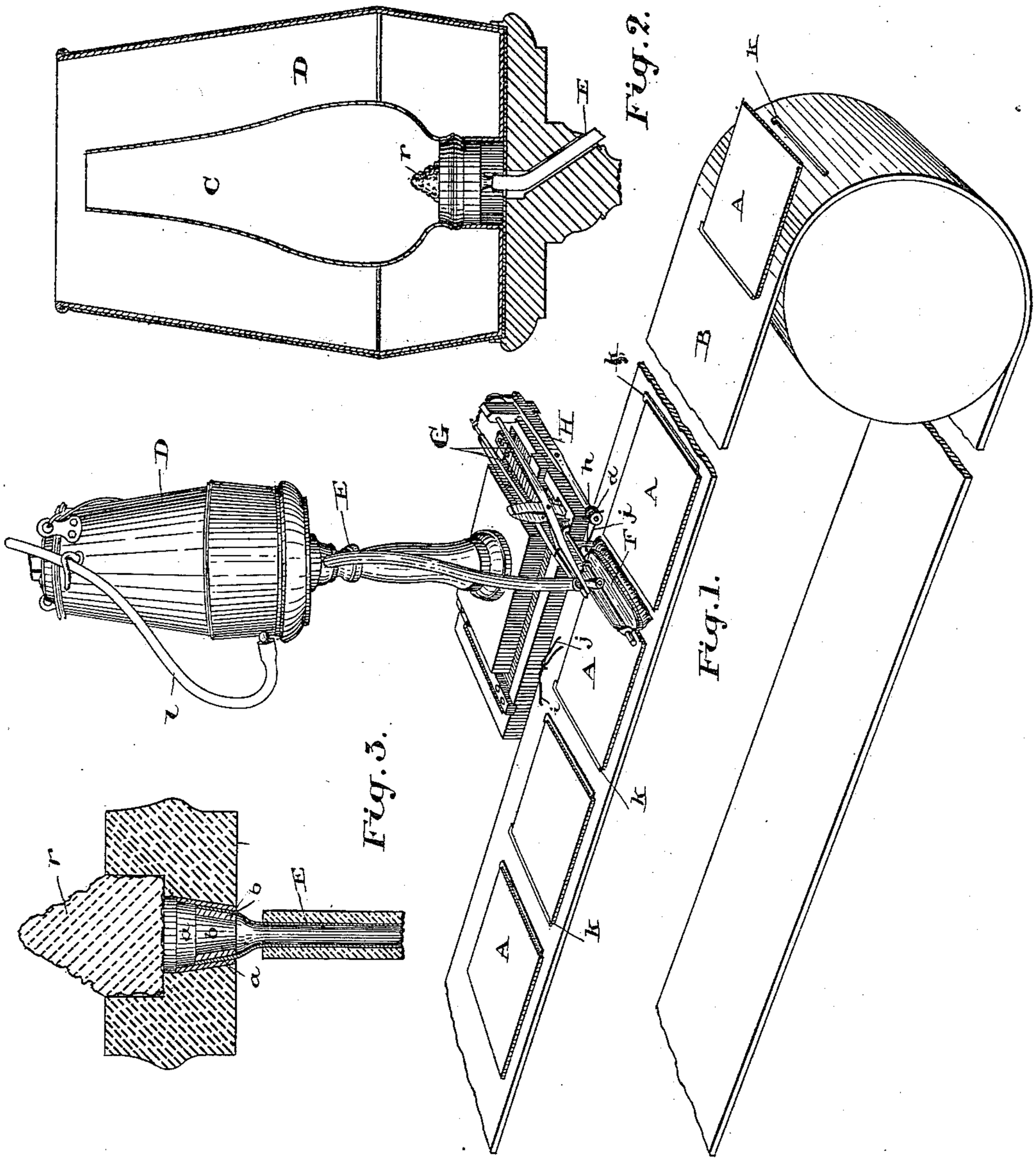

Fig. 1.

Fig. 2.

Fig. 3.

Witnesses.

