

W. SALISBURY.
FABRIC COATING MACHINE.
APPLICATION FILED JAN. 6, 1911.

1,023,398.

Patented Apr. 16, 1912.

3 SHEETS—SHEET 1.

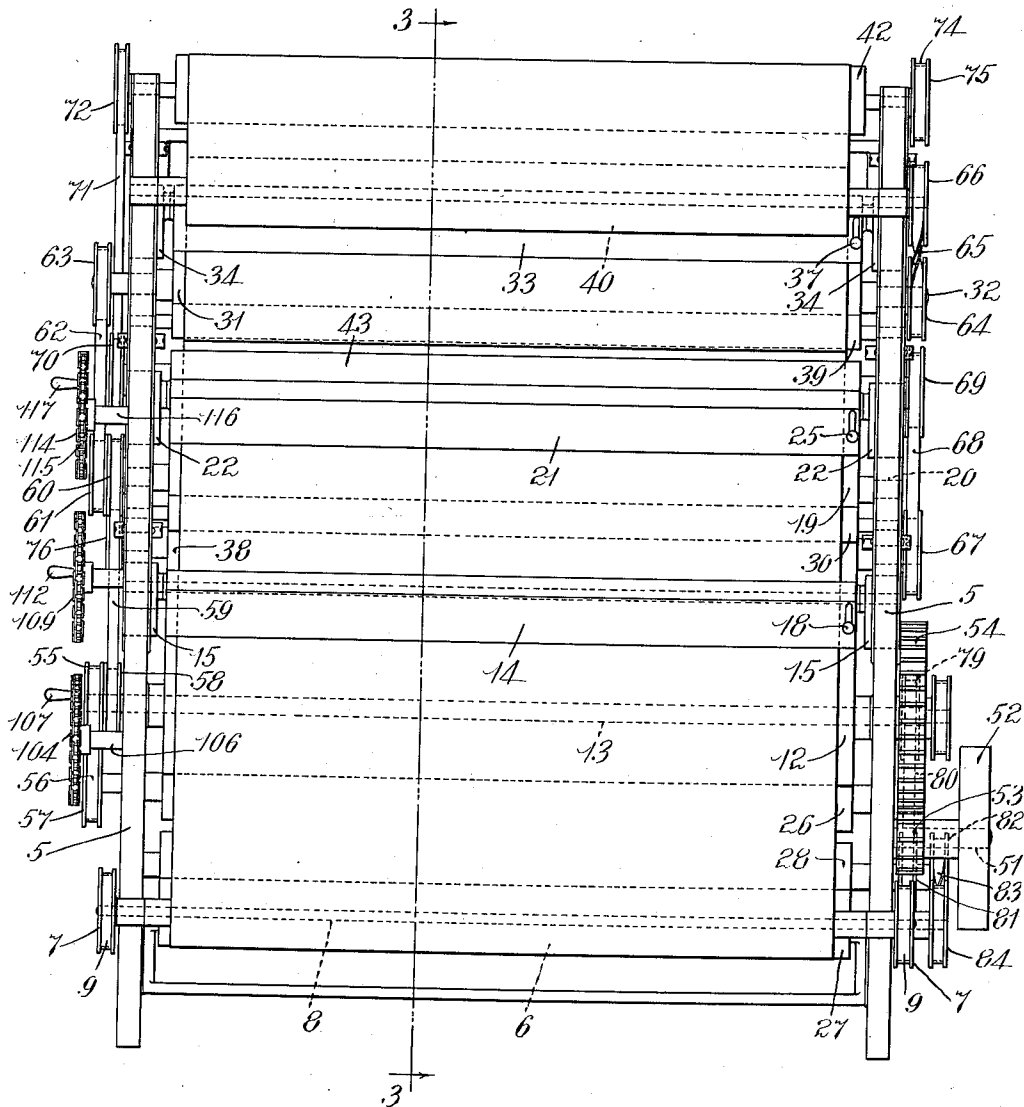


Fig. 1.

