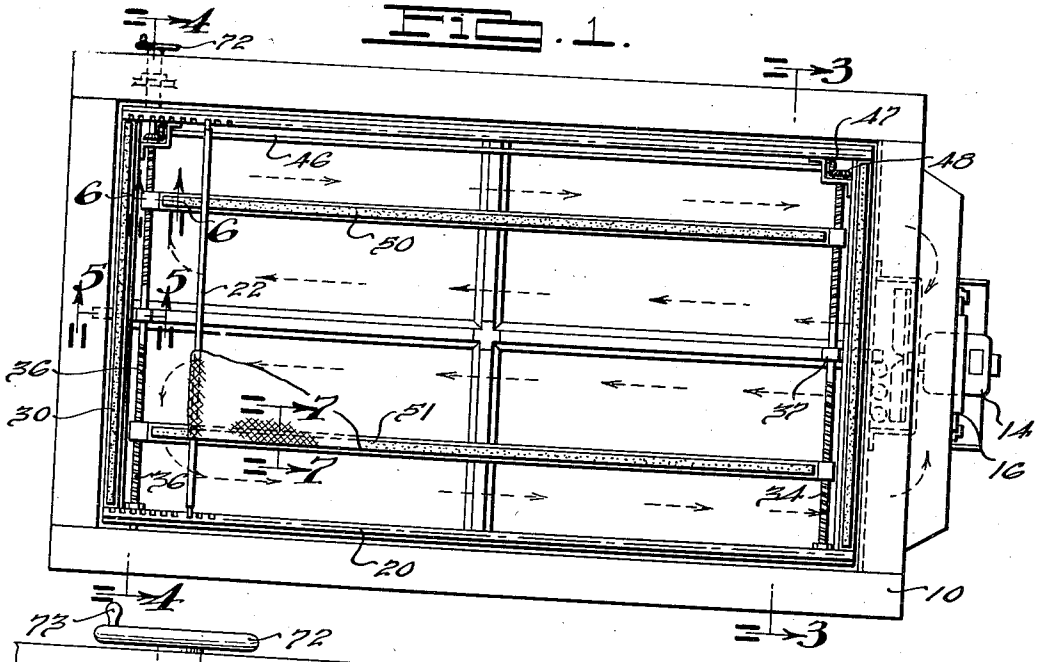
Jan. 30, 1940. E. L. WATERHOUSE 2,188,397

CURTAIN DRYING APPARATUS

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FIG. 1.



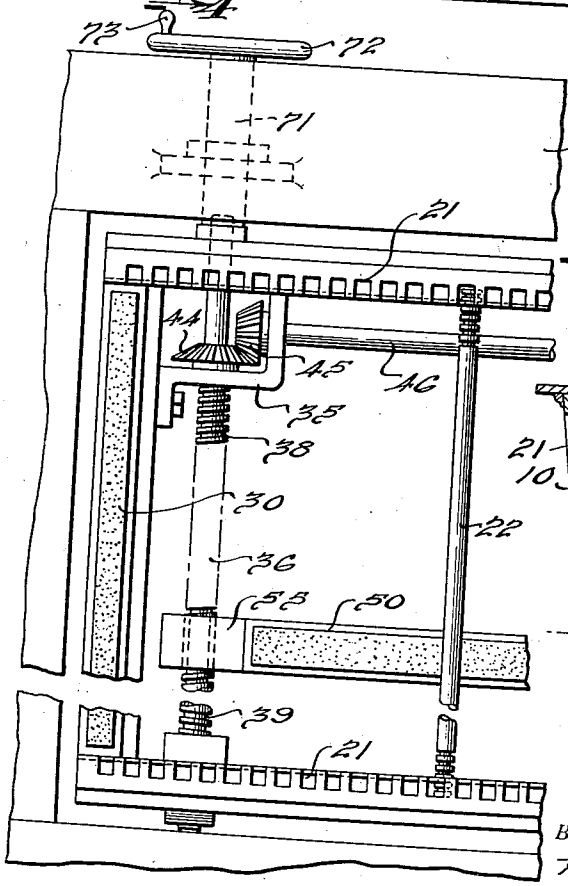


FIG. 2.

