

Oct. 9, 1928.

1,686,680

L. B. CASE

PROCESS AND APPARATUS FOR DRYING ORIENTAL RUGS

Filed Dec. 31, 1926

2 Sheets-Sheet 1

Fig. 1

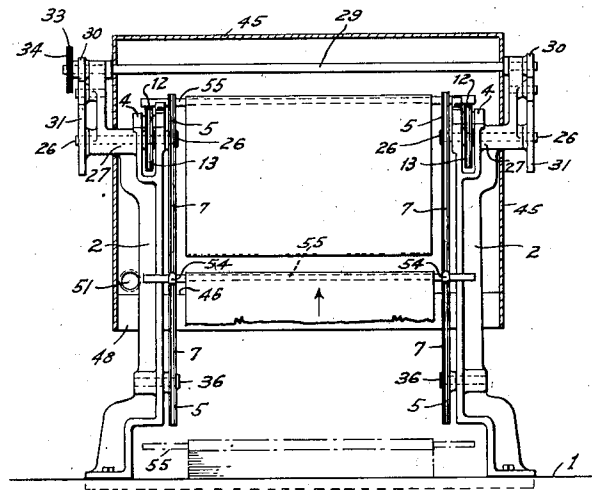


Fig. 2

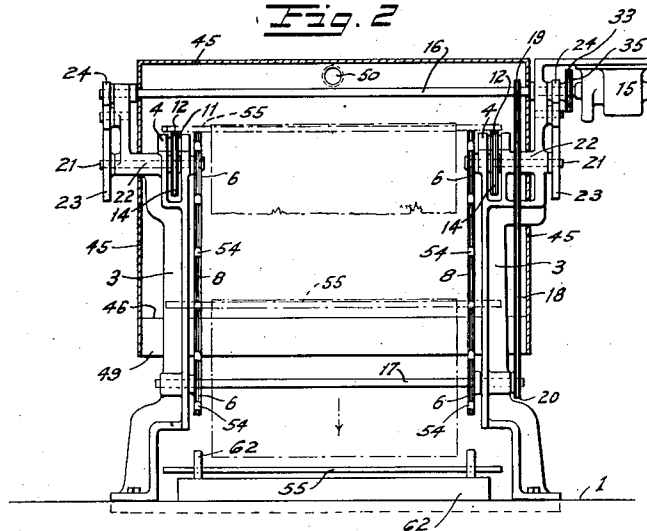


Fig. 6

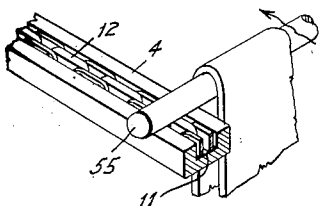
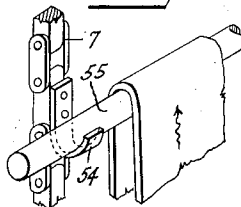


Fig. 5



INVENTOR.
Lyon B. Case
BY *Shull, Dunn & Anderson*
ATTORNEYS.

Oct. 9, 1928.