Witnesses.
Franklin E. Low
Leonard A. Powell.

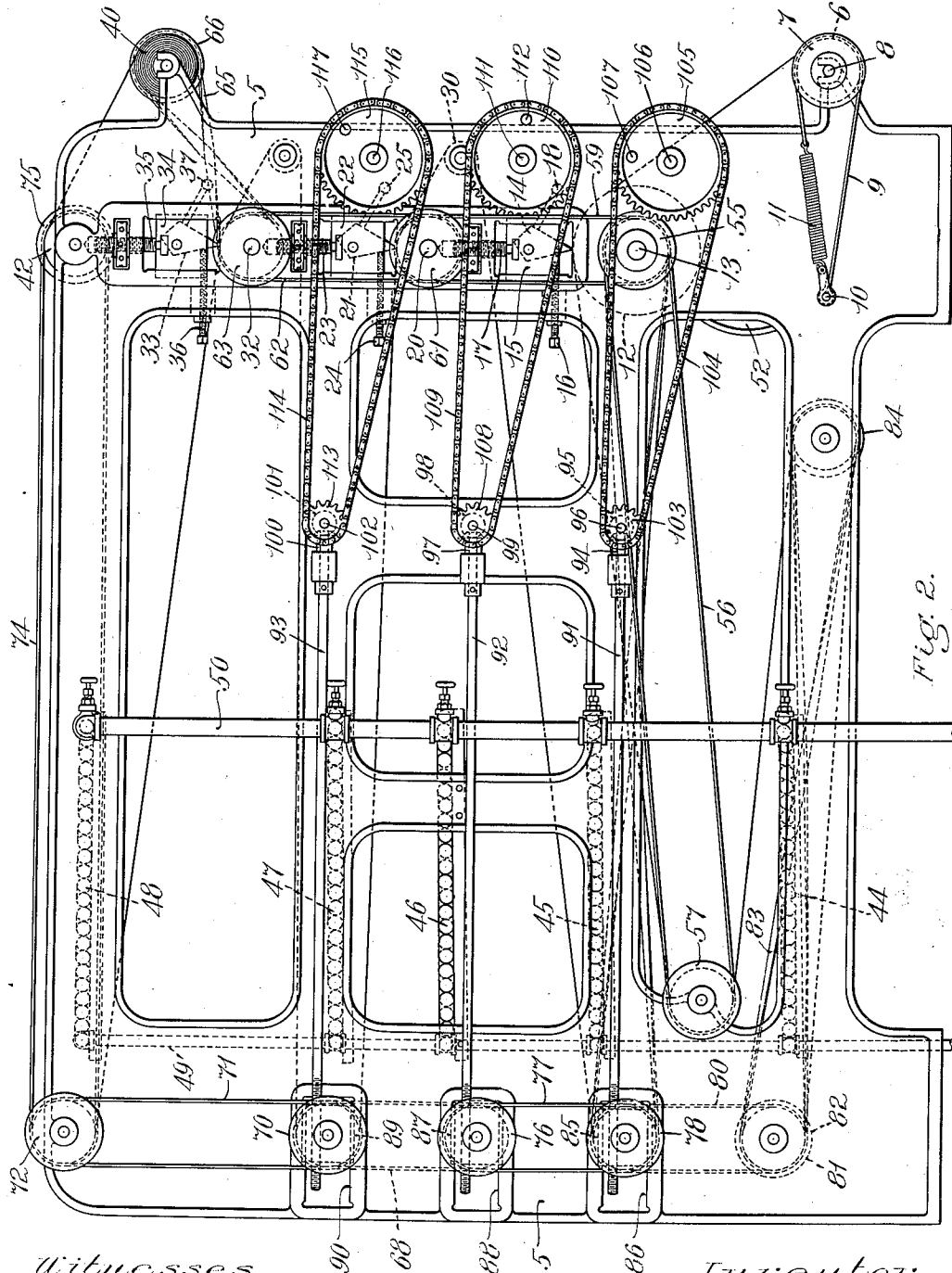
Inventor:
William Salisbury,
by his attorney
Charles S. Gooding.