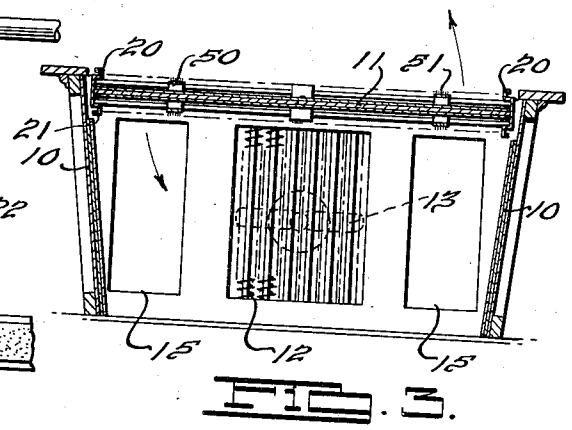


FIG. 3.

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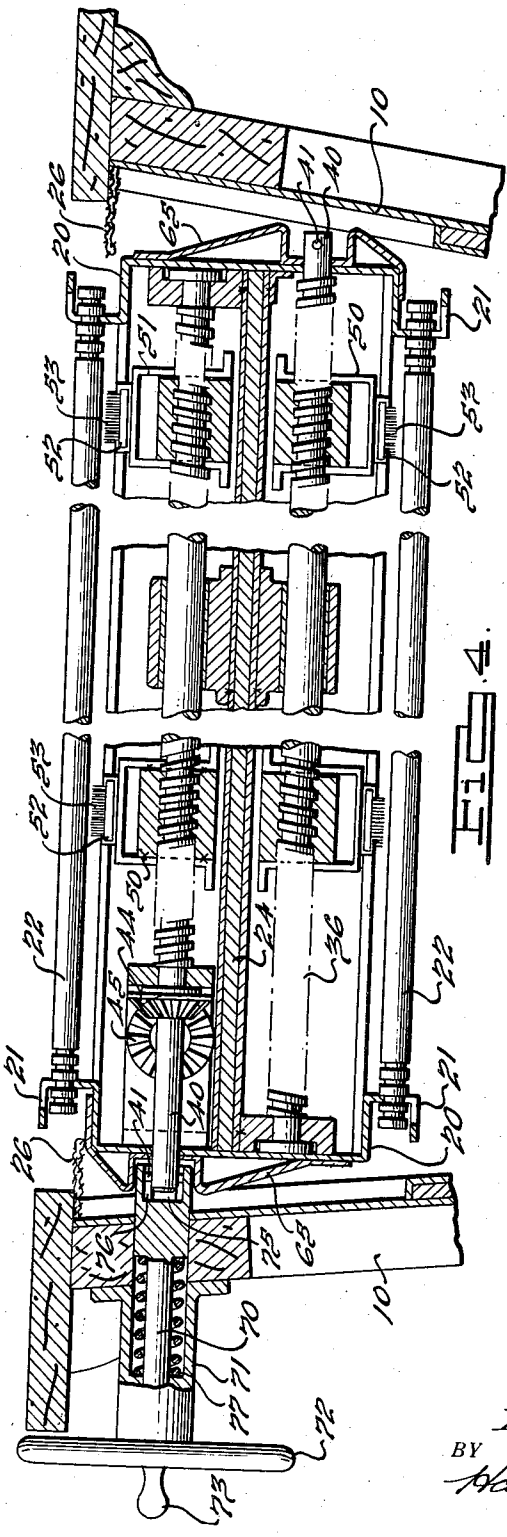


Fig. 4.

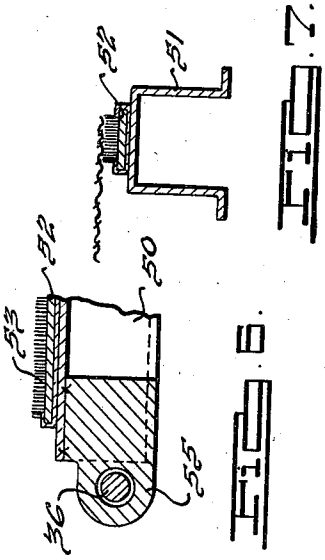


Fig. 6.

Fig. 7.

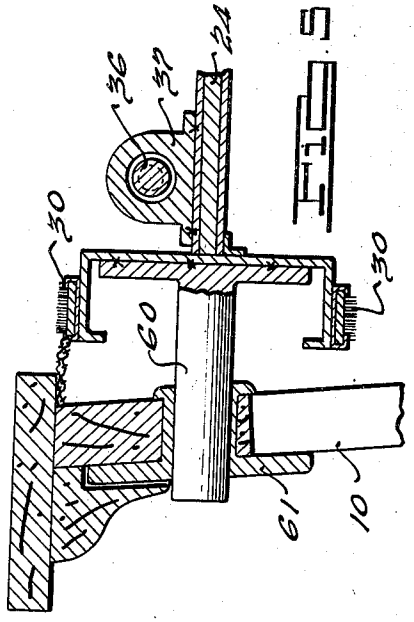


Fig. 5.

