

**April 16, 1935.**

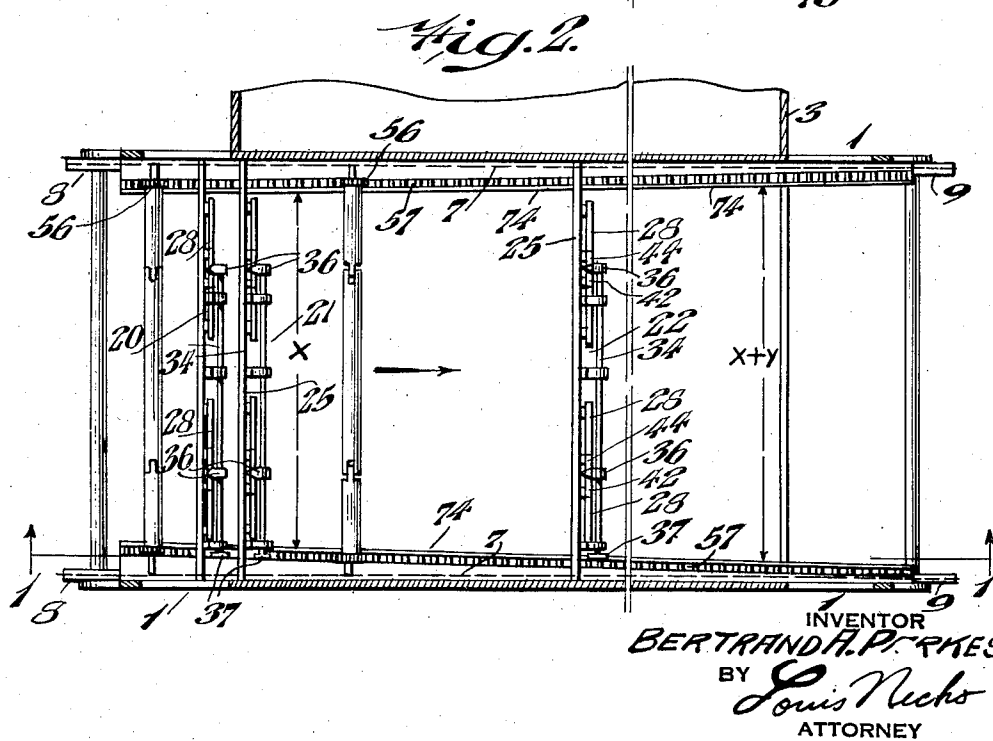
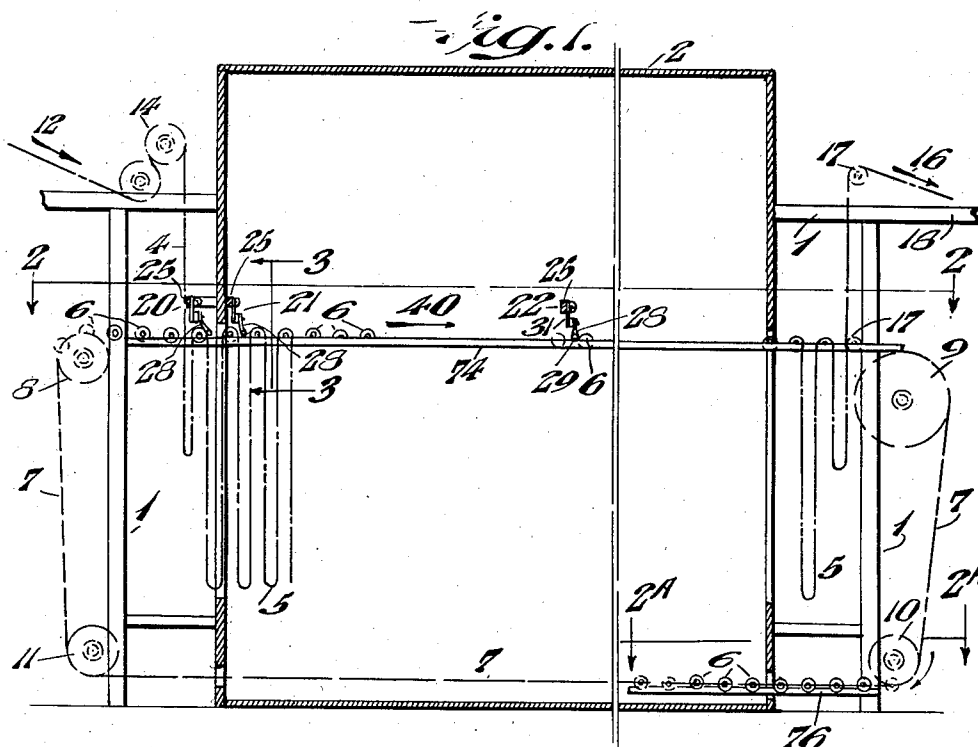
**B. A. PARKES**