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3 SHEETS—SHEET 2.



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3 SHEETS-SHEET 3.

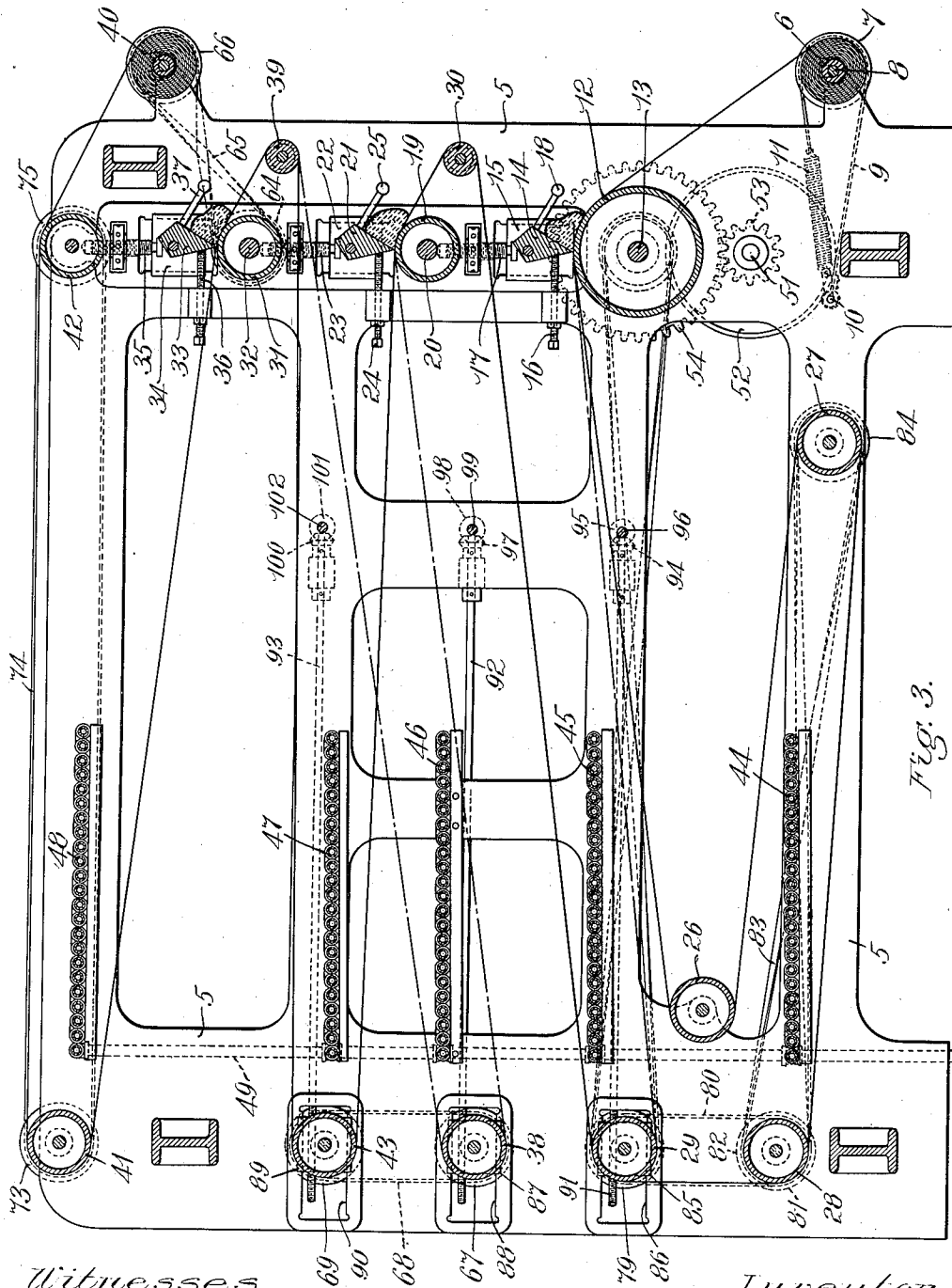


Fig. 3.

