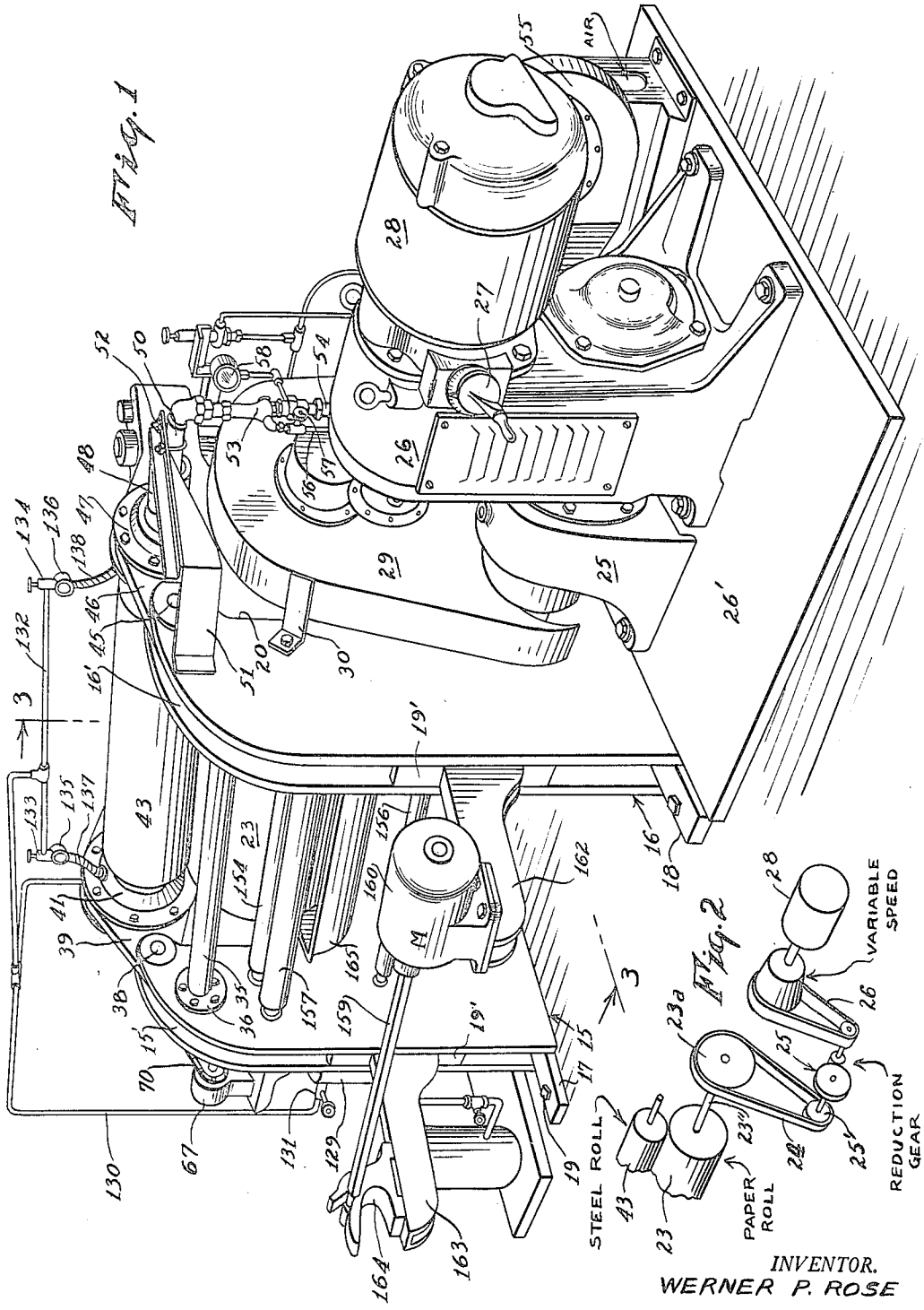
March 27, 1956 W. P. ROSE 2,739,397

CLOTH TREATING CALENDER

Filed June 25, 1953 4 Sheets-Sheet 1

Fig. 1



