Jan. 6, 1925. 1,521,660

J. WADE ET AL

DRYING MACHINE

Filed July 26, 1921 3 Sheets-Sheet 1

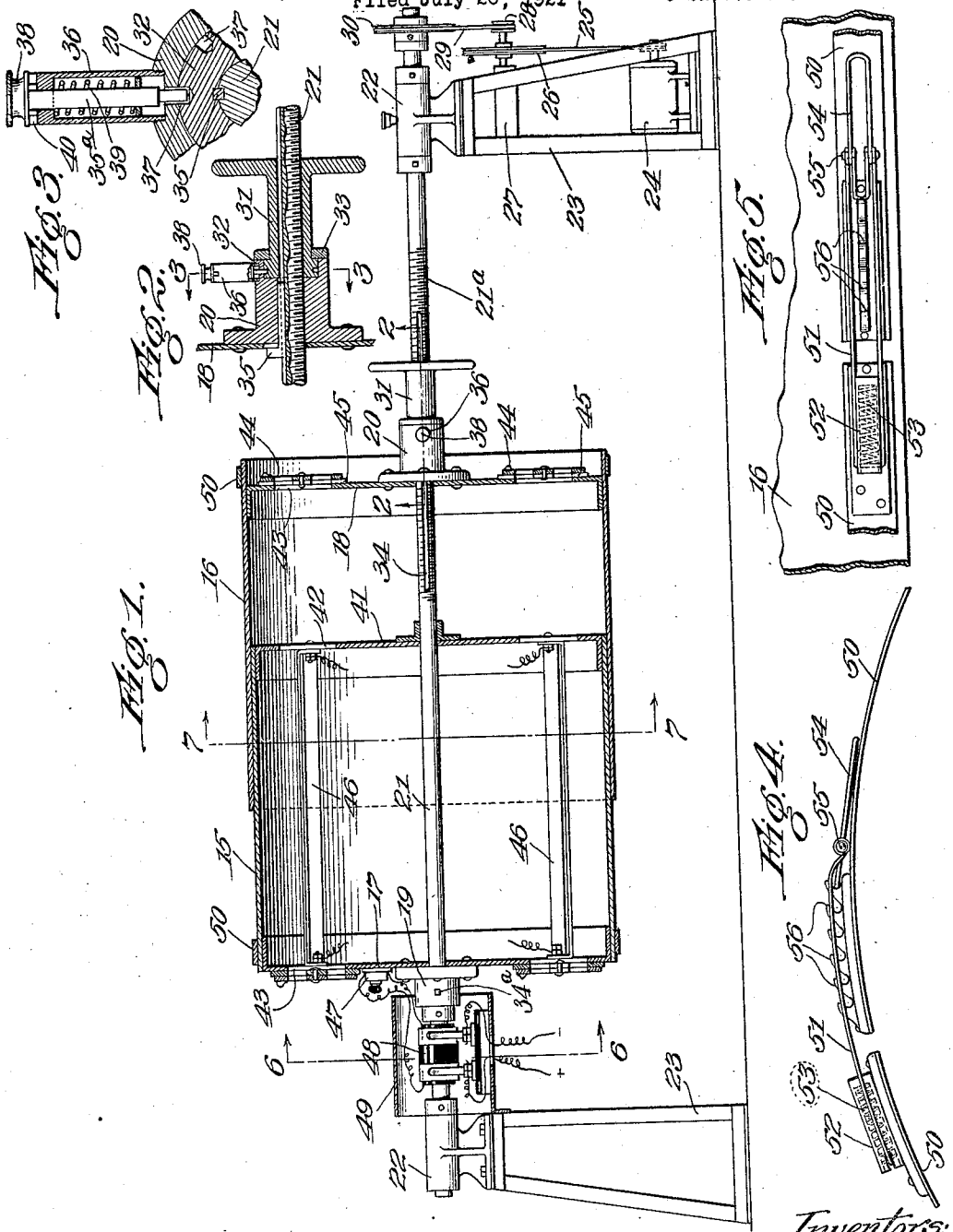


Fig. 1.