Witnesses.
Franklin & Low.
Leonard A. Powell.

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William Salisbury
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UNITED STATES PATENT OFFICE.

WILLIAM SALISBURY, OF STOUGHTON, MASSACHUSETTS.

FABRIC-COATING MACHINE.

1,023,398.

Specification of Letters Patent.

Patented Apr. 16, 1912.

Application filed January 6, 1911. Serial No. 601,134.

To all whom it may concern:

Be it known that I, WILLIAM SALISBURY, a citizen of the United States, residing at Stoughton, in the county of Norfolk and State of Massachusetts, have invented new and useful Improvements in Fabric-Coating Machines, of which the following is a specification.

This invention relates to improvements in machines for coating fabrics with rubber and the like.

Heretofore, in the manufacture of rubber coated cloth, it has been customary to employ a single set of coating instrumentalities by means of which a single coating of rubber was applied to the cloth and after the whole web of cloth had been passed through the machine once and hardened, it was passed through the machine a second time and then a third time so that it should have the requisite thickness of rubber on it. This method, as heretofore practiced, has been necessarily slow and tedious and the cost of manufacture exceedingly high.

The object of my invention is to provide a machine by means of which the speed of manufacture of rubber-coated fabrics may be increased and the cost of manufacture correspondingly decreased, and the object is further to provide a machine in which the fabric may be given its successive coatings of rubber by a series of coating instrumentalities embodied in one and the same machine and so arranged that just the proper interval of time shall elapse between the several coating operations so as to permit each coat to properly harden before the next is applied.

Another object is to provide a conveniently operated means whereby the slack in the fabric may be taken up and the fabric maintained taut and smooth while passing through the machine.

To these ends, my invention consists in the novel features of construction and in the combination and arrangement of parts set forth in the following specification and particularly pointed out in the claims.

Referring to the drawings: Figure 1 is a front elevation of a fabric-coating machine embodying my invention. Fig. 2 is an elevation of the machine viewed from the left of Fig. 1. Fig. 3 is a sectional view taken on line 3—3 of Fig. 1, looking toward the right.

Like numerals refer to like parts throughout the several views of the drawings.

In the drawings, 5 is the frame of the machine suitably constructed to support the various operating parts.

6 is a fabric supply roll journaled in suitable bearings in the frame and having a suitable friction brake or brakes. In the present instance, each of these brakes consists of a brake drum 7 secured to the shaft 8 of the roll 6, this brake drum being partly encircled by a brake band 9 secured at one end to a fixed pin 10 and having its other end secured to one end of a helical torsional spring 11, the other end of said spring being also secured to said pin. These brakes just described act to prevent the fabric supply roll from rotating too freely and producing a slack in the fabric.

The fabric leads from the fabric supply drum 6 to suitable rubber coating instrumentalities preferably comprising a drum 12, this drum being secured to a shaft 13 journaled in suitable bearings in the frame 5. Located above the drum 12 and cooperating therewith and with the fabric thereon is a scraper 14 pivotally supported in bearing blocks 15 and free to swing toward the front of the machine, that is, toward the right, Fig. 3, but held against swinging movement in the opposite direction by means of a pair of stop screws 16 which it engages. The bearing blocks 15 may be vertically adjustable, if desired, and for that purpose have connected thereto suitable adjusting screws 17. The scraper 14 may be manually thrown into and out of engagement with the cloth on the drum 12 by means of a handle or handles 18 secured to said scraper.