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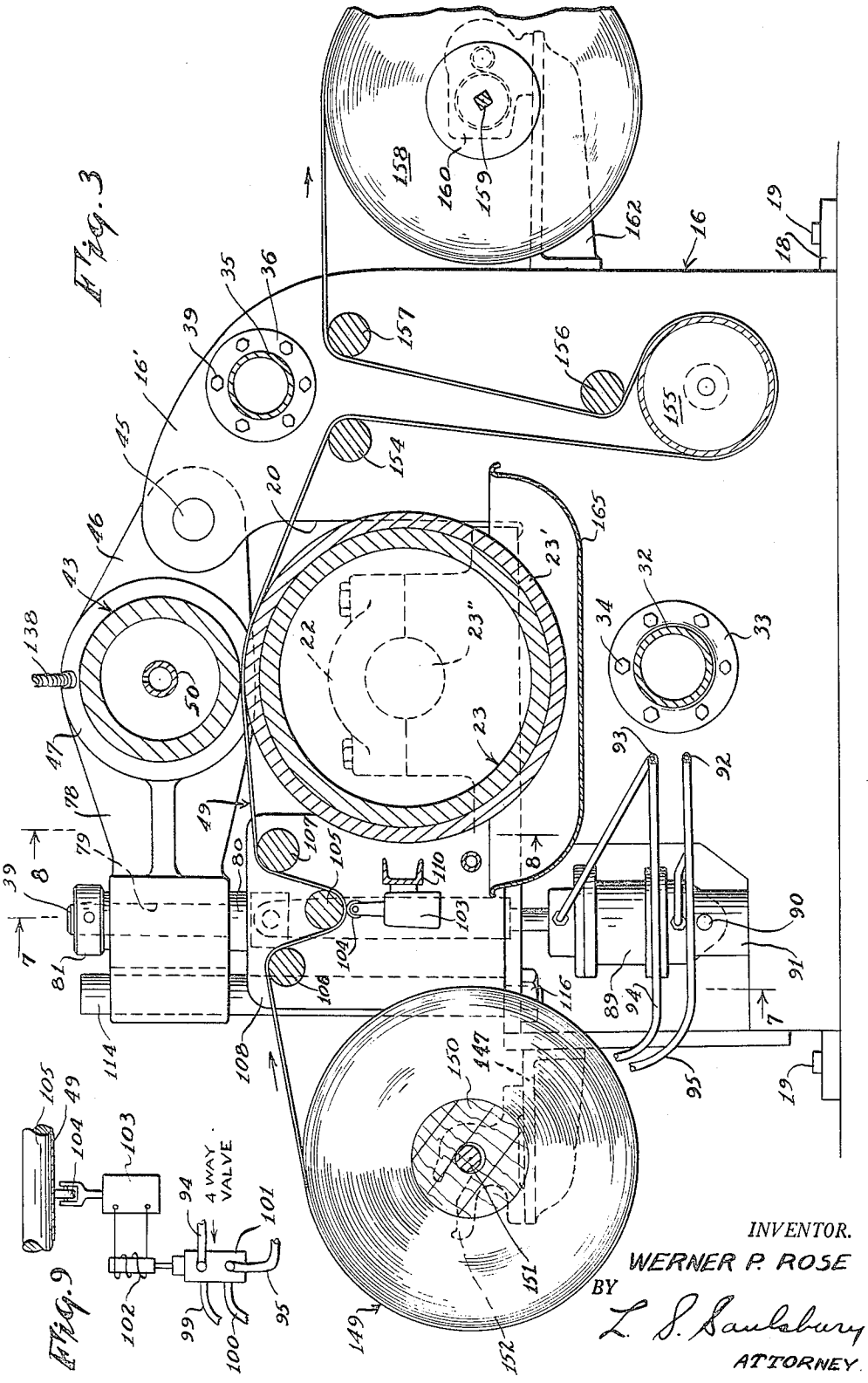
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CLOTH TREATING CALENDER