**1,997,696**

### CLOTH DRYING AND SPREADING MACHINE

Filed Nov. 2, 1933

4 Sheets-Sheet 1



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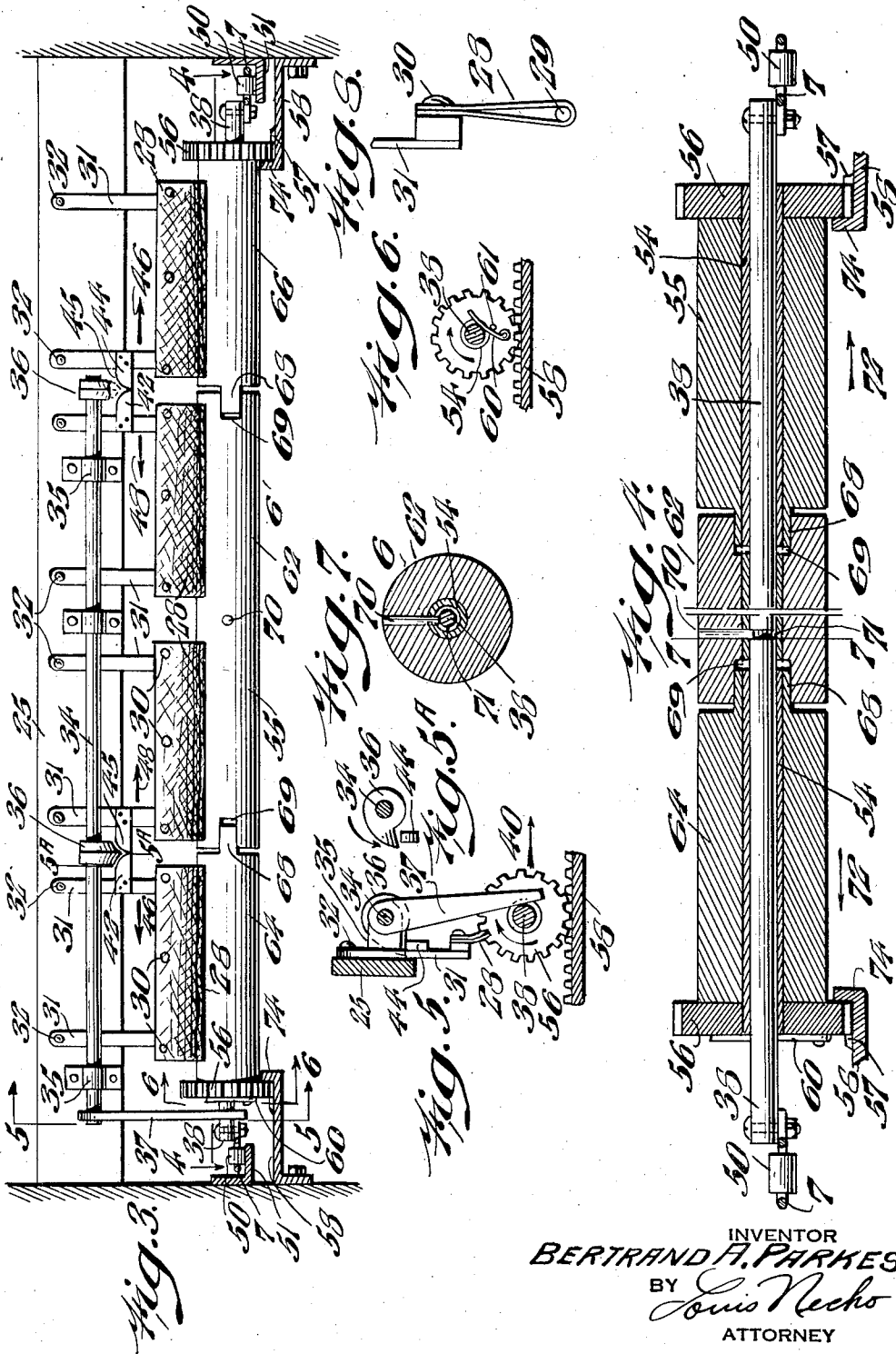
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CLOTH DRYING AND SPREADING MACHINE