The rubber coating instrumentalities just described, it will be understood, are old in this art and I do not claim them *per se*, but show and describe them as a part of an illustrative embodiment of my invention.

The rubber compound is applied to the fabric at this point in a manner well known to those skilled in the art by placing a small body of the compound upon the fabric and against the front of the scraper 14 so that when the fabric is drawn beneath the scraper a layer of rubber of the proper thickness is deposited on the fabric, the thickness of this layer, of course, being regulated by the height at which the scraper is adjusted.

Located preferably above the first set of coating instrumentalities just described is a second set of coating instrumentalities substantially like the first and comprising
 5 a drum 19 secured to a shaft 20 journaled in suitable bearings in the frame, a scraper 21 pivoted on bearing blocks 22 and provided with adjusting screws 23 and stop
 10 screws 24 to limit the swinging movement of the scraper in one direction, the scraper being provided with a suitable handle or handles 25.

In order that the fabric in passing from the first coating instrumentalities to the
 15 second shall have sufficient time elapse between the two coating operations, I provide suitable means to guide the fabric from the first set of coating instrumentalities to the second and preferably such means guides the
 20 web of fabric in a tortuous path from one set to the other. For this purpose, I provide a series of rolls 26, 27, 28, 29 and 30 which the fabric is led to in the order named as it passes from the first coating instrumen-
 25 talities. These rolls are suitably arranged so as to support the fabric and guide the same in a path to and fro between the first and second fabric coating instrumentalities so that the distance from the first to the
 30 second set of said instrumentalities measured along the line of travel of the fabric is great enough to permit the rubber coating to be properly hardened before receiving its
 35 second coat, the hardening of the rubber coating being accomplished by a suitable means hereinafter described for subjecting the same to heat.

The roll 30, it will be understood, is placed in front of the drum 19 or, in other
 40 words, said drum is interposed between the roll 30 and the roll 29 and preferably the roll 30 is placed slightly below the drum 19, as shown in Fig. 3, so that by this disposition of the roll the operator of the machine
 45 is enabled to inspect the fabric and remove any loose defective threads before the rubber coating is applied to the fabric.

The operation of the second set of coating instrumentalities is substantially the
 50 same as that of the first set, it being understood that the scraper will be so adjusted as to cause the second layer of the rubber to be applied to the first layer.

The third set of fabric coating instrumen-
 55 talities is constructed substantially the same as the first two and consists of a drum 31 secured to a shaft 32 journaled in suitable bearings in the frame, a scraper 33 pivotally supported upon a pair of bearing blocks
 60 34 which are adjustable vertically by means of adjusting screws 35, there being provided stop screws 36 to limit the swinging motion of the scraper in one direction and there being provided a handle or handles 37 by
 65 means of which the scraper may be swung

into and out of coöperative relation with the drum and fabric thereon.

Interposed between the second and third sets of fabric coating instrumentalities are
 70 suitable means for supporting and guiding the fabric along its path from one to the other, said means preferably consisting of two rolls 38 and 39, the latter being arranged with respect to the drum 31 in the
 75 same relation that the roll 30 is arranged with relation to the drum 19, as hereinbefore described.

The operation of the third set of fabric coating instrumentalities just described is
 80 substantially the same as that of the first two hereinbefore described and a further description of the same will be unnecessary. Since the second coat of rubber requires considerably less time to harden than the first,
 85 the distance from the first set of coating instrumentalities to the second along the path of the fabric is correspondingly greater than the distance from the second to the third and accordingly a greater number of inter-
 90 mediate guide rolls are provided between the first and second than between the second and third. After the third coat of rubber has been applied to the fabric, the fabric is then led to a take-up roll 40, there being provided
 95 suitable means to support and guide the fabric on its way thereto, such means preferably consisting of rolls 41 and 42, the distance along the fabric from the third set of coating instrumentalities to the take-up roll
 100 being sufficient to permit the third coat of rubber to harden before the fabric is wound onto the take-up roll. In some cases, it may be desirable to apply only two coats of rub-
 105 ber to the fabric and in such cases instead of carrying the fabric from the second set of coating instrumentalities to the third and thence to the take-up roll, the fabric is carried from the roll 38 to a roll 43 and thence directly to the roll 42, from whence it passes
 110 to the take-up roll 40.