F. B. Fetherstonhaugh

Jas. P. Maybee

Inventor.

E. J. Palmer

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Attys

(No Model.) 3 Sheets—Sheet 2.

E. J. PALMER.

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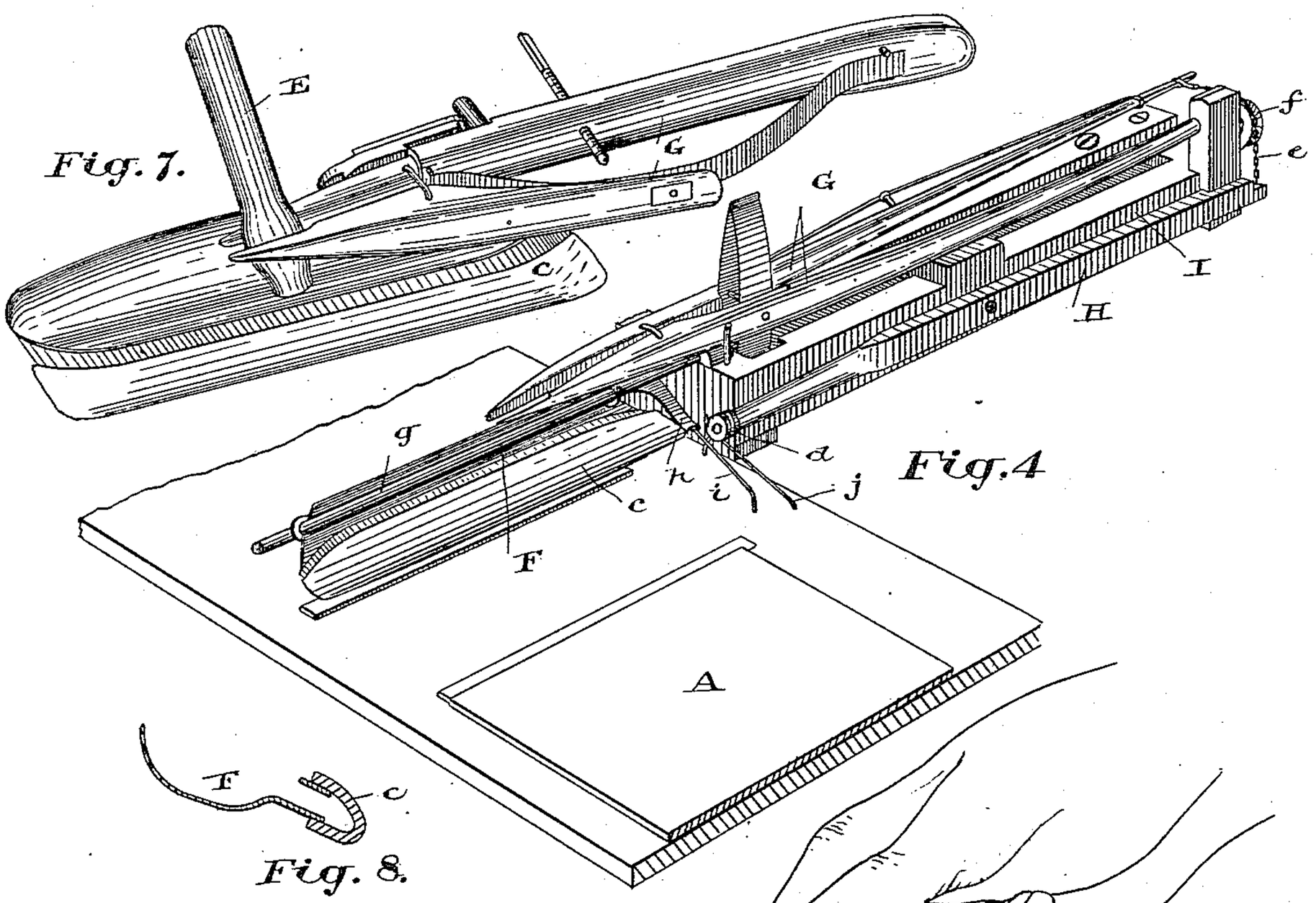

Fig. 7.