Filed Nov. 2, 1933

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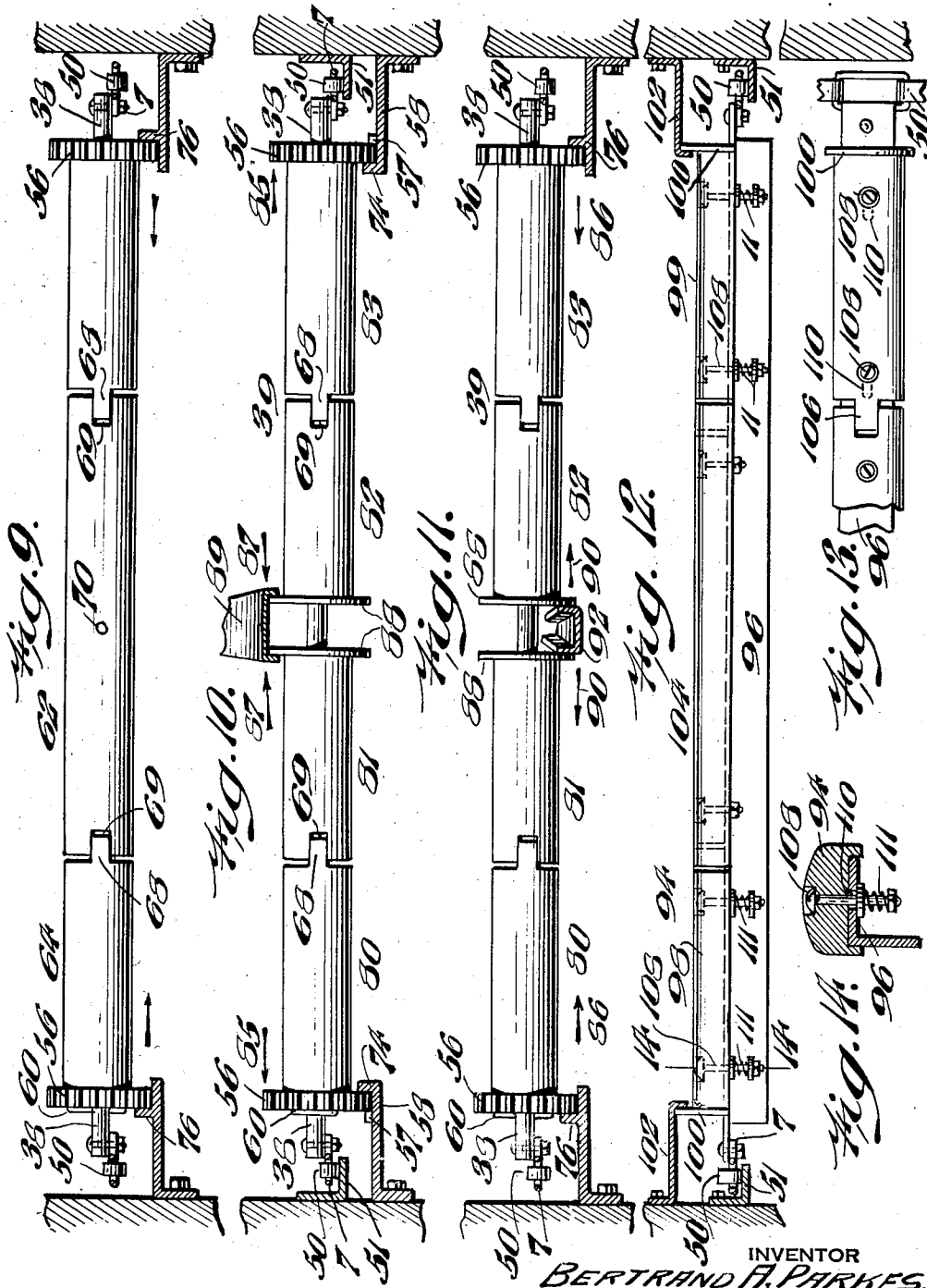
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CLOTH DRYING AND SPREADING MACHINE