I will now proceed to describe the means
 by which the various rubber coatings are subjected to the action of heat. Located at
 115 suitable points along the line of travel of the fabric are coils of piping 44, 45, 46, 47 and 48 connected to and receiving a supply of steam from a stand pipe 49 and connected to a stand pipe 50 constituting an
 120 exhaust pipe. In practice, steam is circulated through these various coils and in this way the fabric, after it has been coated, is subjected to the proper degree of heat at different points in its travel so as to be
 125 hardened sufficiently to receive the next coating and hardened sufficiently to be wound up on the take-up roll.

I will now proceed to describe the means
 for driving the various parts of the machine so that they shall perform their functions
 130 in a proper manner. Journaled on a stud

51 is a driving pulley 52 having secured thereto a pinion 53 meshing into a gear 54 secured to the shaft 13. Secured to the opposite end of the shaft 13 is a pulley 55 connected by a belt 56 to a pulley 57 secured to the shaft of the roll 26, this belt serving to rotate said roll in the proper direction to feed the fabric from the drum 12. Secured to the shaft 13 beside the pulley 55 is a second pulley 58 connected by a belt 59 to a pulley 60 secured to the shaft 20 of the drum 19, this belt serving to rotate said drum in the proper direction to feed the fabric. A second pulley 61 secured to the shaft 20 beside the pulley 60 is connected to the shaft 32 of the drum 31, whereby said drum is driven in the proper direction to feed the fabric and apply the rubber thereto. To the opposite end of the shaft 32 is secured a pulley 64 connected by a crossed belt 65 to a pulley 66 secured to the shaft of the take-up roll 40, whereby said take-up roll is driven in the proper direction to impart a longitudinal feeding movement to the fabric to carry the same from the supply roll 6 in its path to the various fabric coating instrumentalities, it being understood that the drums which are positively driven and such of the guide rolls as are positively driven assist the take-up roll in feeding the fabric. Secured to one end of the shaft of the roll 38 is a pulley 67 connected by a belt 68 to a pulley 69 secured to the shaft of the roll 43, whereby the latter roll is driven in the proper direction. To the opposite end of the shaft of the roll 43 is secured a pulley 70 connected by a belt 71 to a pulley 72 secured to the shaft of the roll 41 and to the opposite end of the latter shaft is secured a pulley 73 connected by a belt 74 to a pulley 75 secured to the shaft of the roll 42. Secured to the shaft of the roll 38 is a pulley 76 connected by a belt 77 to a pulley 78 secured to the shaft of the roll 29 so that the latter roll is driven in the proper direction to feed the fabric. To the opposite end of the shaft of the roll 29 is secured a pulley 79 connected by a belt 80 to a pulley 81 secured to the shaft of the roll 28, and also secured to the shaft of the latter roll is a pulley 82 connected by a crossed belt 83 to a pulley 84 secured to the shaft of the roll 27. Thus it will be seen that with the exception of the rolls 26, 30 and 39, all of the rolls and drums with which the fabric contacts are driven and accordingly cooperate to impart a longitudinal feeding movement to the fabric so that the same shall be fed easily without any undue strain or stretch or wrinkling.