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CLOTH TREATING CALENDER

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Fig. 4

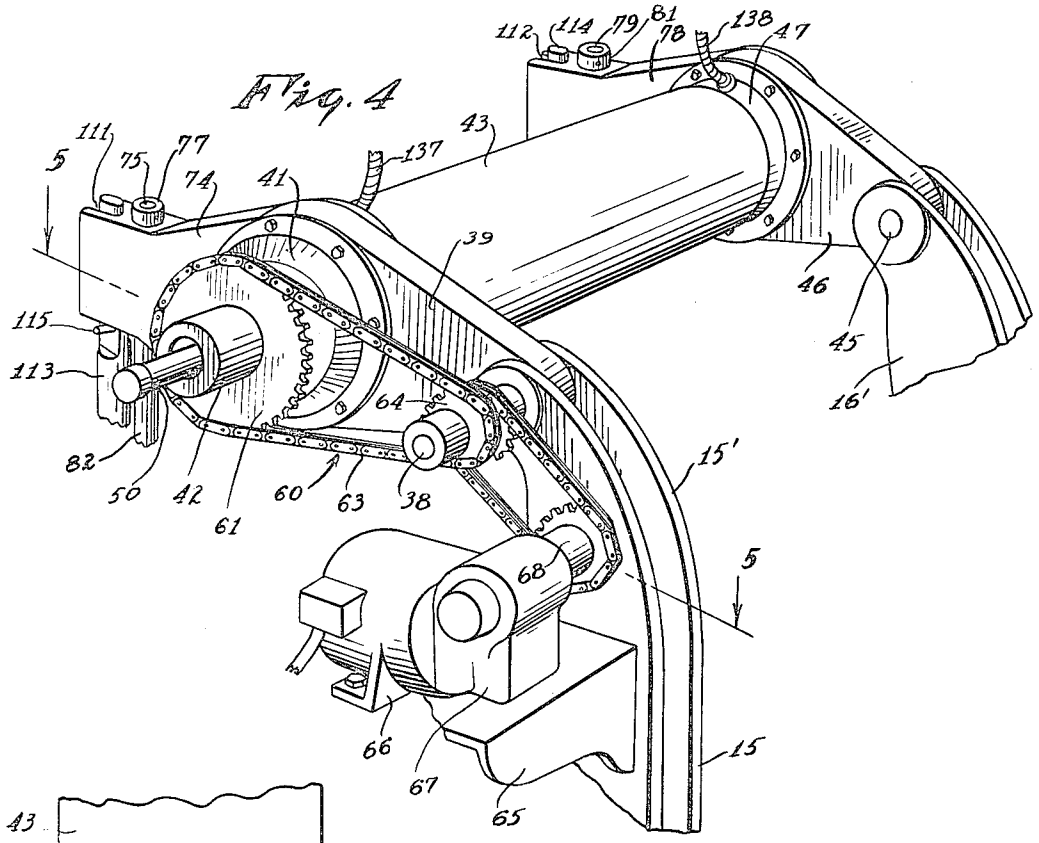


Fig. 5

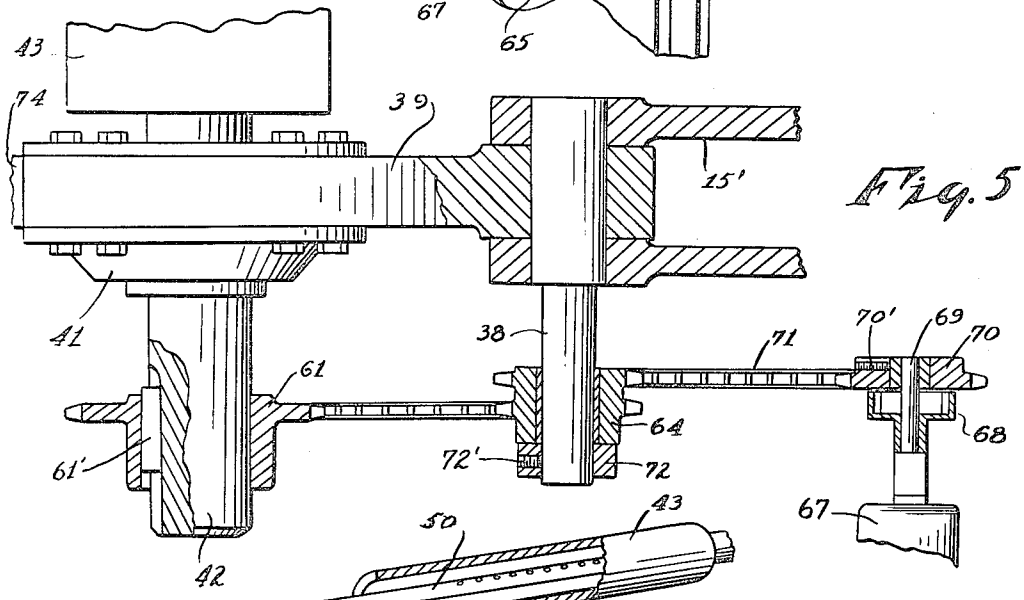
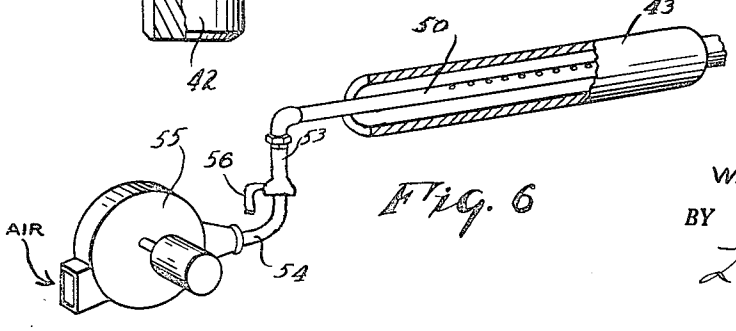