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INVENTOR  
BERTRAND A. PARKES,  
BY *Louis Necho*  
ATTORNEY



## UNITED STATES PATENT OFFICE

1,997,696

## CLOTH DRYING AND SPREADING MACHINE

Bertrand A. Parkes, Philadelphia, Pa.

Application November 2, 1933, Serial No. 696,304

11 Claims. (Cl. 26—54)

My invention relates to a new and useful cloth drying and spreading machine which includes means for forming the cloth into spaced loops to be subjected to currents of hot air or other heating media and which also includes means for effectively spreading the cloth during its progress through the drying chamber of said machine to eliminate any wrinkles or irregularities which may form in the wet cloth while it is fed into the drying machine.

My invention still further relates to a spreading and drying machine which includes means for effecting a gradual, progressive spreading of the cloth on one face thereof in combination with means for producing successive, repeated spreading actions on the other face of the cloth, both of these spreading actions being effected automatically and without any attention on the part of the operator or any attention for special adjustment of the machine.

To the above ends, my invention consists of a cloth drying machine comprising the necessary frame work for supporting a drying chamber through which the cloth is adapted to pass, means for propelling the cloth through the machine, means for directing a heating medium against the cloth to be dried, telescoping poles for supporting loops of the cloth during its progress through the machine, means for effecting gradual expansion of each of said poles as it passes through the drying chamber, means for collapsing or contracting said poles after their exit from the drying chamber, and means suspended above the poles supporting the loops of cloth in the drying chamber for exerting repeated spreading action on the upper surface of the loops of cloth supported on said poles.

In the accompanying drawings:

Fig. 1 represents a diagrammatic view partly in section and partly in elevation taken generally along the line 1—1 of Fig. 2 showing a drying machine embodying my invention.

Fig. 2 represents a diagrammatic view partly in section and partly in elevation taken generally along the line 2—2 of Fig. 1.

Fig. 2A represents a fragmentary diagrammatic view partly in section and partly in elevation taken along the line 2A—2A of Fig. 1.

Fig. 3 represents on an enlarged scale a diagrammatic view partly in section and partly in elevation taken along the line 3—3 of Fig. 1.

Fig. 4 represents a view partly in section and partly in elevation on lines 4—4 of Fig. 3.

Fig. 5 represents a diagrammatic fragmentary

view partly in section and partly in elevation on line 5—5 of Fig. 3.

Fig. 5A represents a section on line 5A—5A of Fig. 3.

Fig. 6 represents a fragmentary diagrammatic view partly in elevation and partly in section on line 6—6 of Fig. 3.

Fig. 7 represents a vertical sectional view on line 7—7 of Fig. 4.

Fig. 8 represents a side elevation of the details of construction of one of the stretching devices illustrated in Fig. 3.

Fig. 9 represents a fragmentary view partly in elevation and partly in section of one of the telescoping poles illustrating the means of collapsing or contracting said poles from the expanded position.

Fig. 10 represents a fragmentary diagrammatic view of a modified form of telescoping pole showing further means for expanding the pole.

Fig. 11 is a view similar to Fig. 10 showing means for collapsing or contracting the modified form of construction shown in Fig. 10.

Fig. 12 shows a still further modified form of the telescoping pole with means for expanding said pole.

Fig. 13 represents a fragmentary plan view of the pole shown in Fig. 12 illustrating details of construction.

Fig. 14 represents a section on line 14—14 of Fig. 12.

Fig. 15 represents a still further modified form of the telescoping pole.

Fig. 16 represents on an enlarged scale a section on line 16—16 of Fig. 15.

Fig. 17 represents a fragmentary sectional view on an enlarged scale showing details of construction of the modified form shown in Figs. 15 and 16.