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UNITED STATES PATENT OFFICE

2,188,397

CURTAIN DRYING APPARATUS

Edward L. Waterhouse, Detroit, Mich., assignor to Waterhouse Laundry Machinery Company, Detroit, Mich., a corporation of Michigan

Application November 15, 1937, Serial No. 174,531

8 Claims. (Cl. 34—17)

This invention relates to apparatus for drying curtains. More particularly, it relates to a machine primarily adapted for drying curtains of varying sizes extremely rapidly and efficiently and to means for maintaining the curtains properly stretched and tensioned to predetermined size during the drying operation.

The present invention contemplates the provision of a generally rectangular housing the upper side of which is adapted to be closed by a pivotally mounted rotatable curtain supporting member which includes means for supporting a curtain to be dried on each of the opposite sides thereof. When this curtain supporting member is swung into position to close the upper side of the housing, a curtain to be dried positioned on one side thereof will be exposed to the interior of the housing and a new curtain may be installed on the opposite side thereof.

The invention contemplates the provision of novel and improved means for mounting a curtain to be dried on each of the opposite sides of the curtain supporting member. These means include a stationary member for anchoring one end of the curtain and adjustable means for anchoring the opposite end of the curtain in order that the curtain may be stretched to the predetermined desired length prior to being dried.

In addition, the device contemplates the provision of means adapted to anchor the lateral marginal portions of the curtain which last mentioned means are adjustable with respect to each other in order that the curtain may be stretched to the predetermined desired width.

The invention has for an object the provision of means for locking the curtain supporting member in horizontal position in order to expose one side thereof to the interior of the drying housing. The locking means serves also to establish a driving connection between the adjustment mechanism carried by the curtain supporting frame and operating mechanism carried by the housing in order that when the curtain drying frame is in predetermined position, an operator may accurately adjust the members which control the lateral width of the curtain to be dried.

Many other and further objects, advantages, and features of the present invention will become clearly apparent from the following specification when considered in connection with the accompanying drawings forming a part thereof.

In the drawings:

Figure 1 is a top plan view of a curtain drying machine embodying the improvements of the present invention.

Figure 2 is an enlarged fragmentary top plan view of a portion of the apparatus shown in Figure 1 illustrating in detail the manner in which the various curtain supporting members are adjustable in the curtain drying frame.

Figure 3 is a transverse sectional view taken on the line 3—3 of Figure 1 illustrating in detail the interior construction of the drying housing showing the manner in which the drying frame is disposed therein during a curtain drying operation.

Figure 4 is an enlarged transverse sectional view taken substantially on the line 4—4 of Figure 1 with portions broken away illustrating in detail the operating and drive mechanism for adjusting the lateral width of the curtain to be dried and showing the manner in which the curtain drying frame is locked in predetermined position during the drying operation.

Figure 5 is an enlarged fragmentary sectional view taken substantially on the line 5—5 of Figure 1.

Figure 6 is a fragmentary transverse sectional view taken on the line 6—6 of Figure 1.

Figure 7 is a fragmentary transverse sectional view taken on the line 7—7 of Figure 1 illustrating the cross sectional configuration of the members used for supporting the lateral marginal edges of the curtain during the drying operation.

With more particular reference to the drawings, it will be readily seen that the apparatus comprises a generally rectangular housing generally designated as 10 which may be closed at its top by means of a curtain supporting frame generally designated as 11. The housing may be mounted directly on a level floor thus dispensing with the necessity of a bottom wall and by reference to Figures 1 and 3, it will be seen that the housing has a plurality of heating coils 12 constituting a radiator in one of the end walls thereof. A fan 13, driven by a suitable motor 14, serves to drive air past the heating coils 12 and into the housing 10. This air circulates in the manner indicated by the arrows in Figure 1 and returns through vents 15 in the end wall of the housing to the fan thereby continually circulating warm air through the interior of the housing. A damper 16 is slidably mounted in the end of the housing permitting fresh air to enter at the rear of the fan 13 in order that fresh air will be introduced into the housing in addition to the re-circulated air. This construction is more or less conventional in curtain driers and forms no part of the present invention.