I will now proceed to describe the means whereby certain of the rolls are adjusted so as to take up the slack in the fabric. These rolls may be adjusted by any suitable means,

but I prefer to employ for this purpose the following mechanism. The shaft of the roll 29 is journaled in bearing blocks 85 mounted to slide horizontally in suitable ways 86 provided in the frame 5. In like manner, the shaft of the roll 38 is journaled at its opposite ends in bearing blocks 87 mounted to slide horizontally in suitable ways 88 provided in the frame 5. In like manner, opposite ends of the shaft of the roll 43 are journaled in bearing blocks 89 mounted to slide horizontally in suitable ways 90 provided in the frame 5. Two shafts 91 located on opposite sides of the machine and journaled on the frame 5 have screw-threaded engagement at their rear portions with the bearing blocks 85, respectively. In like manner, two shafts 92 journaled in suitable bearings at opposite sides of the machine have screw-threaded engagement with the bearing blocks 87, respectively. Similarly, on opposite sides of the machine are two shafts 93 having screw-threaded engagement at their rear portions with the bearing blocks 89, respectively.

Secured to the front ends of the shafts 91, respectively, are miter gears 94 meshing, respectively, into miter gears 95 secured to opposite ends of a shaft 96 extending at right angles to the shafts 91. In like manner, secured to the front ends of the shafts 92, respectively, are miter gears 97 meshing, respectively, into miter gears 98 secured to opposite ends of a shaft 99 journaled in the frame 5 and extending transversely of the shafts 92. Similarly, secured to the front ends of the shafts 93 are miter gears 100 meshing, respectively, into miter gears 101 secured to opposite ends of the shaft 102 journaled in the frame 5 and extending transversely of the shafts 93.

Secured to one end of the shaft 96 is a sprocket wheel 103 connected by a chain 104 to a sprocket wheel 105 journaled on a stud 106 and provided with a handle 107 by means of which the latter sprocket wheel may be rotated to impart a rotation to the shaft 96. By rotating this shaft, said shaft by reason of its connection at opposite ends with the bearing blocks 85 of the roll 29 acts to move both ends of said roll in unison either forward or backward, according to the direction of rotation of the sprocket wheel 105. In like manner, secured to the shaft 99 is a sprocket wheel 108 connected by a chain 109 to a sprocket wheel 110 journaled on a stud 111 and provided with a handle 112. Similarly, secured to one end of the shaft 102 is a sprocket wheel 113 connected by a chain 114 to a sprocket wheel 115 journaled on a stud 116 and provided with a handle 117. The operation of the last two adjusting mechanisms just described is identical with that of the first one and, in like manner, the rolls 38 and 43 are adjusted

horizontally to take up the slack in the fabric.

The placing of the three sets of coating devices in a vertical row at the front of the machine is of great practical advantage for the reason that this placing of the devices renders it possible for the operator to stand at the front of the machine and inspect the cloth as it passes each and every coating device. This placing of the coating devices, moreover, makes it possible to use the machine for coating fabrics with rubber which is a quick drying substance. Now it must be explained that the rubber hardens so rapidly that if the machine were to be stopped with the three masses of rubber at the three coating devices resting upon the fabric, the coated fabric would be ruined, because a thick streak of rubber would thereby be produced across the fabric at each and every coating device. Now it will be evident that it would not do to run the entire fabric right through the machine and thus leave the machine empty, because subsequently when it is desired to use the machine to coat a second roll of fabric it would be a difficult task and would take a long time to thread the new piece of fabric back and forth and around the various rolls of the machine. Consequently, in the operation of the machine when a length of fabric is being run through the machine and the operator sees that the supply of fabric on the roll is almost exhausted, he stops the machine for the purpose of attaching to the last end of the fabric a piece of cheap cloth of sufficient length to extend throughout the machine upon the various rolls.