Fig. 4

Fig. 8.

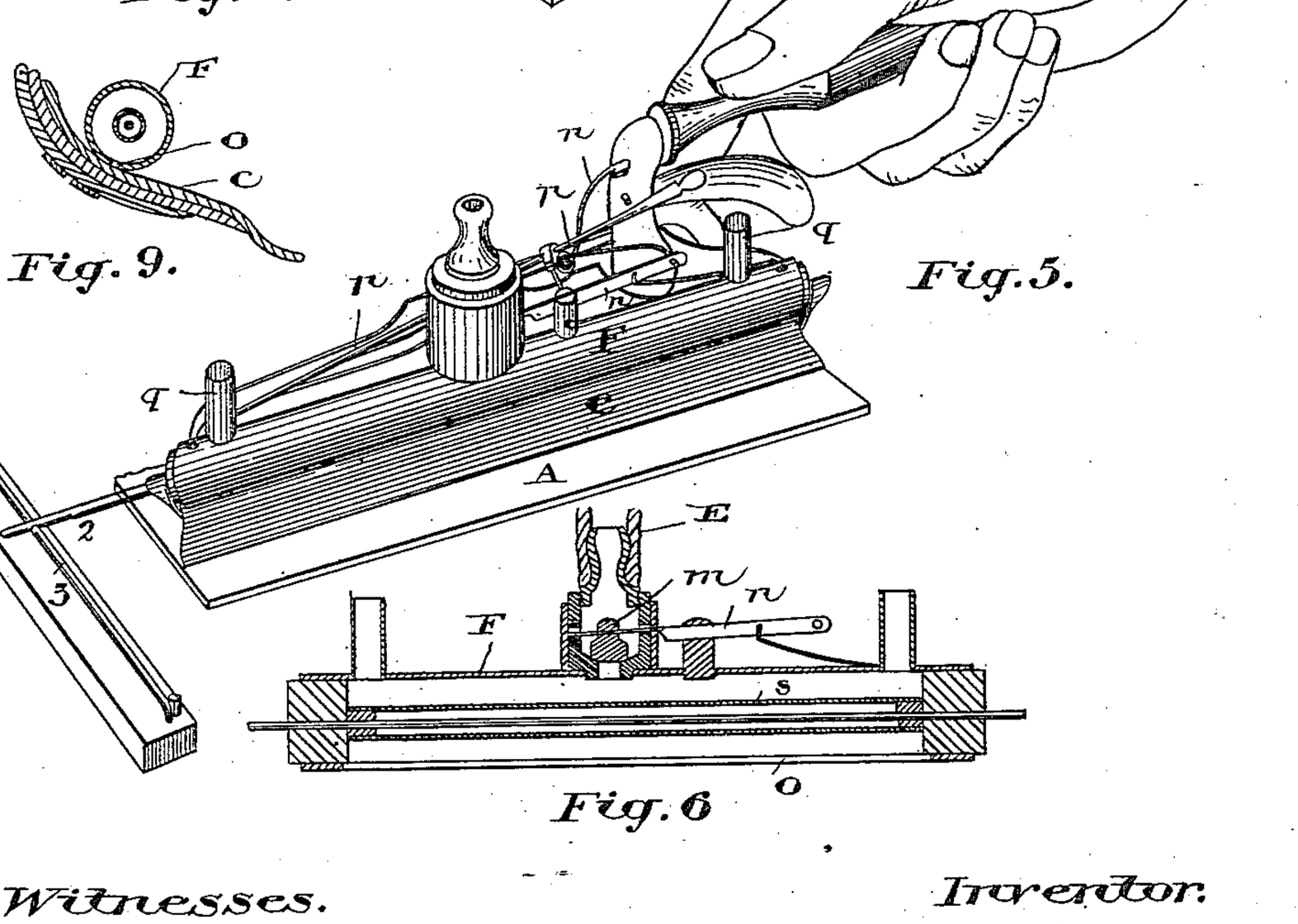

Fig. 9.