Fig. 3.

Fig. 2.

Fig. 5.

Fig. 4.

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DRYING MACHINE

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Fig. 6.

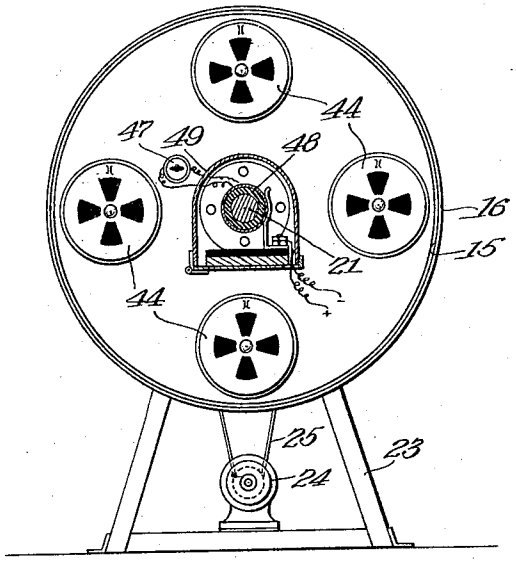
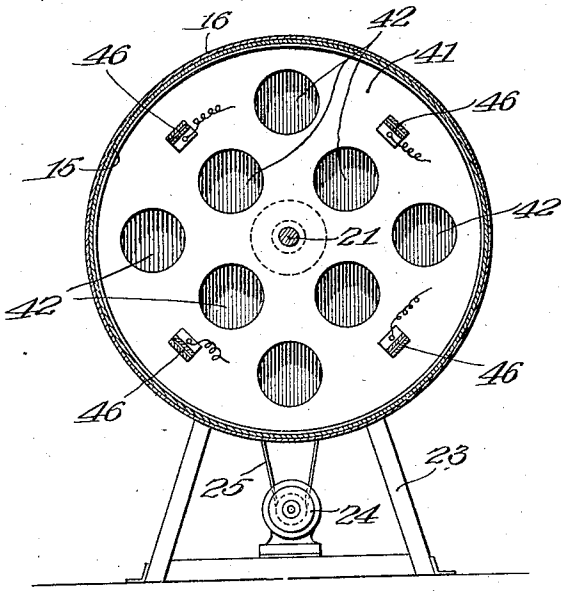


Fig. 7.



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Fig. 8.

