No. 684,282. Patented Oct. 8, 1901.

A. MASSON & R. SCOTT.

PAPER COATING APPARATUS.

(Application filed July 19, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

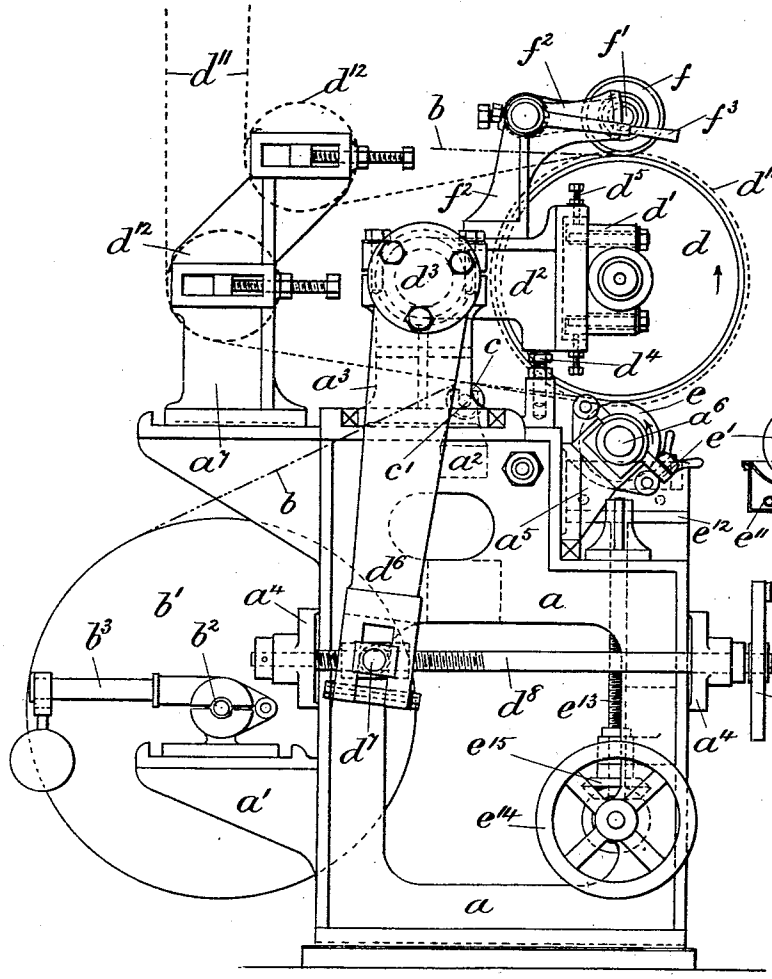
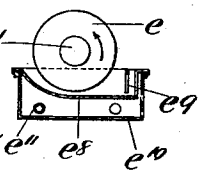


Fig. 4.



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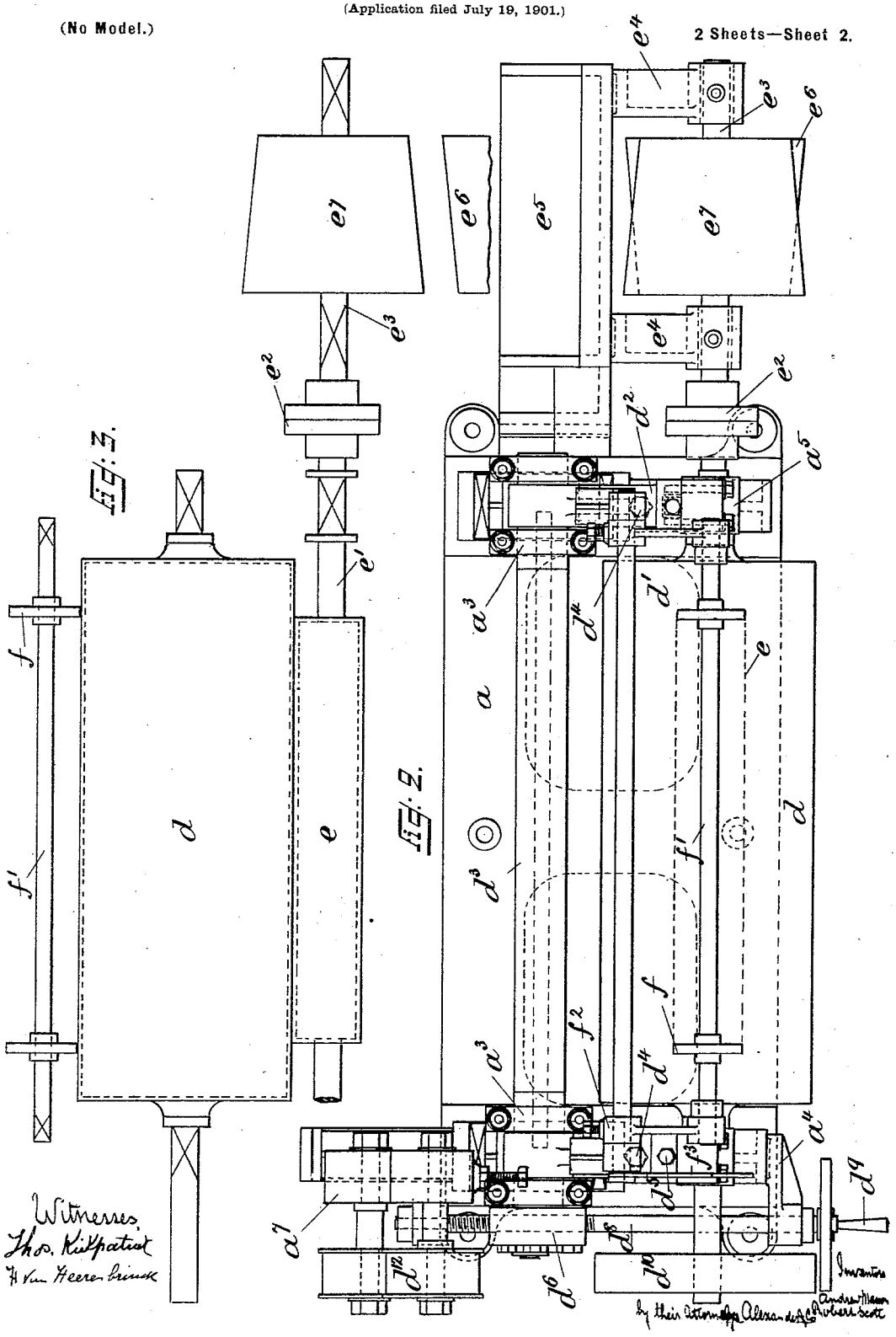
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ANDREW MASSON AND ROBERT SCOTT, OF LONDON, ENGLAND.