Fig. 18 represents a section on line 18—18 of Fig. 16.

Referring to the drawings in which like reference characters designate like parts, my drying machine comprises a suitable frame work or housing 1, a drying chamber 2 which preferably communicates with a heating chamber 3 adapted to contain any drying medium, such as a fan and heating coils, or their equivalents, which form standard parts of a drying machine of this character and which are not shown, since they are well known to persons skilled in the art and do not form a part of the present invention, it being sufficient to state that the heating medium developed in the chamber 3 is directed into the drying chamber 2 through which the cloth 4 to

be dried progresses in the form of loops 5 carried on poles 6 which in turn are carried at their ends by a continuous sprocket chain or the like 7 which travels endlessly over the sprocket wheels 8, 9, 10 and 11 to make a complete journey through the drying machine, the cloth 4 being fed in the direction of the arrow 12 by means of any suitable feeding rolls 14 and emerging in the direction of the arrow 16 over any suitable delivery rolls 17 on to a platform or the like 18. The parts thus far described, together with the heating and blowing or other drying media to dehydrate the loops 5 of the cloth 4 are, as stated, conventional and form no part of the present invention. Hence it is not deemed necessary to illustrate or describe them in further detail.

In order to subject the upper surfaces of the loops 5 of the cloth to one or more spreading actions, before its entry into and during its progress through the drying chamber, I position one (or more) of my novel spreading devices 20 in advance of the drying chamber 2 and one or more such spreading devices 21 and 22 suitably spaced within the drying chamber 2 as diagrammatically illustrated in Fig. 1. The spreading devices 20, 21 and 22, etc., as will be seen in Fig. 3, are suspended from a cross bar or other supporting member 25 suitably secured to the side walls or frame work of the drying machine. Each of the spreading units consists of a flexible member 28 preferably doubled upon itself and provided with a weight 29, as shown in Fig. 8, said flexible member being fastened at 30 to the arms 31 which in turn are pivoted at 32 to the supporting member 25 to render said flexible members 28 movable in either direction on the pivots 32. 34 represents a shaft rotatable in the bearings 35 and carrying fast the cams 36. To one or both ends of the shaft 34 is rigidly secured the arm 37 which normally rides on the shaft 38 of the poles 6 so that as each pole progresses through the drying chamber in the direction of the arrow 40 in Fig. 1 the shaft 38 will serve to trip the arm 37 thus rotating the shaft 34 in a counter-clockwise direction to force or wedge the tapered ends of the cams 36 between the cross links 42 and 44 which are provided with the curved edges 45 (to facilitate entry of the wedge or cam 36 therebetween) and which are carried by the juxtaposed arms 31 which support adjacent spreading units 20, 21 and 22, etc., as shown in Fig. 3. From this construction it will be seen that each pole 6 as it progresses through the machine, both before and after it enters the drying chamber 2, will pass under one or more of the spreading units 20, 21 and 22 and that each pole 6 serves to actuate each spreading unit as it arrives under it successively by the tripping of the lever 37 by means of the shaft 38 which carries the pole 6 to turn the shaft 34 which carries the wedges 36 to force said wedges between the cross links 42 and 44 and thus to push the adjacent spreading units which carry the cross links acted upon by the cam 36 in opposite directions, as shown by the arrows 46 and 48 in Fig. 3. As the spreading units 20, 21 and 22, etc., are thus actuated in opposite directions by the means just described the weighted flexible members 28 thereof bear upon the cloth loop 5 carried by the pole on which they act to effect a wiping action on the cloth outwardly from the center thereof towards the edges. In Fig. 3, I have shown a pole adapted for supporting two widths of cloth simultaneously and in this construction the left hand pair of spreading units will act on one piece of goods while the right hand

pair of spreading units will act on another piece of goods. In this connection, it is pointed out that this construction is adapted to the drying and spreading of any number of pieces or rolls of goods by merely duplicating the pairs of units referred to and by correspondingly altering the construction of the pole which supports the cloth rolls on which the spreading units described are adapted to act.

