

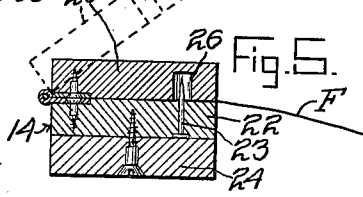
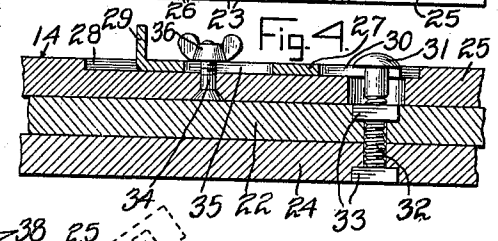
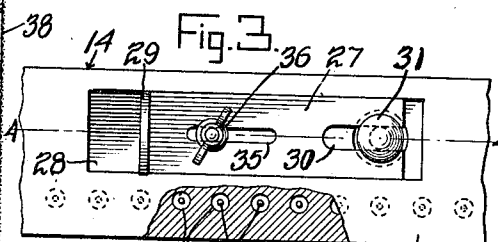
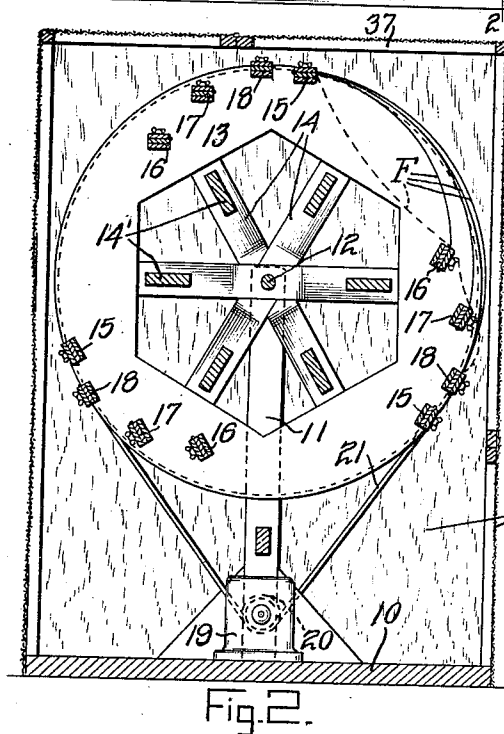
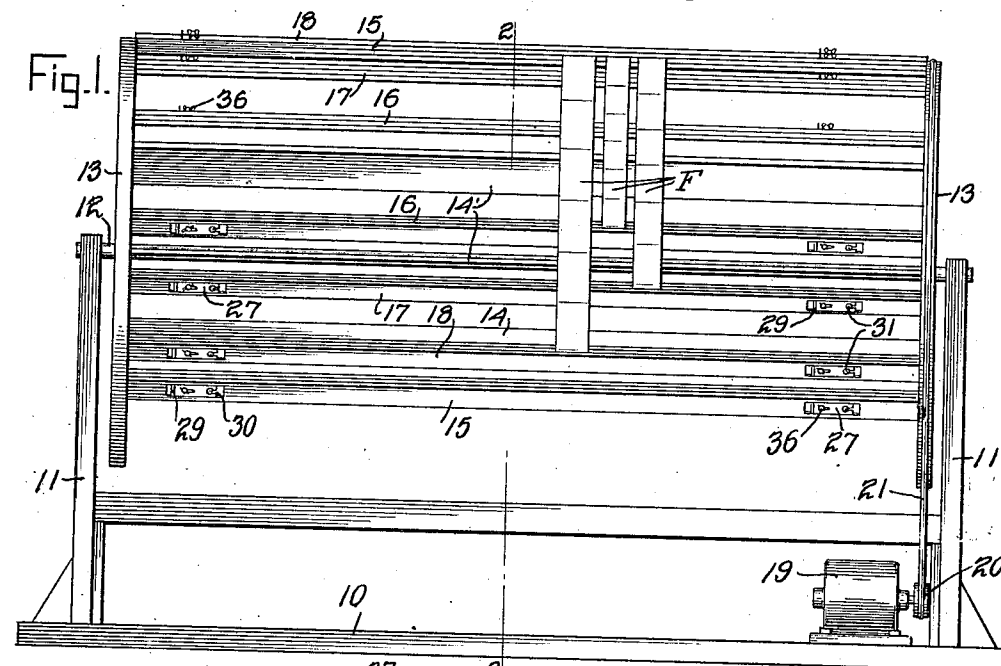
May 29, 1923.

S. T. MICHELSEN

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PHOTOGRAPHIC FILM DRYING APPARATUS

Filed Aug. 26, 1921



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# UNITED STATES PATENT OFFICE.

STEPHEN T. MICHELSEN, OF WASHINGTON, DISTRICT OF COLUMBIA.

PHOTOGRAPHIC-FILM-DRYING APPARATUS.

Application filed August 26, 1921. Serial No. 495,675.

*To all whom it may concern:*

Be it known that I, STEPHEN T. MICHELSEN, a citizen of the United States, residing at Washington, District of Columbia, have invented certain new and useful Improvements in Photographic-Film-Drying Apparatus, of which the following is a specification.

My said invention relates to driers and more particularly to an apparatus for drying photographic films which are coated with an emulsion on both sides. Those skilled in the art are well aware that both surfaces of the films must be protected while wet as any scratches in either side will mar the negative. The present system of drying photographic films consists of securing a clip to one end of the wet films and then hanging them up to drain and dry by means of evaporation, which usually requires from four to eight hours and which subjects the soft emulsions to the danger of being marred or scratched by coming in contact with other films. In this method, the air in the room must be kept comparatively free from circulation so that the films will remain stationary.