PAPER-COATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 684,282, dated October 8, 1901.

Application filed July 19, 1901. Serial No. 68,923. (No model.)

To all whom it may concern:

Be it known that we, ANDREW MASSON and ROBERT SCOTT, subjects of the King of Great Britain and Ireland, and residents of London, England, have invented certain new and useful Improvements in Paper-Coating Apparatus, of which the following is a full, clear, and exact description.

This invention relates to improved apparatus for coating paper films and the like with photographic emulsions or other liquid preparations, the apparatus being also applicable for other analogous uses where absolute accuracy of and perfect coating is essential.

The apparatus is characterized by the combination in coöperative relation of a braked roll of the paper film or the like, (hereinafter referred to as "paper,") an adjustable driven cylinder for supporting the paper while being coated and causing the coating to set, an adjustable tray for holding the emulsion or other liquid preparation (hereinafter referred to as "emulsion") to be applied to the paper, a driven roller for applying the emulsion to the exact required width of the paper while the latter is being carried around by the cylinder, and adjustable runners for holding the coated paper by its edges to the cylinder until it leaves the latter, such elements being respectively adapted as hereinafter more fully described with reference to the accompanying drawings, on which—

Figure 1 represents an end elevation of the apparatus, showing the relative locations of the said parts and their respective adjuncts. Fig. 2 represents a plan view. Fig. 3 represents a front elevation of the coating-roller, paper-supporting cylinder, and holding-runners detached from their supports; and Fig. 4 represents a transverse section of the emulsion-tray.

a represents the apparatus-framework, which is adapted to support the various operative parts by which the paper is treated by suitable bearings, as represented.

b represents the paper to be coated, which passes from a roll b' thereof to a leading-roller c, thence around the paper-supporting and emulsion-setting cylinder d between such cylinder and the coating-roller e and holding-runners f, respectively, as hereinafter more particularly described. The paper-roll spindle b^2 is supported by bearings a', provided with an adjustable spindle-brake b^3, adapted to cause the paper to be coated to be kept taut. The spindle c' of the roller c is supported by bearings a^2. The cylinder d, which serves to support the paper while it is being coated and to cause the coating to set, is made of copper or other suitable metal and is hollow and provided with any suitable means of supplying it with a suitable liquid medium for keeping it sufficiently cool to cause the coating applied to the paper to cool sufficiently for it to set before the paper leaves the cylinder. The cylinder is supported by bearings d', which are carried by frames d^2, mounted on a cross-shaft d^3, which is supported by bearings a^3 at each end of the machine. The cylinder is driven by means of a pulley d^{10}, (shown in dotted lines in Fig. 1,) keyed to its spindle, the driving-belt d^{11} being led laterally to and from the pulley by pulleys d^{12}, (shown in dotted lines in Fig. 1,) which are adjustably mounted in bearings a^7, and so guide the belt as to prevent any upward or downward strains on the cylinder, which would tend to affect the regularity of the coating.

The frame a is provided with fine-thread screws d^4, which enable the operative position of the cylinder-supporting frames d^2 to be accurately determined, and the latter frames are provided with fine-thread screws d^5, which enable the cylinder-bearings d' to be micrometrically adjusted therein, the screws d^4 d^5 thus coöperating in enabling the position of the cylinder d in relation to the coating-roller e to be accurately determined. The shaft d^3 is fitted at one end with a lever d^6, which is pivotally coupled to a nut d^7, working on a screw d^8, which is supported by bearings a^4 and actuated by a hand-wheel d^9 in such a manner as to enable the as-previously-described adjusted cylinder to be raised

from the coating-roller and lowered to its correct position in relation thereto without affecting such adjustments.