Fig. 6



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CLOTH TREATING CALENDER

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Fig. 7

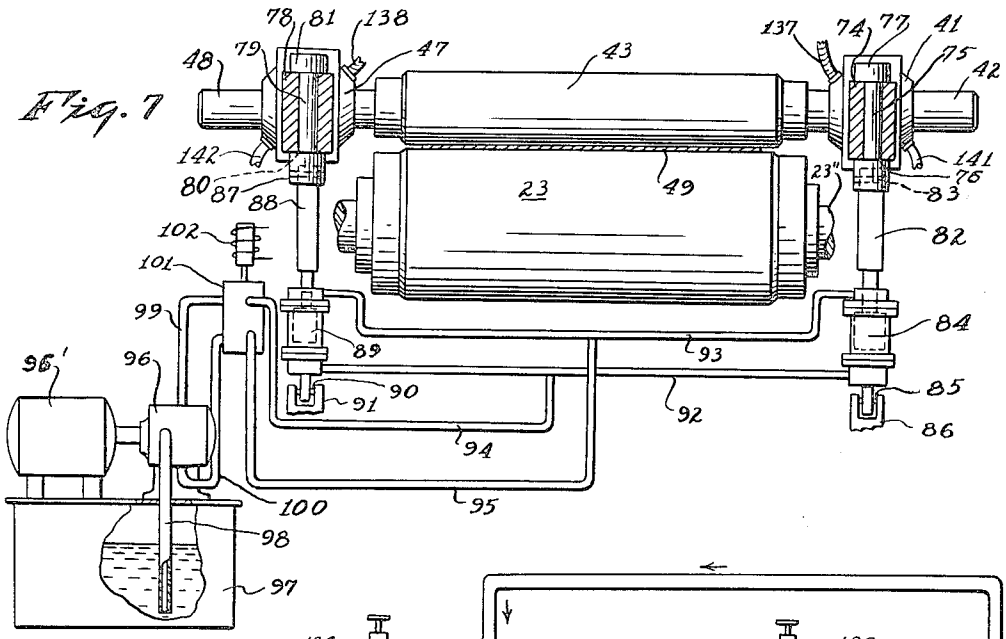
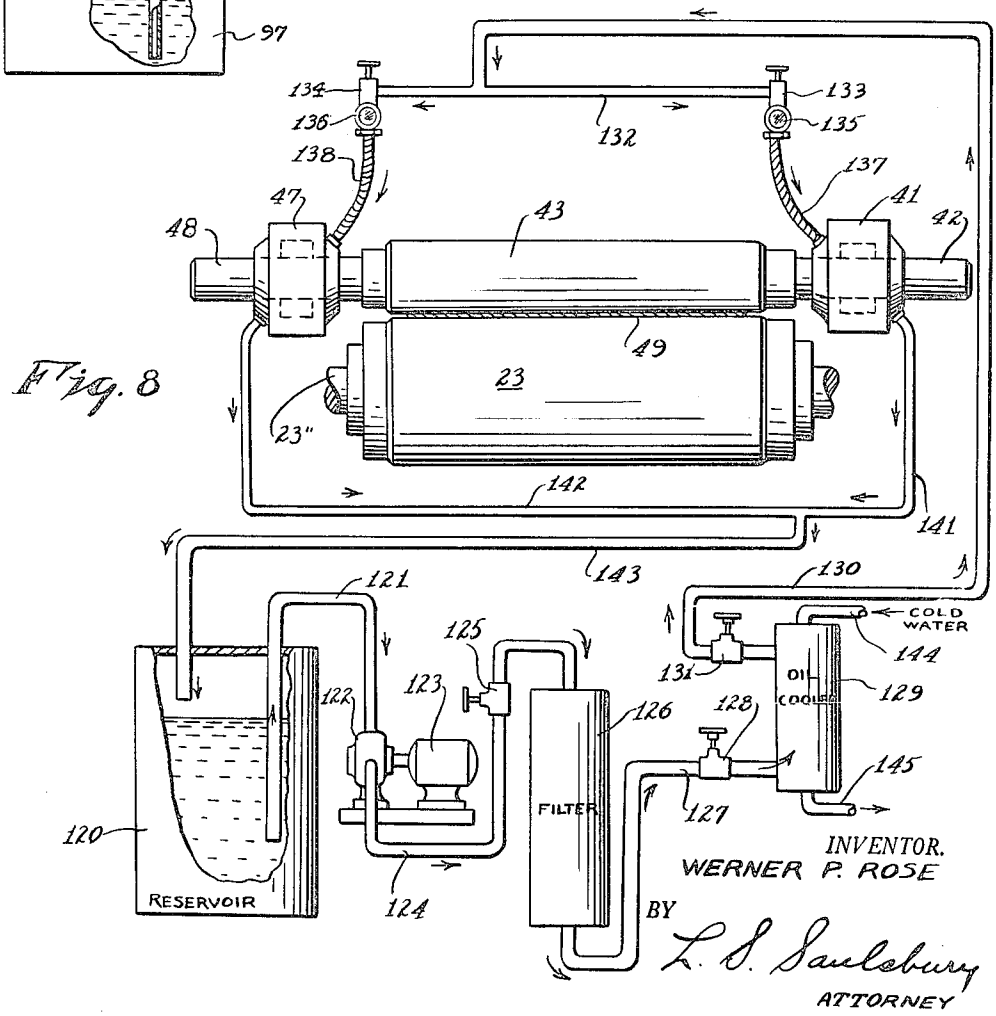