In order to subject the underside of the cloth loop 5 to a spreading action, I employ expanding poles 6 of the construction shown in Fig. 3, from which it will be seen that each pole 6 comprises the supporting shaft 38 hereinabove referred to, which is secured at its ends to the chain 7 which travels as at 50 on the supporting bracket 51 carried by the frame of the machine. On the shaft 38 revolves the pipe 54 which carries fast the wooden covering 55 and the cog-wheels 56 which are adapted to engage the racks 57 on the brackets 58 carried by the frame of the machine. This gives the pole 6 a rotary motion on the shaft 38 while the latter progresses horizontally through the machine with the progress of the chain 7 over the sprockets 8, 9, 10 and 11. In order to prevent loose rotation of the pole 6 on the shaft 38, one (or both) of the cog-wheels 56 is provided with the flat spring 60 pivoted at 61 and confined between the stop 61 and the shaft 38, as best illustrated in Fig. 6. Still referring to the construction disclosed in Fig. 3, it will be seen that each pole is formed of a central relatively large section 62 and two end relatively smaller sections 64 and 66, the sections 64 and 66 being provided with tongues 68 which engage corresponding openings 69 in the opposite ends of the central section 62, as best shown in Fig. 4. The pipe 54 surrounding the shaft 38 is also formed of three pieces to correspond to the sections 62, 64 and 66 of the wooden covering 55, also as shown. The central section 62 is fastened against lateral movement but is permitted rotary movement on the shaft 38 by means of the pin 70 which passes through the corresponding section of the pipe 54 and which engages a groove or keyway 71 in the shaft 38, as best seen in Figs. 4 and 7. In order to be able to expand the pole shown in Figs. 3 and 4, the end sections 64 and 66 are moved away from the central section 62 in the direction of the arrows 72 in Fig. 4 by means of the guide tracks 74 engaging the cog-wheels 56 at either end of the pole, said tracks being gradually narrowed from the delivery end to the inlet end of the drying chamber, as best shown in Fig. 2. In other words, as the pole 6 enters the drying chamber 2 the cog-wheels 56 thereof are engaged by the tracks 74 at their narrowest point so that as the tracks 74 widen or become further apart towards the delivery end of the drying chamber the cog-wheels 56 carried by the end sections 64 and 66 are spread further apart, thus gradually and progressively spacing the sections 64 and 66 from the central section 62 and thus lengthening the overall length of the pole. Thus the pole is shortest when it enters the machine and reaches its maximum length at the end of its travel in the drying chamber 2 and this results in exerting a very gradual spreading action against the under-surface of the loop of cloth 5 carried by the pole as it progresses through the drying chamber. In order to bring this out more clearly in Fig. 2, I have designated the distance between the tracks 74 at the feeding end of the drying chamber 2 as "x" and have designated the distance between the tracks 74 at the exit or delivery end of the drying

chamber as "x+y". In order to collapse or contract the pole thus stretched or expanded during its progress in the drying chamber 2, I have, as shown in Fig. 2A provided corresponding guide tracks 76 positioned at the bottom right hand corner of the machine (as shown in Fig. 1), the tracks 76 being made to taper from the delivery end of the machine towards the feed or inlet end thereof, so that when a pole has delivered the loop of cloth thereon and has traveled over the sprockets 9 and 10 it enters between the guide tracks 76 at their widest point designated "x", and as the pole progresses in its return journey through the bottom of the machine to pass over the sprockets 11 and 8 it passes through the guide tracks 76 and emerges from said tracks at their narrowest point "x-y", thus collapsing the pole from the open expanded position shown at the right hand end of Fig. 2A to the collapsed or contracted position shown at the left hand end of Fig. 2A, in which position the pole again receives a loop of cloth and enters the drying chamber at the feed end thereof, again to be expanded by the gradually widening guide tracks 74 until it leaves the drying chamber at the delivery end thereof. From this it will be seen that each pole is expanded or stretched progressively during its travel through the drying chamber and is contracted or collapsed at the bottom of the machine. Inasmuch as it is necessary to effect a gradual expansion or stretching of the pole, the guide tracks 74 diverge very gradually, and, inasmuch as there is no necessity for any gradual collapsing or contracting of the poles, it will be seen that the return guide tracks 76 converge to the necessary extent over a very short distance.

Fig. 9 illustrates the manner in which the contracting or collapsing guide tracks 76 engage the wheels 56 on the pole during its return journey at the bottom of the machine.