Fig. 5.

Fig. 6

Witnesses.

L. B. Fetherstonhaugh

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(No Model.) 3 Sheets—Sheet 3.

E. J. PALMER.

MACHINE FOR APPLYING PHOTOGRAPHIC EMULSION TO PHOTOGRAPHIC PLATES.

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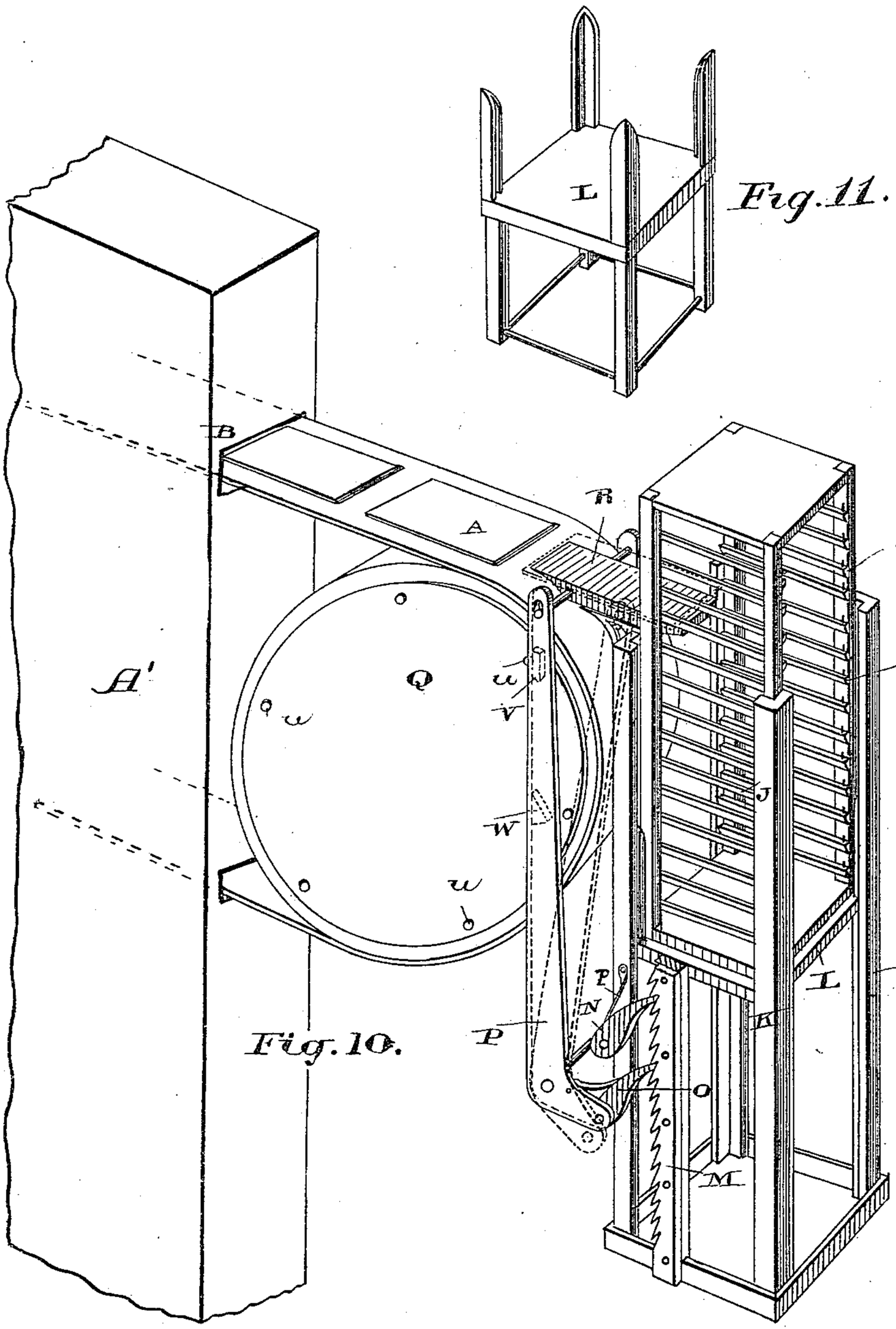

Fig. 11.