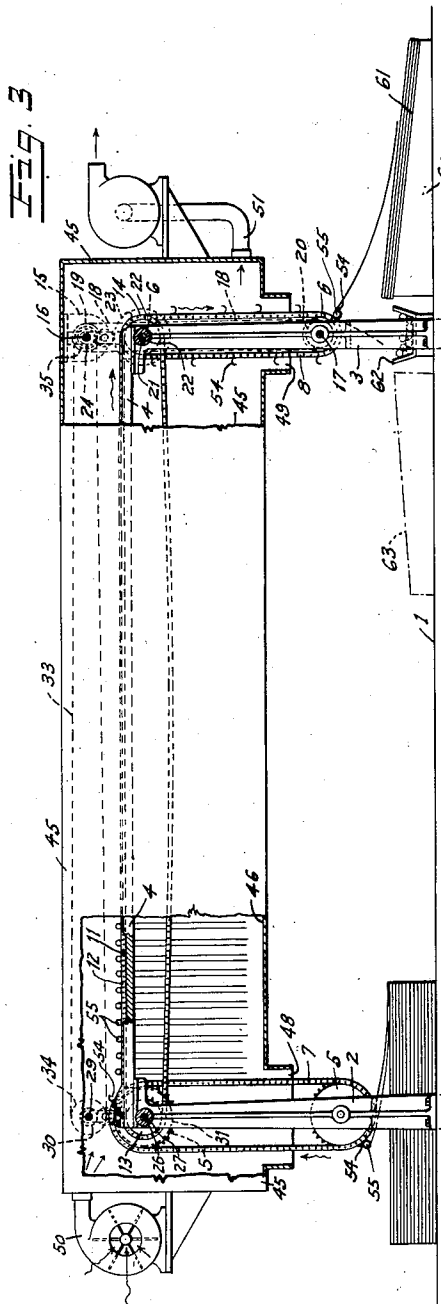
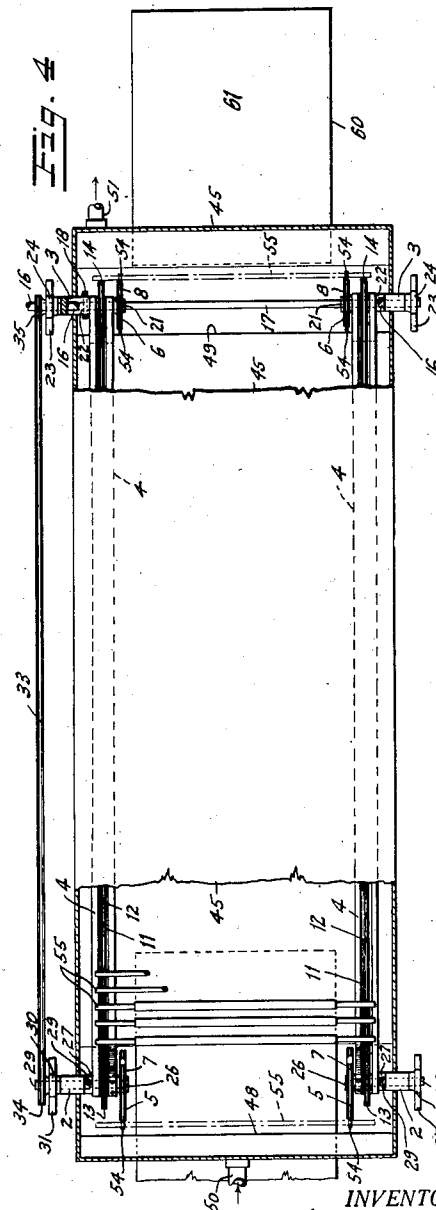
1,686,680

L. B. CASE

PROCESS AND APPARATUS FOR DRYING ORIENTAL RUGS

Filed Dec. 31, 1926

2 Sheets-Sheet 2



INVENTOR.

BY *Lynn B. Case*
Duell, Dunn & Anderson
ATTORNEYS.

Patented Oct. 9, 1928.

1,686,680

UNITED STATES PATENT OFFICE.

LYNN B. CASE, OF NEW BRUNSWICK, NEW JERSEY, ASSIGNOR TO JOHN WALDRON CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

PROCESS AND APPARATUS FOR DRYING ORIENTAL RUGS.

Application filed December 31, 1926. Serial No. 158,148.

This invention relates to a process and apparatus for treating heavy textile fabrics, and more particularly, rugs.

Rugs, as they come from the manufacturer, particularly from the Orient, require very thorough washing before they can be placed on sale. Moreover, from time to time after use, it is desirable that this washing should be repeated. Such rugs, however, when wet, are quite heavy, hard to handle, and difficult to dry. It is an object of this invention to overcome these difficulties.

Within the broad scope of this invention means are provided for taking the rugs in the form they are delivered from the wash-room, passing them into a dryer, causing them to arrange themselves within the dryer spaced from each other so as to be thoroughly dried and then removing them from the dryer. A convenient way of accomplishing this consists in causing the rugs to progress slowly through a dryer of such dimensions relative to the speed of movement that the rugs will be thoroughly dried by the time they have completed their progress.