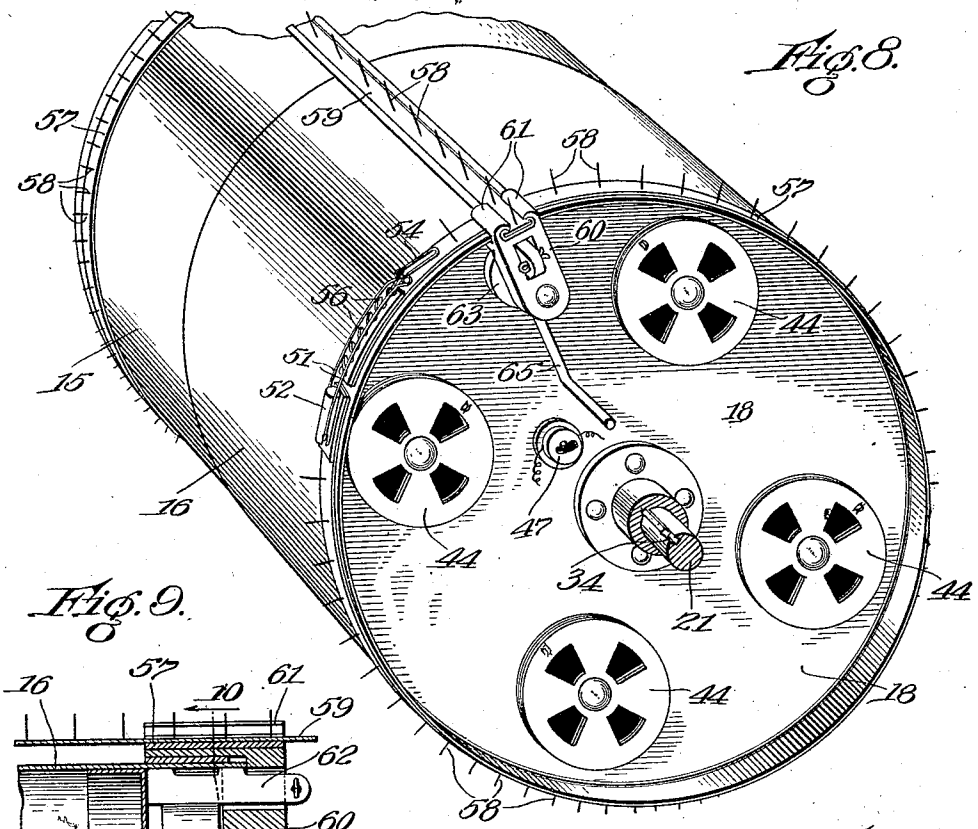


Fig. 9.

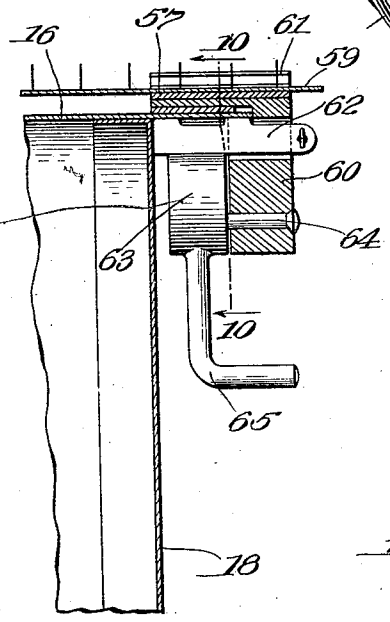
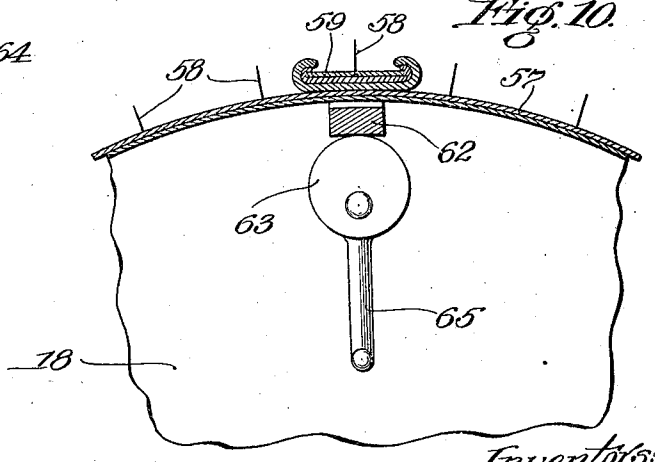


Fig. 10.



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Patented Jan. 6, 1925. 1,521,660

UNITED STATES PATENT OFFICE.

JOHN WADE AND WILLIAM WADE, OF CHICAGO, ILLINOIS.

DRYING MACHINE.

Application filed July 26, 1921. Serial No. 487,594.

To all whom it may concern:

Be it known that we, JOHN WADE and WILLIAM WADE, citizens of the United States, and residents of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Drying Machines, of which the following is a description, reference being had to the accompanying drawings, which form a part of our specification.

Our invention relates to a machine for drying, stretching and ironing fabrics or washable material in sheet form, such as window shades, lace curtains, carpets, woolen and cotton goods in sheet or bolt form; the invention having for its object the provision of a construction whereby the material or goods may be firmly held in contact with the heated walls while the machine is in operation and during the operation of drying the material will be held against shrinkage and may be subjected to a stretching operation while the same is being dried.

One purpose of our invention is to provide a sheet material-holding device adapted to be rapidly rotated so as to subject the material to a moving current of air, while the device may gradually become distended so as to subject the material to a uniform and proper stretching action whereby the material may be brought back to its original width or condition.