Fig. 10.

Witnesses.

F. B. Fetherstonhaugh

Jas. E. Maybee

Inventor:

E. J. Palmer

by Donald C. Ridout & Co

Attys

UNITED STATES PATENT OFFICE.

ELI J. PALMER, OF TORONTO, ONTARIO, CANADA, ASSIGNOR OF ONE-THIRD TO THEODORE SNELL, OF SAME PLACE.

MACHINE FOR APPLYING PHOTOGRAPHIC EMULSION TO PHOTOGRAPHIC PLATES.

SPECIFICATION forming part of Letters Patent No. 313,761, dated March 10, 1885.

Application filed July 7, 1884. (No model.)

To all whom it may concern:

Be it known that I, ELI JOHN PALMER, of the city of Toronto, in the county of York, in the Province of Ontario, Canada, manufacturer of photographic material, have invented a certain new and useful Machine for Applying Photographic Emulsion to Photographic Plates; and I do hereby declare that the following is a full, clear, and exact description of the same.

The object of the invention is to insure an even and regular distribution of emulsion over the face of the plate; and it consists, essentially, of a narrow vessel made substantially the length to correspond with the width of the plate on which the emulsion is to be applied, and provided with a porous apron, or its equivalent, designed to receive the emulsion and distribute it on the plate, substantially as hereinafter more particularly explained.

Figure 1 is a perspective view showing the photographic plates arranged on an endless apron designed to carry them under the distributing-vessel, which is also shown connected to the urn from which the emulsion is obtained. Fig. 2 is an enlarged sectional elevation of the urn and emulsion-reservoir from which the main supply of emulsion is fed to the distributing-vessel. Fig. 3 is an enlarged sectional detail showing the form of connection between the flexible tube leading to the distributing-vessel and the interior of the emulsion-reservoir. Fig. 4 is an enlarged perspective view of the distributing-vessel and its operating mechanism. Figs. 5, 6, and 7 are details of alternative forms of distributing-vessel when designed to be operated by hand. Fig. 8 is a sectional end view of the distributing-vessel shown in Figs. 1, 4, and 7. Fig. 9 is a sectional end view of the distributing-vessel shown in Figs. 5 and 6. Fig. 10 is an elevation of endless belt and rack for receiving the plates. Fig. 11 is a detail of elevator L.

As the object of my invention is to insure an even and regular distribution of emulsion over the face of the plates, it will be seen that this object will be attained by the distributing-vessel—such as I shall hereinafter describe—whether made in the form shown in Figs. 1 and 4 or in the form shown in Figs. 5, 6, and 7.

A represents the plates on which the emulsion is to be applied. These plates are arranged, as shown in Fig. 1, on an endless belt when it is intended to operate the distributing-vessel automatically. This endless belt B is intended to be of sufficient length to carry the plates, after receiving the emulsion, through a drying-room, within which they may be automatically discharged onto a rack arranged to receive them, as hereinafter specified.

C is the emulsion-reservoir contained within an urn, D. The bottom of this reservoir C is open, but is plugged and connected to the flexible tube E in the following manner: The body of the reservoir C is made preferaby of glass, and its open bottom fits over a soft-rubber plug made to fit tightly into a hole made in the bottom of the urn D. As shown in detail in Fig. 3, a hole is pierced through the plug, and a hard-rubber tapered ferrule, *a*, is fitted into the said hole.

b is another tapered ferrule, designed to fit in the side of the mouth of the flexible tube E, so as to expand it and form a bell-mouthed opening from the reservoir C into the tube. When the end of the tube E is inserted into the ferrule *a*, and the ferrule *b* within the mouth of the tube is driven down into the ferrule *a*, a tight and solid joint is formed at the bottom of the reservoir C, and the tube E is at the same time thus rigidly connected to the said reservoir. A piece of sponge, *r*, is inserted in the hole over the ferrules *a* and *b* to form a filter for the emulsion.