The wet rugs are ordinarily delivered in a pile and it is desired that they be again piled after drying. A practical embodiment of the invention therefore, consists in means for picking the rugs from the pile and delivering them to the drier, and means for removing them from the drier and depositing them upon a pile. Both of these latter means are preferably arranged to work vertically, in order that the rugs may be removed from or restored to the pile without being dragged along the floor. Within the dryer the rugs are preferably allowed to hang vertically, and in order that they may be maintained in spaced relation it is preferred that they be moved through the dryer horizontally. It is an object, therefore, of this invention to handle the rugs automatically and expeditiously and with a minimum of expense.

It is a further object to dry the rugs quickly and thoroughly with a minimum of labor and inconvenience.

Other objects of the invention will be in part obvious and in part described hereinafter.

The invention accordingly comprises the several steps and the relation and order of one or more of such steps with respect to each of the others, and the apparatus embodying features of construction, combinations of ele-

ments and arrangement of parts which are adapted to effect such steps, all as exemplified in the following detailed disclosure, and the scope of the application of which will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention reference should be had to the following detailed description taken in connection with the accompanying drawing, in which:

Figure 1 is an elevation of an apparatus embodying this invention, when viewed from the receiving end.

Figure 2 is a similar view when viewed from the delivery end.

Figure 3 is a side elevation, certain parts being broken away to facilitate the disclosure.

Figure 4 is a top plan view partly in section.

Figure 5 is a plan of one form of hook which may be employed.

Figure 6 is a detail showing the relation of the rug carriers to the drier conveyor.

In the drawings the numeral 1 designates the ground or floor of a building in which the apparatus is to be installed, on which are supported a plurality of uprights 2—2, and 3—3. Each of the uprights 2 is preferably connected with one of the uprights 3 by a horizontal beam 4 to form a bridge and these bridges are parallel to each other and spaced apart a distance as to cause them to support the ends of rug supports or poles, as will be described, but such as to permit a rug to pass between them, the two horizontal members forming together a pair of tracks adapted to support a carrier for the ends of the rug supports or poles in a manner to be described. One such bridge is substantially identical with the other, so that a description of one will be sufficient.

The uprights 2—2 and 3—3 respectively, carry at their upper and lower ends pulleys, 5—5 and 6—6. An endless belt or chain 7 passes around the pulleys 5—5 at the receiving end of the apparatus and a second belt 8 passes over the pulleys 6—6 at the delivery end. The horizontal beam 4, which connects the upper end of the upright 2 with its corresponding upright 3, must be of sufficient strength or so reinforced and supported as to support the plurality of rugs to be dried. It is preferably provided, on its upper surface, with a groove 11 in which moves a travelling belt or carrier 12 turning around

pulleys 13, 14 upon the uprights 2 and 3. This chain may be provided with anti-friction wheels if desired, to facilitate its movement over the track when loaded.

5 The driving mechanism may conveniently be described as follows:—

It is preferred to drive the horizontal carrier 12 from the delivery end. The power is, therefore, applied at that end. A motor 10 15, at the upper end of the upright 3 operates a transverse shaft 16. The pulleys 6—6 at the bottom of the upright 3 are both mounted upon a common transverse conveyor shaft 17, and the shaft 17 is driven from the 15 shaft 16 by a drive chain 18 meshing with sprockets 19 and 20 upon the shafts 16 and 17 respectively. At each side of the machine at the top, at the delivery end, are provided short stub shafts 21 journaled in bearings 20 22 carried by the uprights. One of the pulleys 14 is rigidly attached to each of these shafts, while the pulleys 6 are rotatively journaled thereon. The stub shaft 21 carries at its outer ends large gears 23 meshing with 25 pinions 24 upon the shaft 16 and these gears are fast upon the shaft, whereby the sprocket wheels 14 may be driven through the pinions and gear from the shaft 16. A similar stub shaft 26, at the top of the upright 2, at the 30 receiving end of the machine, is journaled in bearings 27 at the top of the upright. Each of these stub shafts carries fast upon itself one of the pulleys 5, at the same time serving as a journal for one of the pulleys 35 13. A transverse shaft 29 at the receiving end of the machine, carries gears 30 meshing with gears 31 fast upon the stub shafts 26, whereby the pulleys 5 are driven from the shaft 29 by the gears 30 and 31. The transverse shaft 29 is driven from the transverse 40 shaft 16 through the medium of a chain 33 meshing with sprockets 34 and 35 upon the shafts 16 and 29 respectively.