The objects and advantages of our invention will be more readily comprehended from the detailed description of the drawings wherein:—

Figure 1 is a longitudinal sectional view of the main portion of our machine.

Figure 2 is a detail sectional view taken on the line 2—2 of Figure 1 looking in the direction of the arrows.

Figure 3 is a vertical sectional view taken on the line 3—3 of Figure 2 looking in the direction of the arrows.

Figure 4 is a detail elevation of a portion of one of the holding elements.

Figure 5 is a plan view thereof.

Figure 6 is a sectional elevation taken on the line 6—6 of Figure 1 looking in the direction of the arrows.

Figure 7 is a cross sectional view taken on the line 7—7 of Figure 1 looking in the direction of the arrows.

Figure 8 is a detail view in perspective illustrating modified forms of holding elements.

Figure 9 is a detail sectional view of the fastening member or clamp for securing one of the holding elements slidably in place.

Figure 10 is a sectional view taken on the line 10—10 of Figure 9 looking in the direction of the arrows.

In the particular exemplification of the invention, it is disclosed in the nature of a pair of open ended metallic cylinders 15 and 16 arranged in telescoping relation to provide an adjustable drum or smooth surfaced means wherein the outer cylinder or shell 16 is permitted to completely envelope or telescope with the cylinder or shell 15. The outer ends of both cylinders 15 and 16 are closed by end walls 17 and 18, respectively, which are provided with suitable hubs 19 and 20 to receive a supporting drive shaft 21 which is shown extending therethrough.

The ends of the drive shaft 21 are suitably mounted in bearings 22, 22 arranged on the supports or pedestals 23, 23, one of which is shown provided with an electric motor at 24, the armature shaft whereof is provided with a pulley to receive the flexible drive member or belt 25 which is disposed about a large pulley 26 mounted on a shaft having a suitable bearing in the pedestal or support 23 as indicated at 27. The shaft carrying the large pulley 26 is also provided with a small pulley 28 having a belt 29 which is disposed about a pulley 30 secured to the end of the shaft 21 so that operation of the motor will drive the shaft 21 and cause the composite means or drum, composed of cylinders or shells 15 and 16, to rotate therewith. The driving mechanism illustrated discloses a substantially noiseless driving connection between motor and shaft, but it will be understood that any suitable driving mechanism between motor and the main shaft may be employed.

The drive shaft 21 throughout a portion of its length is threaded as at 21^a to receive adjusting means 31, shown in the nature of an internally threaded sleeve provided with a hand-wheel. The inner end of the sleeve is provided with an enlargement or head portion 32 fitting within a proper recess in the hub 20 and is maintained in place by a plate or cap 33. The shaft 21 is also provided with a slot or keyway 34 throughout a predetermined portion of the screw-threaded end thereof as shown in Figures 1 and 2, to receive a key 35 which also ex-

tends into a key or slot-way formed in the hub 20 and induces the cylinder or shell to rotate with the shaft and at the same time permits longitudinal movement of the cylinder or shell 16; while the cylinder or shell 15 is made to rotate with the shaft 21 by means of the bolt or pin 34ª which passes through the hub 19 and the shaft 21, and therefore also maintains the cylinder or shell 15 against longitudinal movement.