It will be noticed that the tube E is covered with a thick outer covering after it leaves the bottom of the urn D. This covering is intended to protect the flexible tube E, and prevent the emulsion cooling as it passes from the reservoir C to the distributing-vessel F.

I should here mention that the urn D is intended to contain hot water of sufficiently high temperature to keep the emulsion within the reservoir C thin enough to flow freely through the tube E.

1 is a flexible tube used to withdraw the water from the urn, which is done by dropping the tube from the position it is shown in in Fig. 1.

As shown in Figs. 1, 4, and 8, the distribut-

ing-vessel consists of an open boat-shaped vessel having a longitudinal slot made in its bottom and covered with an apron, *c*, made of flannel or some other porous material.

G represents a pair of spring-pinchers made to grip the end of the tube E which projects into the distributing-vessel F. The spring in the pinchers G is sufficiently strong to tightly close the end of the tube E and prevent the emulsion from escaping from the tube into the vessel F.

H is a lever pivoted on the base-board I, and having a friction-roller, *d*, on one end which projects over the belt B. The other end of the lever is connected to one of the legs of the pinchers G by the cord or chain *e*, which cord or chain passes over a friction-pulley, *f*, so that the downward motion of that end of the lever H will impart a horizontal movement to the end of the pinchers G, to which the cord or chain *e* is attached. This horizontal movement will, it will be seen, cause the end of the pinchers G, which grip the tube E, to open, and consequently the emulsion within the tube E is permitted to flow into the vessel F during the period that the said pinchers may be held open. The vessel F is journaled or pivoted on the rod *g*, which extends beyond the end of the pinchers G, as shown. The vessel F has also an arm, *h*, so arranged that as the belt B is moved the said arm will come in contact with the elevating-bridge *i*, attached to the belt B, which action causes the vessel F to rock upon the rod *g*, and be held clear of the belt B during the passage of the arm *h* over the said elevating-bridge *i*. A bridge, *j*, is also attached to the belt B, so that it will come in contact with the friction-roller *d*, in order to impart an upward rocking movement to that end of the lever H, and a consequent downward movement to its other end for the purpose of opening the pinchers G during the period that the vessel F is supported clear of the belt B, as specified.

On reference to Figs. 1 and 4, it will be noticed that the plates A are held to the belt B, between projecting lips *k*, and that a distinct space is left between each plate. The bridges *i* and *j* are located at each of these spaces, and are so shaped that the vessel F is raised clear of the belt B, and just sufficient emulsion admitted into the vessel F during the passage of the said space below the vessel F, and the moment that enough emulsion has been admitted into the vessel F the supply is cut off by the closing of the spring-pinchers G, and simultaneously with this action the vessel F is dropped upon the next plate A, which is then swept by the apron *c*, which conveys to and evenly distributes upon the said plate the exact quantity of emulsion required to properly coat it.

From this description it will be seen that when my machine is arranged to work automatically any number of plates A can be evenly and quickly coated with the photographic emulsion without any attention from the operator other than placing the plates upon the belt B. Although I think it will be preferable to thus arrange my machine to work automatically, Figs. 5, 6, and 7 show how it may be operated by hand.

On reference to Fig. 7 it will be seen that the spring-pinchers G grip the end of the tube E exactly in the same manner as already described; but that instead of automatically opening the pinchers they may be opened by squeezing the hand which grips them, the required quantity being admitted into the vessel F by the eye of the oparator, who, when he has filled the vessel, simply draws the apron *c* over the surface of the plate A, thereby conveying the exact quantity required to properly coat the plate, and as the emulsion will flow evenly over the surface of the apron *c* it is therefore evenly distributed over the whole surface of the plate.