The upper side of the housing 10 is adapted

to be closed by the framework 11 which, in the form of the invention shown, comprises a generally rectangular frame formed of sheet metal strips 20 of rolled section which define the marginal edges thereof. These frame members are provided with angle shaped flanges 21 in their marginal edges which flanges are slotted to receive the ends of the curtain supporting rods 22. The slots formed in these flanges may be provided at uniformly relatively closely spaced intervals in order that the particular length of the curtain being dried may be accurately adjusted. The framework formed by the members 20 is divided into upper and lower portions by means of a partitioning member 24 which fills the entire area defined by the frame members 20 whereby when the frame is arranged in horizontal position, the partitioning member 24 will serve to close the upper side of the housing 10.

The marginal portions of the housing 10 adjacent the frame 11 may have flexible fabric seals 26 secured thereto which serve to engage the adjacent portions of the frame members 20 in order to provide a relatively tight joint at the marginal portions of the curtain drying frame and preclude the wasteful escape of heated air from the interior of the housing during the curtain drying operation.

The partitioning member 24 may, if desired, be formed of a pair of co-extensive sections of sheet metal with a layer of suitable insulating material therebetween in order to retain as much heat as possible within the housing during the curtain drying operation.

The adjustment mechanism on each of the opposite sides of the frame constitutes a complete curtain drying unit, the unit on one side of the frame being entirely separate from and independent of the drying unit on the opposite side of the frame.

Secured at one end of the frame in predetermined position is a curtain anchoring strip 30 which is firmly fixed in position on the frame and preferably comprises a strip of tape having a plurality of upstanding wires woven therein which wires serve to provide means for anchoring one marginal edge of the curtain to be dried. Suitable angle brackets 35 are anchored in position at the corners of the frame and serve to provide bearings at each end of the frame for a pair of transversely extending shafts 34 and 36 which extend throughout the entire transverse width of the frame. Suitable bearing blocks 37 may be provided for these shafts at substantially the midpoint thereof and it will be apparent by reference to Figures 1 and 2 of the drawings that the shafts 34 and 36 are provided with righthand feed threads 38 throughout half their length and lefthand feed threads 39 throughout the other half of their length.

The shaft 36 has one end 40 thereof projecting through the frame member 20 and provided in its outer end with a transversely extending pin 41 the purpose and function of which will be described in detail hereinafter. Adjacent the outer end portion of the shaft 36 and mounted thereon is a bevel gear 44 which is adapted to mesh with a second bevel gear 45 secured to the end of a longitudinally extending shaft 46 which carries at its opposite end a bevel gear 47 meshing with a bevel gear 48 carried upon the end of the shaft 34. Consequently it will be apparent that rotation of the shaft 36 serves to produce synchronous rotation of the shaft 34 therewith.

A pair of members 50 and 51 are provided for supporting the lateral side portions of the curtains. These members may be formed of suitable channel shaped sections of sheet metal and carry on the upper surfaces thereof strips of tape 52 secured thereto which strips of tape have upstanding wires 53 woven therein to provide a secure anchorage for the curtain to be dried. The members 50 and 51 have at each of their ends internally threaded collars 55 which are threadably received upon the shafts 34 and 36. Consequently it will be apparent that as the shaft 36 is rotated, these collars effect lateral movement of the members 50 and 51 and that the movement of these members will be either simultaneously toward or simultaneously away from each other due to the fact that the ends of the members are journalled upon the portions of the shaft having right and left-hand threaded sections.

The frame 11 has trunnions 60 mounted in the midpoint of its end members which trunnions are journalled in suitable bearings 61 in the end walls of the housing 10 in order that the framework as a whole may be swung about a longitudinal axis and turned completely over. Consequently it will be seen that either one side or the other of the frame may be exposed to the interior of the housing as may be desired. It will be noted that the curtain supporting members, feed screws, shafts, and bearings on the lower side of the housing, as viewed in Figures 3 and 4, are identical in construction and arrangement with the parts on the upper side of the framework and consequently these parts are designated by the same reference characters.