In Fig. 10, I have shown a modified form of construction of a pole which in its internal construction is the same as that shown in Fig. 4, except that this pole is formed of four sections 80, 81, 82 and 83, preferably of equal size, the sections 80 and 83 being pulled outwardly in the direction of the arrows 85 by the guide tracks 74 (in Fig. 4) and being pushed inwardly towards the center in the direction of the arrows 86 by the guide tracks 76 (in Fig. 2A). In this construction the center sections 81 and 82 are drawn together in the direction of the arrows 87 by having flanges 88 which engage a tapered guide track 89 and are pushed apart in the direction of the arrows 90 by engagement of the flanges 88 with oppositely tapered guide tracks 92, it being understood that the movement of the sections 80 and 83 in the direction of the arrows 85 and the sections 81 and 82 in the direction of the arrows 87 takes place gradually while the pole is traveling through the drying chamber 2 from the inlet to the outlet end thereof. The movement of the section 82 in the direction of the arrow 87 and of the section 83 in the direction of the arrow 85 serves to spread or stretch a piece of goods draped thereon and the same is true of the sections 80 and 81. The contraction together of the sections 80 and 81 and 82 and 83 takes place after the pole has left the drying chamber and is free of the loops 5 of the cloth 4, preferably in the same manner described in connection with Fig. 2A. The guide tracks 89 and 92 are suitably secured to any part of the frame of the machine in a position to engage the flanges 88 of the middle sections 81 and 82.

In Fig. 12, I have shown a still further modified form of my invention in which I use a pole 94, of a cross section other than round, the pole 94 being secured to a bracket 96 which is at its ends connected to the chain 7 which carries the pole forwardly through the drying chamber 2 in the manner already described in connection with Fig. 1. In this construction the end sections 98 and 99 of the pole are provided with flanges 100 which engage tapering guide tracks 102 which serve gradually to pull the sections 98 and 99 away from the stationary or fixed central section 104, it being understood that other narrowing guide tracks corresponding to the guide tracks 76 in Fig. 2A are positioned at the bottom of the machine to act on the sections 98 and 99 to push them towards the center fixed section 104 to contract the pole in the same manner illustrated in connection with Figs. 2A, 9 and 11. The sections 98 and 99 have a tongue and groove connection 106 corresponding to the tongue and groove connection 68 and 69 in Fig. 4 and the sections of the pole proper 94 are secured to the supporting bracket 96 by means of pins or the like 108 which are adapted to move in the slots 110 to permit movement of the sections 98 and 99 of the pole proper 94 with respect to the supporting bracket 96. In order to prevent loose action and undesired movement of the sections 98 and 99, the pins 108 securing said sections to the supporting bracket 96 are preferably tensioned by means of the spring 111, as shown in Fig. 14. In this construction the pole does not revolve and simply progresses through the drying chamber 2 and is gradually elongated during its progress through the drying chamber by the pulling away of the sections 98 and 99 from the center section 104, the pulling away of the sections 98 and 99 from the center section 104 serving to spread or stretch the cloth draped thereover.

In Figs. 15 and 16, I have shown a still further modified form of my invention in which the shaft 38 has rotatable thereon the pipe sections 114 and 115, each of which carries a pole section 116 and 117. The pole construction proper is formed of two semi-cylindrical parts 118 and 119 which are suitably clamped together with the juxtaposed ends of the upper section 118 of each of the sections 116 and 117 overlapping the corresponding edges of the lower sections 119, as shown in Fig. 16. On the shaft 38 is mounted a cam 120, so that as the pole rotates over the shaft 38 the edges 122 of the upper half 118 of the pole sections 116 and 117 ride on the cam and hence are pushed apart in the direction of the arrows 124 to elongate the pole and spread the goods draped thereover. When the pole has completed one-half of a revolution and the edges 122 have dropped off the cam 120 the springs 126 will at once push the sections 116 and 117 together. In this construction the upper section 118 of the pole begins to expand just as it begins to receive a loop 5, and when in its rotation it has reached a point where said loop begins to rest on the lower fixed constant section 119 the edges 122 slide off the cam 120 and the sections 116 and 117 are brought together by action of the springs 126 at the outer ends of the sections 116 and 117. The sections 116 and 117 begin to expand again as in the rotation of the pole they again come into position to support the loop 5 of the cloth 4. In this construction the pole has an expanding and contracting action with each rotation thereof, thus subjecting the goods draped thereover to repeated

spreading actions during its progress through the drying chamber 2.