Each of the lower pulleys 5 is separately 45 journaled upon a shaft 36 carried by the upright.

By the foregoing construction it will be clear that the motor will drive all of the conveyor and carrier chains from the delivery 50 end of the chain and there is no transverse shaft extending across the pathway of the rugs.

A casing 45 forms a chamber which surrounds the carrier 12 and the upper portions 55 of the conveyors 7 and 8 and extends below the carrier, as shown at 46, far enough to permit the looped rugs to hang from poles upon the belt without touching the bottom of the casing. The conveyors 7 and 8 have their 60 lower portions extending out of the bottom of the casing through orifices 48 and 49, to permit the loading and unloading of the rugs. These orifices are such that a minimum of communication is afforded between 65 the interior of the casing and the room in

which it is placed, so that the atmosphere within the casing and that external to it may not mingle.

The casing 45 constitutes a dryer and there is passed through it warm, dry air. This is 70 illustrated in the drawing by the blower 50, forcing air into the chamber, and an outlet 51 for carrying out the moist air. This outlet 51 may, itself, be provided with air exhausting means, if desired. The control of 75 the movement of the air through the openings 48 and 49 may be attained in large measure by controlling the relative air pressure within and without the casing, by controlling the relative flow of air through the inlet 80 and exhaust conduits. Thus, if a pressure be maintained within the casing which is less than the pressure in the room, no air will flow out of the openings 48 and 49.

The air is preferably carried along the top 85 or one side of the casing and then discharged laterally or vertically across it and exhausted from the other side or the bottom, so that it passes transversely of the chamber parallel to and between the rugs. For this reason the 90 chamber may be made larger on the sides or at top and bottom, to provide a space to distribute the air equally between the rugs.

The rugs may be conveniently handled by looping them over a pole which may be made 95 about 3 or 4 inches in diameter. With this method of support the belts 7 and 8 are preferably in the form of chains provided with a plurality of hooks 54, adapted for the reception of the ends of such a pole 55. In 100 operation a pole may be laid in one of the hooks 54 of the belt 7 immediately above the pile of wet rugs, thereupon one free end of the rug may be drawn over the pole by the attendant, whereupon the upward move- 105 ment of the hooks will grip both ends of the pole to loop the rug and carry it upwardly from the pile. The carrier 12 is also preferably in the form of a chain, but it need not have supports or hooks to receive the ends 110 of the poles, since they may rest directly upon the chain.

It is desirable that the rugs within the dryer, while supported from the carrier 12, shall be substantially equally spaced and 115 this is conveniently accomplished by so adjusting the distance apart of the hooks upon the belt 7 that the carrier 12 will travel the predetermined distance between the time when successive hooks present themselves in 120 position to be loaded. The rugs may hang a foot apart from the carrier 12, but it is undesirable to attempt to load another rug on the conveyor 7 until the first has been carried out of the way. It is practical, there- 125 fore, to cause the belt 7 to make one revolution every 10 minutes and to provide upon it two hooks 54 diametrically spaced upon the belt. Thus one hook will be delivering a pole and the rug it carries to the belt 12 while 130

the other hook is being loaded. The carrier 12, however, may be made to move them about one foot in five minutes.

It is desirable that the conveyor 8 be in position to receive a rug supporting pole whenever the latter is presented to it. I therefore provide upon the belt 8 a number of hooks 54, so that, at no time, is there any great distance between the point of delivery of a rug supporting pole and the nearest available hook. The rate of travel of the belt 8 is not so important as that of the belt 7, since it has no function in the spacing of the rugs upon the belt 12. It should, however, for convenience, have such speed that one rug is completely delivered and out of the way before the next one is deposited upon its hook. It is therefore convenient to cause this belt to travel at substantially the speed of the belt 7.

A stand 60 may be arranged below the delivery end of the belt 8, which stand may have an inclined surface 61 for convenience. As the end of the looped rug comes out of the exit orifice 49, the attendant takes one side of it and pulls it over onto the surface 61 or of the rugs lying thereon. It is desirable that the poles be kept from rotating during the loading and unloading operation lest the rugs slip off the poles.