The hub 20 is provided with locking means in the nature of a plunger 35ª mounted in a suitable casing or shell 36 which is screwed into an opening in the hub, while the lower end of the plunger is adapted to pass into suitable sockets as at 37 formed in the enlargement or head 32 of the adjusting means or sleeve 31. The pin or plunger 35ª is provided with a thumb-piece or knob 38 and is normally pressed downwardly by means of a suitable coil spring 39 mounted in the shell or casing 36. The top or upper closed end of the shell or casing 36 is provided with a pair of notches to receive the lugs 40 secured on the bottom of the thumb-piece or knob 38 and thus permit the pin 35 to extend to its maximum inward position illustrated in Figures 2 and 3. With this construction it is apparent that when the pin or plunger is drawn upwardly so as to remove the lugs 40 out of the slots, the lower end of the pin or plunger 35ª will have been drawn out of the recess or socket 37 in the enlargement or head 32 of the adjusting means or collar 31 and thus permit rotation of the adjusting means or collar 31 without imparting rotation to the cylinder or shell 16. With this construction, the relation between the cylinders or shells 15 and 16 may be controlled; that is to say, when the plunger or pin 35 is withdrawn from the socket or recess 37, the operator may grasp the hand-wheel of means 31 and rotate it so as to cause the same to travel lengthwise of the screw portion of shaft 21 and likewise induce the shell or cylinder 16 to move longitudinally of the shaft; such movement being permissible by reason of the slot and key connection between the hub 20 and the shaft 21. The adjustment just referred to is preferably made when the shaft 21 is idle or not in operation and, as is apparent, the composite driving member or drum, composed of cylinders 15 and 16, may be contracted or distended as desired so as to adapt the machine to material of different widths and at the same time subject the material, after the same has been placed on the composite member or drum, to a stretching operation.

The inner end of the cylinder or shell 15 is preferably provided with an end wall or spider 41 suitably mounted on the shaft 21 and secured in place in any proper manner so as to properly reinforce the inner end of the cylinder or shell 15 and therefore reenforce the intermediate part of the composite drying means or drum. The inner end 41 is shown provided with a plurality of openings as at 42, see Figure 7; while the outer end walls 17 and 18 of the shells 15 and 16 are each preferably provided with a number of openings 43, to permit air circulation entirely through the composite drum. In order that the air circulation may be controlled and the heating of the drum thus partially controlled, the openings 43 in the outer end walls 17 and 18 are preferably provided with rotatable shutters 44 mounted against apertured discs 45, so that the shutters 44 may be rotated to close the openings in the discs or to partially open the same in accordance with the wishes of the operator.

In the particular exemplification of the invention, the outer end wall 17 and the inner wall or spider 41 provide suitable support for the longitudinally disposed electric heaters 46, of which any suitable number may be employed; for example four in number, as shown in Figure 7. The heaters are of a well known construction and suitably secured in place and properly insulated from the metallic walls of the machine, with the wires or lead lines extending to a suitable switch indicated at 47 which controls the current passing through the lead lines from the commutator indicated at 48 and disposed about one end of the shaft 21 as shown in Figure 1; the commutator with its lead lines, obtaining current from a suitable source of electrical energy, being supported and enclosed in a suitable housing 49 secured to the pedestal 23. The switch 47 may be of a three-way type, so that in the construction illustrated the current to all of the heaters may be shut off, or the current to two of the heaters supplied or current transmitted to the four heaters.

In order that the material to be operated on may be readily and properly secured to the drying member or drum, I provide a flat metallic band or strap 50 for each shell 15 and 16, adapted to extend substantially about the entire circumference of said shells, with the ends thereof held in position and drawn together by suitable clamping mechanism as for example of the nature more clearly shown in Figures 4 and 9 and consisting of an elongated loop member 51, one end whereof is suitably mounted in a slot formed in the side walls of a shell or housing 52 which contains a suitable spring 53 adapted to bear against the end of the loop member 51 and the inner closed end of the shell 52, thereby maintaining the loop member 51 under constant pressure. The outer end of loop member 51 has a fulcrum member or loop-shaped lever 54 pivotally connected thereto at the point 55 so as to have

the lever or fulcrum member 54 disposed to opposite sides of the pivot point 55. The spring contained housing 52 is secured to one end of each band or strap 50 while the adjacent end of each band or strap is provided with a rack or toothed portion 56 disposed lengthwise of the band and formed to receive the inner or short end of the fulcrum member or lever 54. With this construction it is apparent that the band or strap may be drawn together and adjusted to clamp material of varying thicknesses firmly onto the drying member or drum so as to hold the same in place.