What I claim:

1. The combination with a drying machine, 5  
comprising a frame and a drying chamber adapted to receive the cloth to be dried, of sectional telescoping poles constituting the sole support of said cloth and travelling through said drying chamber, and means for expanding said poles 10  
during their progress through said drying chamber whereby the frictional engagement of said cloth with said pole serves to spread the cloth draped thereon during the drying operation.
2. The combination with a drying machine, 15  
comprising a frame and a drying chamber adapted to receive the cloth to be dried, of sectional telescoping poles constituting the sole support of said cloth and travelling through said drying chamber, means for expanding said poles during 20  
their progress through said drying chamber to spread the cloth draped thereon during the drying operation, and means outside of said drying chamber for contracting said poles after the cloth has been removed therefrom.
3. The combination with a drying machine, 25  
including a frame, a drying chamber and cloth supporting devices adapted to travel through said drying chamber, of spreading devices suspended from said frame above said cloth supporting devices and bearing upon said cloth, and means for 30  
actuating said spreading devices in opposite directions to effect a wiping action in opposite directions on the contiguous surface of said cloth.
4. The combination with a drying machine, 35  
comprising a frame, and a drying chamber, of sectional expandable poles constituting the sole support of the cloth to be dried and travelling through said drying chamber, means carried by said frame for expanding said poles, during their 40  
progress through said drying chamber to spread the cloth draped thereon during the drying operation, and means for contracting said poles.
5. The combination with a drying machine, 45  
comprising a frame and a drying chamber, of expandable poles adapted to support the cloth to be dried and to travel through said drying chamber, means for expanding said poles during their travel in said drying chamber to exert a 50  
spreading action on the contiguous surface of the cloth draped thereon, means for contracting said poles when said poles are not in engagement with the cloth, spreading devices suspended above said poles and adapted to bear upon the other surface of the cloth draped on said poles, and 55  
means for actuating said spreading devices in opposite directions to exert a wiping action on the corresponding surface of said cloth.
6. The combination with a drying machine,

comprising a frame and a drying chamber, of expandable poles adapted to support the cloth to be dried and to travel through said drying chamber, means for expanding said poles during their travel in said drying chamber to exert a spreading action on the contiguous surface of the cloth draped thereon, means for contracting said poles when said poles are not in engagement with the cloth, spreading devices suspended above said poles and adapted to bear upon the other surface of the cloth draped on said poles, and means for actuating said spreading devices in opposite directions to exert a wiping action on the corresponding surface of said cloth, said spreading devices being adapted to resume their normal position intermittently with the progress of the cloth supporting poles thereunder.

7. In a drying machine a sectional expandable pole adapted to constitute the sole support of the cloth to be dried, means for propelling said pole through said machine and means for expanding said pole simultaneous with the progress thereof.

8. In a drying machine a sectional expandable rotary pole adapted to constitute the sole support of the cloth to be dried, means for propelling said pole through said machine and means for expanding said pole simultaneous with the progress thereof.

9. In a drying machine a sectional expandable pole constituting the sole support of the cloth to be dried, means for propelling said pole through said machine, means for expanding said pole during its movement through the machine in one direction whereby the frictional contact of the expanding pole and the cloth draped thereon serves to spread the latter, and means for contracting said pole after its disengagement with said cloth.

10. In a drying machine the combination of expandable sectional poles adapted to support the cloth to be dried, means for expanding said poles to spread the cloth draped thereon, wipers suspended above said poles in contact with the upper surface of said cloth, and means for actuating said wipers to effect a wiping action in opposite directions on the upper surface of said cloth.

11. In a drying machine a sectional expandable pole supporting the cloth to be dried, means for propelling said pole through said machine and means for expanding said pole while supporting the cloth and progressing through the drying machine, whereby the frictional contact of the expanding pole with the under surface of the cloth supported thereby effects a spreading action on said cloth to remove wrinkles therefrom.

BERTRAND A. PARKES.