In Figs. 5, 6, and 9 I show an alternative form of my emulsion-distributing machine when used by hand. In this form the distributing-vessel F is cylindrical, and a valve, *m*, is placed between the mouth of the flexible tube E and the interior of the vessel F. This valve is opened by the lever *n*, the operator learning by experience the right time to hold the valve open for the purpose of filling the interior of the vessel F. A longitudinal slot, *o*, is made in the bottom of the vessel F, and an apron, *c*, extends from below the said slot, so as to close it when the slot rests against it; but when the cylindrical vessel F is raised by pressing laterally against the lever *p* the slot is opened and permits the escape of the emulsion within the vessel F, which flows down the apron *c* to the plate over which the said apron is drawn.

When the emulsion-distributing vessel F is made in the form shown in Figs. 5, 6, and 9, it may be gripped, as shown in Fig. 5. The operator first pressing on the lever *n*, admits sufficient emulsion from the reservoir C, to which the vessel F should be connected, and after thus filling the vessel the operator draws the apron over the face of the plate, opening at the same time the slot by pressing against the lever *p*, as herein specified. The small tubes *q* permit the escape of air, and thereby allow the emulsion to flow freely into the vessel F.

In Fig. 6 it will be noticed that the vessel F has a tube, *s*, made of glass or any other equivalent material, inserted into its longitudinal center. This tube is intended to retain in a measure the heat of the emulsion poured into the vessel, as the air within the tube is self-contained, and when heated will contribute to the cooling emulsion around it a certain amount of warmth. The capacity of the vessel F can also be regulated by the diameter or length of the tube *s*, for by increasing its diameter the capacity of the vessel F will be reduced; or if the tube *s* is made shorter than

the space within the vessel F, then the capacity of the vessel will be correspondingly increased.

Before concluding my description of the vessel F it will be well to mention here that although it will be preferable to have the vessel of a length corresponding in width to the plates to be treated, it will of course be understood that different widths of plates may be treated with the same instrument, the only change being necessary is to reduce or increase the length of the apron, and to either so regulate the supply of the emulsion or to make provision for increasing or decreasing the capacity of the vessel F, as suggested by the description of the tube *s*. I however consider this, as before stated, simply making the vessel substantially the same length as the width of the plate to be treated.

In Fig. 10 will be found an illustration of the mechanism employed to discharge the plates A from the belt B onto the rack. I might here mention that before the belt B reaches the plate-rack it passes through a refrigerator, A′, (shown in Fig. 10,) so that the emulsion on the plates carried by the belt will be congealed before they reach the plate-rack J, onto which they are finally stacked, which plate-rack is of course located in the drying-room. The plate-rack J is held within a vertical frame, K, so that it may slide vertically within the said frame. The plate-rack J rests upon the elevator L, which is provided with a ratchet-rack, M.

N is a ratchet-pawl pivoted on the frame K, and provided with a spring, *p*, designed to hold the pawl N into gear with the ratchet-rack M.

O is a corresponding pawl provided with a similar spring, but pivoted on a lever, P, which extends up to a point close to the belt B, as indicated.

On the side of the pulley Q around which the belt B passes I place a series of pins, *u*, which are designed to come in contact with the lugs V and W on the lever P. The effect of the contact of these pins with the lug is, first, that when the pin *u* comes in contact with the lug V the lever P is pushed over into the position it is shown in in dotted lines, and as the said pin continues around the said drum it comes in contact on the opposite side of the lug W, pushing the lever back into the position it is shown in in full lines in the figure. This motion of the lever P produces two effects—viz., first, it carries the plates A from the belt B into the plate-rack J, and, secondly, when pushing the lever P back into the initial position, it raises the plate-rack one shelf, ready to receive the next plate. I should here mention that a conveying-table is supported by the lever P, which, it should be stated, is duplicated on the other side of the rack.

The pins *u* are so set on the pulley Q that they do not move the lever P until the plate has first been pushed onto the conveying-table R by the traveling action of the belt B. As soon as this is accomplished the belt comes into action and the lever conveys the table R into the rack, where it drops the plate onto one of the ledges formed in the rack and returns for the next plate.