In the apparatus to be hereinafter described, the films are each secured at both ends and spaced from each other so that during the drying process it is impossible for them to get into contact with each other. Instead of allowing the films to dry slowly in still air, the portion of the apparatus to which they are attached is revolved at high speed which causes each film to discharge its surplus water by centrifugal force and at the same time creates sufficient draft or circulation of air to effect a complete drying of the films in 20 or 30 minutes. It is therefore one object of my invention to greatly shorten the duration of time required to completely dry photographic films. Another object is to protect the surfaces of the films during the drying operation. Other objects and advantages will become apparent from the following specification and the appended claims, reference being had to the accompanying drawing forming a part thereof in which similar characters of reference designate like parts in the several views of which:

Figure 1 is side elevation of my improved drying apparatus.

Fig. 2 a section taken on the line 2×2 of Fig. 1,

Fig. 3 a detail plan view of a portion

of one of the clamping bars showing the locking means therefor.

Fig. 4 a detail section taken on the line 4×4 of Fig. 3, and

Fig. 5 a cross section through one of the locking bars.

In the drawings, 10 represents a base or support of suitable form having uprights 11 adjacent its ends in which a shaft 12 is journaled to rotate. A disk 13 is secured on each end of the shaft by means of flat spokes 14 set at an angle to form fans, and these disks are rigidly connected to each other by master clamping bars 15 and individual clamping bars 16, 17 and 18 as will be fully described later. Flat strips 14' connect opposing spokes 14 of the two disks 13 to act as a fan. The disks 13 and the various clamping bars, virtually form an open cylinder adapted to be rotated at high speed by any suitable means. I have shown for the purpose a motor 19 having a pulley 20 driving a belt 21 which runs in a groove formed in the periphery of one of the disks 13. It is to be understood that the speed of rotation is to be governed by the size of the cylinder, but I have found that a cylinder three feet in diameter should revolve at a speed of about 300 revolutions per minute for best results.

The clamping bars referred to are all identical in construction, but I have referred to some of them as "master" clamping bars and others as "individual" clamping bars for the reason that one end of each film, regardless of its length, is first secured to a master clamping bar 15 while the opposite ends of the films, which are of different standard lengths, are secured to the individual clamping bar 16, 17 or 18 which is nearest the end of the respective film. By arranging the individual bars in this relation, the necessity of assorting the films according to their lengths is obviated. Each clamping bar consists of an intermediate strip 22 through which is driven a row of headed tacks 23 spaced about  $\frac{1}{2}$  inch apart. A facing strip 24 is secured beneath the strip 22 to prevent the tacks 23 from coming out. Hinged to the strip 22 is a similar strip 25 having a series of openings 26 bored in its under side to register with the tacks 23. In operation, the strip 25 is raised as shown by the dotted lines in Fig. 5 and one end of the films F are pushed down on the tacks 23 with the tacks perfo-

rating the films. The strip 25 is then closed down against the films with the points of the tacks 23 entering the openings 26. Each of the clamping bars carries a series of locking elements comprising a plate 27 of rectangular form which rests in a depression 28 in the strip 25 and has an upturned end 29 forming a finger piece. The opposite end of the plate is slotted as at 30 and adapted when in locked position to slide beneath the head 31 of a bolt 32 held securely in the strips 22 and 24 by nuts 33. The plate 27 is held in its locked position by means of a screw 34 secured in the strip 24 passing through a slot 35 in the plate and provided with a winged nut 36 that is readily loosened to permit the plate to slide far enough to bring its slotted end from beneath the head 31 of the bolt 32.

A casing consisting of a frame 37 over which is stretched cloth 38, may be used to cover the entire apparatus to exclude any dust or foreign matter which would tend to mar the films.

I wish it understood that although I have shown three sets of clamping bars, I do not wish to be limited to any particular number of sets or to any particular number of "individual" clamping bars to each set.

What I claim as new and desire to secure by Letters Patent is:

1. A centrifugal drying apparatus for photographic films composed in part of an open cylinder carrying master means for securing one end of each of the films of different lengths and individual means for securing the other ends thereof, and means for rotating said cylinder at a high speed to cause the said films to bow out of contact with certain of the said individual means, substantially as set forth.

2. A photographic film drier comprising a base, uprights secured to said base, a shaft journaled in said uprights, an open cylinder secured to said shaft and comprising a

pair of open disks, axial bars connecting said disks, film gripping means formed in said bars, air agitating means connecting said disks and means for rotating said disks and bars bodily, substantially as set forth.

3. A photographic film drier comprising supports, a rotatable cylinder carried by said supports, a series of independent groups of film gripping bars forming a part of said cylinder and air agitating means carried within said cylinder, substantially as set forth.

4. A rotary photographic film drying apparatus comprising a series of independent groups of film gripping bars; each group comprising a master gripping bar and a series of individual gripping bars, substantially as set forth.

5. In a photographic film drying apparatus, film gripping bars comprising a central strip, a row of tacks in said central strip, a tack retaining bar secured to the under side of said central strip, a cover strip hinged to one edge of said central strip, perforations in the under side of said cover strip registering with said tacks and means for locking said cover strip to said central strip, substantially as set forth.

6. A centrifugal drying apparatus for photographic films composed in part of an open cylinder carrying master means for securing one end of each of the films of different lengths and individual means for securing the other ends thereof, means for rotating said cylinder at a high speed to cause the said films to bow out of contact with certain of the said individual means, means for drawing air into the ends of said cylinder and further means for forcing said air out of the side of said cylinder past the said films, substantially as set forth.

In testimony whereof I affix my signature.

STEPHEN T. MICHELSEN.