Both the cylinder d and the roller e are accurately trued up to fit each other properly. They are not in contact when in operation, but are apart by the thickness of the paper to be coated. The emulsion therefore does not touch the cylinder, but remains on the coating-roller, from which it is imparted to the downward face of the paper while the latter is supported by the cylinder.

The coating-roller e is covered with india-rubber or other suitable material not liable to affect or to be affected by the emulsion used. Its spindle e' rests in fixed bearings a^5, fitted with hinged covers a^6, and is connected by couplings e^2 with its driving-shaft e^3, which is supported in bearings e^4, carried by a frame e^5, connected to the frame a, and is driven by coned pulleys e^6 e^7, the former of which is pulley-driven and drives the latter and which enable the coating-roller to be driven at a speed suitable to the amount of coating required upon the paper.

The bearings a^5 a^6 and couplings e^2 enable the coating-roller to be speedily removed and replaced by another roller of a different width, the roller used being of the exact width of the coating required to be applied to the paper. The coating-roller runs in a tray e^8, which is plated or coated with silver or other suitable material not liable to affect or to be affected by the emulsion used and is made of the shape represented and with a gate e^9, under which the emulsion, which enters the tray at one end, is caused to pass, so that it will rise to its level in the tray under the coating-roller regularly without agitation and free from air-bells. The tray rests in and upon a box e^{10}, made of copper or other suitable metal and fitted with hot-water or steam pipes e^{11} and charged with water, which is heated by means of said pipes sufficiently to keep the emulsion in the tray at its proper coating temperature. The box e^{10} rests upon a plate e^{12}, which extends across the machine and is raised and lowered at its ends by means of screws e^{13}, actuated by a hand-wheel e^{14} and connecting-gearing e^{15}.

The holding-runners f, which aid in keeping the coated paper taut against the cylinder while and after being coated, are made of metal covered with india-rubber and sufficiently heavy to hold the paper to the cylinder by running on the paper edges. They are adjustably mounted on a spindle f', carried by bearings f^2, rising from the frames d^2, and are set on the spindle at a distance apart equal to the width of and in alinement with the ends of the coating-roller used, and their spindle is provided with a hand-lever f^3, which enables them to be instantly raised from the paper when desired.

An especial advantage attendant on the improved apparatus is that the various adjustments of its parts are so arranged and situated as to be easily worked in the dull light available for photographic coating purposes.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. In paper-coating apparatus, in combination, a braked roll of paper, an adjustable driven hollow cylinder adapted to support the paper while being coated and to cause the coating to set before the paper leaves the cylinder, an adjustable tray for holding the emulsion to be applied to the paper and for heating the emulsion to the required coating temperature, a relatively fixed driven roller for applying the emulsion to the required width of the paper being carried around by the cylinder, adjustable runners for holding the coated paper by its edges to the cylinder until it leaves the latter, means of differentially driving the coating-roller, and means of driving the paper-carrying cylinder arranged to exert the driving strain in a plane at right angles to the plane in which the centers of the coating-roller and the cylinder are situated, as set forth.

2. In paper-coating apparatus, in combination, a hollow cylinder adapted to support the paper while being coated and provided with means of cooling it internally sufficiently to cause the coating to set, a tray for holding the emulsion to be applied to the paper and provided with means of heating the emulsion to the coating temperature, a roller for applying the emulsion to the paper being carried around by the cylinder and runners for holding the coated paper by its edges to the cylinder, the tray being provided with means of raising and lowering it relatively to the coating-roller, the coating-roller being removably supported in fixed bearings and provided with means of rotating it, the cylinder being adjustable in its bearings in relation to the coating-roller and being supported in frames provided with means of independently adjusting the same and being provided with means of rotating it, and the holding-runners being carried by the cylinder-bearing frames and provided with means of applying them to and removing them from the cylinder, as set forth.

3. In paper-coating apparatus, in combination, a coating-roller supported by fixed bearings having hinged covers, means of rotating the roller, an emulsion-tray having a regulating-gate, a water-bath carrying the emulsion-tray and having means of heating the water and the emulsion, and means of raising and lowering the tray and bath in relation to the coating-roller, as set forth.

4. In paper-coating apparatus, in combination, a hollow cylinder adapted with means of cooling it internally, bearings supporting said cylinder, screws for adjusting said bear-

ings, frames carrying said screws, a shaft supporting said frames, bearings supporting said shaft, a lever connected to said shaft and screw connections for adjusting said lever-shaft, frames, bearings and carried cylinder, set-screws for determining the adjusted position of the cylinder-carrying frames, and a frame for supporting said screw-bearings shaft-bearings and set-screws, as set forth.

In testimony whereof we have signed this specification in the presence of two subscribing witnesses.

ANDREW MASSON.
ROBT. SCOTT.

Witnesses:
CHARLES AUBREY DAY,
ALFRED CHARLES DAY.