Adjacent the portion of the frame member 20 where the shafts 36 extend therethrough, sheet metal brackets 65 are provided which brackets provide an inclined cam surface for guiding the adjusting mechanism hereinafter described into driving engagement with the end portions of the shaft 40. An adjusting shaft 70 is journalled for rotation in a suitable supporting housing 71 secured in the wall of the housing 10. This shaft has secured to its outer end a hand wheel 72 adapted to be operated manually by means of a crank handle 73 and at its inner end is provided with an axial bore 75 adapted to slip over the outer end of the shaft 40. This bore is provided with keyways 76 adapted to receive the transversely extending pin 41 in the shaft 40 in order to establish a driving connection between the shaft 70 and the shaft 40. The shaft 70 is urged axially inwardly toward the housing by means of a compression coil spring 77. It will be readily apparent that as the curtain supporting frame 11 is swung to horizontal position, the recess in the end of the shaft 70 may be slipped over the outer end of the shaft 40. The seating of the transverse pin 41 in the channel ways 76 not only serves the purpose of establishing a driving relation between the shafts 70 and 40 but serves the purpose of locking the curtain supporting frame in predetermined horizontal position thus precluding further rotational movement thereof about the trunnions 60.

When these shafts have thus been engaged and the curtain drying frame locked in horizontal position, an operator may place a curtain to be dried over the frame anchoring one end of the curtain on the upstanding wires in the tape 30 at one end of the frame. After this end of the curtain has thus been anchored, the curtain holding bar 22 may be removed from the frame and

slipped through the hem of the curtain. The curtain is then stretched to the predetermined desired length and the ends of the bar 22 are dropped in the appropriate slots in the flanges of the frame member 20 thus insuring the fact that the curtain will have the predetermined desired length when it has been dried. The lateral marginal edges of the curtain may then be anchored to the upstanding wires 53 in the tapes 52 which, as has been described above, are firmly anchored to the members 51. The hand wheel 71 may then be rotated in clockwise direction which serves to produce corresponding rotation of the shafts 34 and 36 as described above and it will be seen that the feed screws formed on these shafts engaging the collars 55 carried by the ends of the members 50 and 51 will serve to effect corresponding parallel movement of these frame members away from each other thus stretching the curtain to the predetermined desired lateral width. The curtain by this operation has now been completely stretched to the predetermined desired dimensions.

The hand wheel 72 may now be moved axially effecting a dis-engagement of the inner end thereof from the outer end of the shaft 40 and the frame 11 may be swung about the trunnions through a distance of 180° thus exposing the stretched curtain to be dried to the interior of the housing. The hot air circulated by the fan 13 will serve to dry the curtain rapidly and while the curtain is being dried, a second curtain to be dried may be mounted upon the mechanism on the opposite side of the frame. It will be readily apparent that as the frame is swung through 180°, the cam surface formed by the bracket 65 will come into engagement with the axial end of the shaft 70 thereby effecting an outward movement thereof against the spring 77 serving automatically to effect engagement of the inner end of this shaft with the outer end of the shaft 40 thereby locking the frame in horizontal position and at the same time establishing a driving relation between the shaft 70 and the end of the shaft 40.

From the foregoing, it will be appreciated that the adjustment mechanism on one side of the frame is a complete unit within itself and that a curtain may be accurately mounted and stretched on the opposite side of the frame without in any way disturbing the mounting of the curtain being dried.

The heated air circulation supplied interiorly of the housing may be controlled in such a manner that the curtain exposed to the interior of the housing will be completely dried in the length of time which is required for installing a curtain to be dried on the exposed position of the frame. Consequently it has been found that the apparatus may be operated substantially continuously.

It will be readily appreciated from the foregoing that the specific embodiment of the invention shown in the drawings and described above is merely illustrative of one form which the invention may take. Other forms thereof falling within the scope of the invention as defined in the subjoined claims will be clearly apparent to those skilled in the art.

What is claimed is:

1. Curtain drying apparatus including in combination a drying housing, a curtain drying frame pivotally mounted with respect to said housing and adapted to alternately expose opposite sides of said frame to the interior of the housing, said frame having a set of adjustably mounted curtain supporting members on each of the opposite sides thereof, a shaft associated with each of said sets of curtain supporting members serving to effect adjustment thereof, a shaft journalled in said housing adapted to selectively engage one or the other of said shafts to adjust said curtain supporting members.