A receptacle 62 is arranged below the lower end of the belt 8 to receive the supporting poles from which the rugs have been removed as the poles are dropped from the conveyor and this receptacle 62 may be mounted on wheels or on a track not shown to facilitate removing the poles for reuse. I prefer, however, to provide automatic means to return the poles to the delivery end. This may comprise a hopper beneath the conveyor 8, having an opening for the delivery of poles through its bottom. This opening has a timed closure. A conveyor extends from beneath the conveyor 8 to beneath and almost in contact with the conveyor 7. This conveyor has pole receiving cleats at spaced intervals, and the closure is timed to deposit one pole on each such pair of cleats.

The poles are carried by the conveyor into the pathway of the hooks 54, while a guide carries the pole up with the hook until it is engaged by the latter. The lower conveyor, the closure for the hopper and the conveyor will be so timed that a pole is delivered to the hook 54 just as it comes to the bottom to be loaded.

With the construction outlined there is some tendency as the rugs are removed from the poles, for the poles themselves to roll out of the hooks 54 of the conveyor 8. This may be overcome either by increasing the height of the hook on the outer side or by removing the rugs on the inside to a similar table located there as shown at 63. This result

may also be attained by reversing the direction of movement of the belt 8 and arranging it so that the poles may be delivered to its inner side. This will, of course, involve a reversal of the direction of extension of the hooks as well.

In handling the rugs in accordance with this process, the rugs are placed upon their poles 55 resting in the hooks 54 of the belt 7 and by that pole are carried upwardly into the dryer over the pulley 5 and deposited upon the carrier 12. This movement is relatively rapid. As soon as the poles are dropped upon the carrier 12, however, they are moved horizontally out of position to be engaged by the hooks 54 and are carried through the dryer at slow speed. I have found it practical to employ a speed of one foot in five minutes for the belt 12, so that, as will be seen, the rugs are spaced from each other by one foot. The belt 12 should be long enough to insure the thorough drying of the rug before delivery and I have found, in the conditions above outlined, that 40 feet is a practical length.

It will be seen that by the above apparatus the rugs may be easily raised and placed in the dryer and thoroughly dried and then may be easily removed. Should difficulty be experienced due to the tendency of the poles to rotate in the hooks, they may be so shaped or so associated with the hooks as to restrain the tendency to rotate.

Since certain changes may be made in the above construction and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a combination of apparatus for drying rugs, a casing substantially closed, means for controlling the relative air pressure within and without the casing, means for conveying rugs within the casing, said means being adapted to elevate a rug when one end is looped thereover, means for conveying the rugs through the casing at a predetermined rate to assure even spacing and thorough drying, means for delivering the rugs without the casing at a different rate, said last means extending through the casing to enable the rugs to be piled by pulling one edge in a direction substantially transverse to the line of travel of said means, the said means sup-

porting the other edge until the first edge is in substantially desired piling position.

2. In a combination of apparatus for handling rugs, a casing substantially enclosed, 5 conveying means for delivering rug-supporting poles in a spaced relation within the casing, a track in the casing and a carrier supported thereby for moving the rug-supporting poles through the casing, second conveyor 10 means for receiving the poles from the carrier and delivering them at a desired rate without the casing, all said conveyor means entering the casing through openings in the bottom, the conveyor means being so positioned that the openings need not be appreciably wider than the shortest distance between the opposite sides of the conveyor, and means 15 for establishing air conditions in the casing to substantially prevent air within the casing flowing out of said openings. 20

3. In a combination, of apparatus for drying rugs, means for engaging a series of poles

at regular intervals, said means being arranged to elevate a rug when one end is looped thereover, means for disengaging the poles 25 from said first means automatically when raised to a predetermined height, means for conveying the rugs at a slower rate through an enclosure having an atmosphere of predetermined temperature and pressure, means 30 at one end of the enclosure adjacent the top for causing the passage of dry air through the enclosure, an exhaust at the opposite end of the chamber adjacent the bottom for carrying out the moist air, the air being controlled in its passage through the enclosure so 35 that it passes transversely of the enclosure, first being carried along the top and then discharged laterally or vertically across it and exhausted at the bottom, and means for lowering the rugs from the enclosure. 40

In testimony whereof I affix my signature.

LYNN B. CASE.