When the distributing-vessel is to be manipulated by hand, sometimes, as shown in Fig. 5, a guiding-plate (marked 3) is used on which the notched rod 2, attached to the distributing-vessel, slides. This guide enables the operator to carry the distributing-vessel evenly over the face of the plate.

I am aware that it is not new to use a series of belts for conveying photographic plates from a distributing-vessel through a cooling-chamber, and do not claim such, broadly; but, so far as I am aware, it has never been proposed to convey the plates under the distributing-vessel and from thence through a refrigerator by means of one continuous belt.

What I claim as my invention is—

1. In a device for applying emulsion, a narrow vessel made substantially of a length to correspond with the width of the plate on which the emulsion is to be applied, and provided with a porous apron or its equivalent designed to receive the emulsion and distribute it on the plate, substantially as and for the purpose specified.

2. In a device for applying emulsion, a narrow vessel made substantially of a length to correspond with the width of the plate on which the emulsion is to be applied, and having a longitudinal slot made at or near its bottom to permit the escape of the emulsion onto a porous apron through which the emulsion is applied to the plate.

3. A distributing-vessel, F, journaled on the rod *g*, and having an arm, *h*, attached to it, in combination with the bridge *i*, attached to the traveling belt B, substantially as and for the purpose specified.

4. The distributing-vessel F, journaled or pivoted on the rod *g*, and provided with an arm, *h*, the spring-pinchers G, arranged to grip the end of the flexible tube E, and the lever H for operating the said pinchers, in combination with the bridges *i* and *j*, connected to the traveling belt B, substantially as and for the purpose specified.

5. The spring-pinchers G, arranged to grip and close the end of the flexible tube E, and connected, as described, to the pivoted lever H, in combination with the bridge *j*, connected to the traveling belt B, substantially as and for the purpose specified.

6. The distributing-vessel F, journaled, as described, and supplied with emulsion from a flexible tube, E, closed by the pinchers G, in combination with a traveling belt, B, having plates A held on its surface, as described, and bridges *i* and *j*, arranged to operate the vessel F and pinchers G, substantially as and for the purpose specified.

7. An emulsion-reservoir, C, placed within

a hot-water urn, D, and having a flexible tube, E, connected with the bottom thereof, and arranged to convey emulsion to the distributing-vessel F, in combination with the sponge *r*, inserted in a recess in said reservoir C, over the mouth of said tube, substantially as and for the purpose specified.

8. A soft-rubber plug arranged to close holes in the bottoms of the reservoir C and urn D, a hard-rubber tapered ferrule, *a*, inserted in a correspondingly-formed hole in the said plug, in combination with a flexible tube, E, having a hard-rubber tapered ferrule, *b*, inserted in its mouth and forced into the ferrule *a*, substantially as and for the purpose specified.

9. In combination with a device for distributing photographic emulsion on plates, an endless traveling belt, B, having projecting lips *k* and bridges *i i*, placed on the surface, substantially as and for the purpose specified.

10. A horizontal endless traveling belt, B, having projecting lips *k*, placed on its surface for holding the plates A, in combination with a traveling shelf placed at the turning-point of the endless apron, and arranged substantially on a level with the top of the belt to receive the plates A, substantially as and for the purpose specified.

11. An endless apron, B, having projecting lips *k*, to retain in position the plates A, in combination with a rack, K, arranged to hold a series of shelves, and automatically operated so as to bring an empty shelf before each plate, substantially as and for the purpose specified.

12. In a machine for applying photographic emulsions, the combination of a distributing-vessel, as F, refrigerator, as A′, rack K, and a traveling belt, B, arranged to convey the photographic plates under the distributing-vessel, and from thence through said refrigerator, and deliver them to said rack, substantially as and for the purpose specified.

13. The combination of an endless traveling belt, movable plate-rack, and a reciprocating conveyer-table situated intermediate of said belt and rack, substantially as described.

Toronto, June 19, 1884.

E. J. PALMER.

In presence of—
CHARLES C. BALDWIN,
DONALD C. RIDOUT.