As previously stated, our improved machine is more especially intended for drying and at the same time smoothing out or ironing sheet or yard goods, window shades and the like, which is induced by heating the metallic shells, (without direct contact, however, between the shells and the heating element) and by the rotation of the drum or drying member whereby the material is subjected to moving air currents. The material to be operated on is placed onto the composite drum or member so as to extend from side to side of the telescopically arranged members and then wound thereabout, after which the bands or straps are put into place with the clamps adjusted so as to firmly and smoothly hold the material in place and maintain the same taut. Where the material is of such nature that it is likely to shrink during the washing and cleaning operation, after it has been placed about the drum as described, the operator may then distend the composite drum by releasing the spring-controlled plunger 35ª so as to operatively disconnect hub 20 from adjusting member or hand-wheel 31, at which time the operator may then rotate the hand-wheel or adjusting member in a direction which will cause it to draw the shell or cylinder 16 outwardly and away from the opposite end of the shell or cylinder 15 and thus subject the material wound thereabout to a stretching operation; the material being held in its stretched condition while the drum is made to revolve and heated by the heating medium or heaters described. It is apparent that with the material thus firmly held in smooth relation about the composite drum, that it will dry in smooth condition and thus obviate the necessity of any additional ironing. The material may be subjected to any desired degree of stretching so as to provide its original width, or greater width if desired.

Our improved machine is especially adapted for use in drying window shades, which will be so held as to retain their original width and at the same time will enable the edges thereof to be easily trimmed while the shades are in place on the composite drum.

In Figures 8 to 10 we show a modification of our invention in so far as the holding mechanism is concerned, which mechanism is especially adapted for use with lace net, lace curtains and the like; the drying member or composite drum being identical to that previously shown and described, consisting of the shells 15 and 16, with the shell 16 slidably keyed on the operating shaft 21 and the end walls of the shells provided with the air controlling shutters 44, all as previously described. The difference in construction merely exists in substituting different clamping or holding members for the members 50 shown in Figures 1, 4 and 5. We show the clamping members or holding bands 57, 57 each provided with a plurality of upwardly presented pins 58 spaced a short distance apart lengthwise of the bands, as clearly shown in Figure 8, adapted to pass through the interstices or openings in the lace material at the edges thereof, which permits the material to be wound smoothly about the composite drying member or drum. In order that the intermediate portion and especially the ends of such material may be properly secured, we prefer to provide one or more flat strips 59 also provided with a plurality of pins 58 like the bands 57 so that the end of the material may likewise be passed over the various pins, thereby distributing the pulling strain on the material. In order that the composite drying drum or member may be adjusted or extended in the manner previously described, when employing the transversely disposed strips or holder 59, we show the latter held in place on the opposite ends of the drum by suitable clamps which, in the exemplification, comprise a block 60, which at its upper end has inwardly bent portions 61 to provide a slot-way in which the strip 59 may slide. The ends of the shells or cylinders are preferably formed so as to provide a flange disposed beyond the heads 17 and 18, as clearly shown in Figures 1, 8 and 9, and the upper end portion 61 of the block 60 is made to extend toward one side so as to overlap the flange portion of the cylinders or shells as well as the encircling bands 57. The block 60 is shown provided with a loosely mounted member or block 62 which is adapted to engage beneath the extended end or flange portion of the shell or cylinder, as shown in Figure 9. The block or member 60, at a point beneath the member 62, is provided with a cam or eccentric member 63 pivotally secured thereto at 64, to enable the cam member to come into pressing engagement with the member or block 62 when the cam member 63 is oscillated about the pivotal point 64 through operation of a suitable hand-crank or member 65. With the construction shown, it is apparent that the block 60 may be passed over the extended

edge or flange portion of the cylinders or drums 15 and 16 at any desired point and the wedge member 62 brought into gripping relation with the bottom or inside of the flange through proper operation of the eccentric member 63 thereby firmly clamping the mechanism in place while at the same time permitting the pin strip or holding member 59 to have movement relative to the clamp member; or in other words to permit the cylinder 16 with its clamping mechanism to move in a direction lengthwise of the pin strip 59.