It will be understood from the foregoing that when the machine is to be stopped for the purpose of attaching to the coated fabric the piece of cloth above referred to, something must be done to prevent the various masses of rubber from producing on the fabric the thick streak above referred to. The operator accomplishes this by instantly removing from the surface of the fabric the three masses of plastic rubber by means of a knife or scraper. This can be done very quickly and conveniently owing to the placing of all three coating devices in a vertical row at the front of the machine where they are instantly accessible and, moreover, where the operator can stand all the time and watch the progress of every inch of the fabric at each and all of the coating devices so as to be sure that they are producing perfect work. When the operator removes the rubber masses, as just described, he can then attach to the coated fabric the piece of cloth above referred to, after which he returns the rubber masses to their places and starts the machine into operation. When the last end of the coated fabric reaches the first coating device, the operator removes the mass of

rubber from that device, when the end reaches the second coating device, he removes the rubber from that device, and when the end reaches the third coating device, he removes the rubber from that device. He then stops the machine, thus leaving in and upon the machine the piece of uncoated cloth above referred to. At some later time when it is desired to coat another roll of fabric, the operator attaches the end of the new fabric to the end of the uncoated cloth and starts the machine into operation. When the first end of the new fabric appears at the three coating devices in succession, the operator places the masses of rubber upon the fabric at the three coating devices one at a time in succession. He is enabled to thus watch the advancing end of the fabric and put the rubber into place at the proper time, because of the disposition of the coating devices in a vertical row, one above another, where they are all in full view and instantly accessible.

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

1. A fabric coating machine having, in combination, a plurality of sets of instrumentalities for coating the fabric, each of said sets consisting of a roller and a cooperating scraper acting on opposite sides of the fabric and means to impart a longitudinal feeding movement to said fabric, the distance from the first of said coating instrumentalities to the second along the path of the fabric being greater than the distance from the second to the third.

2. A fabric coating machine having, in combination, a plurality of sets of instrumentalities for coating the fabric, each of said sets consisting of a roller and a cooperating scraper acting on opposite sides of the fabric, means to impart a longitudinal feeding movement to said fabric, the distance from the first of said coating instrumentalities to the second, along the path of the fabric, being greater than the distance from the second to the third, and means to support and guide said web between said coating instrumentalities.

3. A fabric coating machine having, in combination, a plurality of sets of instrumentalities for coating the fabric, each of said sets consisting of a roller and a cooperating scraper acting on opposite sides of the fabric, means to impart a longitudinal feeding movement to said fabric, the distance from the first of said coating instrumentalities to the second, along the path of the fabric, being greater than the distance from the second to the third, means to support and guide said web between said coating instrumentalities, and means for adjusting said supporting and guiding means thereby to take up slack in said fabric.

4. A fabric coating machine having, in combination, a plurality of sets of fabric coating instrumentalities, each of said sets consisting of a roll and a cooperating scraper acting on opposite sides of the fabric, means to impart a longitudinal feeding movement to said fabric from one of said sets to another, driving means connecting said rolls, whereby all of said rolls cooperate to impart a feeding movement to said fabric the distance from the first to the second fabric coating instrumentalities being greater than the distance from the second to the third, and means whereby said fabric may be subjected to the action of heat while passing from one to another of said coating instrumentalities.

5. A fabric coating machine having, in combination, a plurality of sets of fabric coating instrumentalities located one above another, each of said sets consisting of a roll and a cooperating scraper acting on opposite sides of the fabric, a series of rolls to support and guide said fabric in a path to and fro between the first fabric coating instrumentalities and the second, a roll to support and guide said fabric in a path to and fro between the second and third fabric coating

instrumentalities, and means for simultaneously adjusting opposite ends of one of said rolls thereby to take up the slack in the fabric.

6. A fabric coating machine having, in combination, a plurality of sets of fabric coating instrumentalities located one above another, each of said sets consisting of a roll and a cooperating scraper acting on opposite sides of the fabric, a series of rolls to support and guide said fabric in a path to and fro between the first fabric coating instrumentalities and the second, a roll to support and guide said fabric in a path to and fro between the second and third fabric coating instrumentalities, and another roll to guide the fabric to the second coating instrumentalities, the second coating instrumentalities being located between the last-mentioned roll and said series of rolls.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WILLIAM SALISBURY.

Witnesses:

LOUIS A. JONES,
SADIE V. MCCARTHY.