2. Curtain drying apparatus including a drying housing, a frame movably mounted with respect to said housing to alternately expose opposite sides thereof to the interior of said housing, means on said frame for anchoring one end of a curtain to be dried, adjustable means for anchoring the opposite end of said curtain, a pair of movably mounted bars each adapted to engage one of the side edges of said curtain, a pair of feed screws for simultaneously moving said bars toward or away from each other, gearing interconnecting said feed screws to effect synchronous operation thereof, an operating shaft journalled for rotation in said housing and means for releasably coupling said operating shaft to one of said feed screws.

3. Curtain drying apparatus including in combination, a drying housing, a curtain supporting frame adapted when in horizontal position to close the upper side of said housing, said curtain supporting frame being pivotally mounted whereby opposite sides thereof will alternately be exposed to the interior of said housing as said frame is swung about its pivots, adjustable curtain supporting members on said frame, a rotatable shaft journalled in said frame operatively associated with said curtain supporting members and serving to adjust the relative positions thereof, an operating shaft journalled for rotation in said housing and releasable coupling means for drivingly interconnecting said shafts whereby said actuating shaft may serve to control the relative position of said curtain supporting members.

4. Curtain drying apparatus including in combination, a generally rectangular housing open at the top, a curtain drying frame adapted when in horizontal position to close the top of said housing, said frame being pivotally mounted with respect to the housing whereby upon rotation about its pivots opposite sides thereof will be alternately exposed to the interior of said housing, curtain supporting means on each of the opposite sides of said frame, each of said curtain supporting means including a rotatable shaft for operating the same, an actuating shaft journalled for rotation in said housing and adapted to, when said frame is in horizontal position, engage one or the other of said rotatable shafts whereby to establish a driving connection therebetween and at the same time lock said frame against rotational movement with respect to said housing.

5. Curtain drying apparatus including a generally rectangular housing open at the top, a rectangular frame adapted to provide a closure for the top of said housing, said frame being pivotally mounted with respect to said housing whereby upon rotation about its pivots opposite sides thereof will alternately be exposed to the interior of said housing, curtain supporting means on said frame including relatively movable curtain supporting bars and a shaft for effecting relative movement of said bars, an actuating shaft journalled for rotation in said housing and means on said frame adapted to cooperate with said actuating shaft to establish

a driving connection between said actuating shaft and said operating shaft when said frame is swung to horizontal position.

6. Curtain drying apparatus including in combination, a generally rectangular housing open at the top, a curtain drying frame adapted to close the top of said housing, said frame being pivotally mounted with respect to said housing whereby upon rotation about its pivots opposite sides thereof will be alternately exposed to the interior of said housing, curtain supporting means on one side of said frame, said curtain supporting means including a pair of relatively movable curtain supporting bars and an operating shaft for effecting relative movement of said bars, similar curtain supporting means on the opposite side of said frame similarly including relatively movable curtain supporting bars and an operating shaft for effecting movement thereof, an actuating shaft journalled for rotation in said housing and adapted for driving engagement with either one or the other of said operating shafts when said frame is in horizontal position.

7. Curtain drying apparatus including in combination, a generally rectangular housing open at the top, a curtain drying frame adapted to close the top of said housing, said frame being pivotally mounted with respect to said housing whereby upon rotation about its pivots opposite sides thereof will be alternately exposed to the interior of said housing, curtain supporting means on one side of said frame, said curtain supporting means including a pair of relatively movable curtain supporting bars and an operating shaft for effecting relative movement of said bars, similar curtain supporting means on the opposite side of said frame similarly including relatively movable curtain supporting bars and an operating shaft for effecting movement thereof, an actuating shaft journalled for rotation in said housing and means carried by said frame serving automatically to establish a driving connection between said actuating shaft and the operating shaft on the upper side of the frame.

8. Curtain drying apparatus including in combination, a generally rectangular housing open at the top, a curtain drying frame adapted to close the top of said housing, said frame being pivotally mounted with respect to said housing whereby upon rotation about its pivots opposite sides thereof will be alternately exposed to the interior of said housing, curtain supporting means on one side of said frame, said curtain supporting means including a pair of relatively movable curtain supporting bars and an operating shaft for effecting relative movement of said bars, similar curtain supporting means on the opposite side of said frame similarly including relatively movable curtain supporting bars and an operating shaft for effecting movement thereof, an actuating shaft journalled for rotation in said housing, said actuating shaft being resiliently mounted for limited axial movement and a cam member carried by said frame adapted upon swinging said frame to horizontal position to effect axial movement of said actuating shaft to aid in establishing a driving connection between said actuating shaft and one of said operating shafts.

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