As is apparent from the construction shown, the material wound about the composite drum will be quickly dried in smooth condition during the rotation and heating of the drum; the heating being accomplished by using all or a portion of the electric heaters, while the degree of heat may be controlled through the amount of ventilation permitted to pass through the end walls as well as by the number of heaters in operation. As the heating elements are not in actual contact with the material-receiving walls of the metallic shells or cylinders, scorching of the material is not likely to occur. After the material has been properly wound about the composite drum and clamped into place and the material has shrunken during its cleaning operation, then the operator may distend the composite drum or telescopically arranged members to any desired degree adapted to subject the material to the proper or desired amount of stretching.

In order that the plunger of the adjusting member may readily lock the member to the hub 20, we show the head 32 of the adjusting member 31 provided with a number of sockets or recesses 37 to receive the plunger or pin 35[a] and thus provide a locking relation without necessitating a complete rotation of the respective members. The drying member, which, in the exemplification, comprises cylinders or shells are of thin sheet metal provided with smooth outer surfaces, which at the same time will readily radiate the heat and the drying member or drum has preferably been shown and described in the form of a pair of telescopically arranged cylinders, but it is apparent that the drying member may be of different form permitting telescopic arrangement or distention of the respective parts; the invention having been shown in what we believe to be its preferred embodiment and described in terms employed merely as terms of description and not of limitation, as structural modifications are possible and may be made without, however, departing from the spirit of our invention.

What we claim is:—

1. A machine of the character described, comprising a rotatable shaft provided with a screw-threaded portion, a plurality of telescopically arranged metallic cylinders or shells mounted on said shaft to rotate therewith, means cooperating with the threaded portion of said shaft and with one of the cylinders or shells whereby the latter may be made to travel lengthwise of said shaft and its telescopic relation with the adjacent cylinder or shell controlled, the end walls of the cylinders being provided with controllable air-admitting openings, material-holding bands disposed about the opposite ends of the cylinders, yielding means for securing the ends of said bands together, and means located within the cylinders whereby the latter may be heated.

2. A machine of the character described, comprising a rotatable shaft provided with a screw threaded portion, a pair of telescopically arranged metallic shells or cylinders mounted on said shaft so as to rotate therewith, the end walls of said shells or cylinders being provided with controllable air-admitting openings, a diaphragm or spider secured about the shaft and to the inner end of one of said shells or cylinders, electric heaters secured to the end wall of one of said cylinders and to said diaphragm or spider, a commutator secured about one end of said shaft and electrically connected with said heaters, means whereby the current to said heaters may be controlled, means disposed about the screw threaded portion of the shaft and in operative relation with one of said shells or cylinders whereby the latter may be moved lengthwise of the shaft and its telescopic relation with the other shell or cylinder controlled, and adjustable means adapted to be disposed about each of the shells or cylinders whereby the material to be operated on may be clamped in place.

3. A machine of the character described, comprising a rotatable shaft provided with a screw threaded portion, a pair of metallic cylinders mounted on the shaft to rotate therewith and arranged in telescopic relation, means disposed about the threaded portion of the shaft for operatively connecting one of said cylinders to the shaft and to cause the cylinder to be moved lengthwise of the shaft, electrical heaters arranged within said cylinders, means for controlling the current thereto, adjustable means disposed about opposite ends of said cylinders for clamping the material in place, a transversely disposed member for holding the ends of the material, and clamping means for holding the transversely disposed member in place and to permit relative longitudinal movement.

4. In a machine of the character described, the combination of a pair of cylinders arranged in telescopic relation, means whereby the telescopic relation between the

cylinders may be controlled and the cylinders rotated, adjustable means disposed about opposite ends of the cylinders for clamping the material to be operated on in place, a member disposed transversely of the cylinders and said adjustable means for securing the intermediate portion of the material in place, with clamping means disposed at the ends of the transversely disposed member and adapted to engage with the circumferential walls of the cylinders and with said transversely disposed member, and eccentric means for forcing said clamping means into gripping relation with the circumferential walls of the cylinders.

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