Fig. 8



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CLOTH TREATING CALENDER

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Application June 25, 1953, Serial No. 364,055

6 Claims. (Cl. 38—52)

This invention relates to a cloth treating calender.

It is an object of the present invention to provide a cloth treating calender in which the top, steel-cut gas-fired press roll is constantly driven at all times and never stops rotating, when out of contact with the cloth, through a free-wheeling overdrive arrangement whereby upon the roll being elevated, it will be driven so that no inertia is built up and uneven heat result to cause a scuff mark whenever the rolls are disengaged or re-engaged and so that heat will be distributed throughout the surface of the same and wherein any speed up of the paper roll beyond the constant speed of rotation of the steel roll will cause the steel roll to free-wheel and be driven by the paper roll and the cloth at the set speed thereof.

It is another object of the invention to provide a cloth-treating calender of the two-roll type in which the gas-heated, engraved steel top roll is the press roll with the hydraulic devices being connected thereto to effect the pressure upon the cloth and the large paper roll journalled in the frame structure instead of the large heavy paper roll having to be vertically adjusted when serving as the pressure roll.

It is another object of the invention to provide in a two-roll cloth-treating calender having a continually driven gas-heated, steel-top press roll a simple hydraulically adjustable pivotable supporting arm means for effecting the upward adjustment of the press roll, while maintaining its driving connection with a small motor, and also effective, upon bringing the top roll to bear upon the cloth and bottom paper roll to supply heavy working pressure upon the cloth and paper roll.

It is another object of the invention to provide in a two-roll cloth treating calender employing a gas-heated vertically-adjustable top press roll, a simple fluid control mechanism responsive to the seam of the cloth to automatically lift the top roll upon the increase in seam thickness of the cloth being detected and permitting the quick return of the top roll into engagement with the cloth as soon as the seam enlargement has passed and wherein the large paper roll will be protected.

Other objects of the invention are to provide a two-roll calender which may be used for embossing cloth, employing a vertically-adjustable top press roll, which is of simple construction, less expensive than other types of calenders to manufacture, has a minimum number of parts, a base and frame structure formed from standard plate stock, easy to assemble, self-contained and self-powered, easy to install at the cloth-treating plant, easy to maintain and having its own oil supply system for delivering a constant flow of oil to the bearings of the press roll, compact and consumes minimum space and efficient in operation.

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

Figure 1 is a front perspective view of the two-roll cloth-treating calender embodying the features of the present invention;

Fig. 2 is a skeletonized perspective view of the driving arrangement for the large paper roll;

Fig. 3 is an enlarged vertical sectional view of the machine as viewed on line 3—3 of Fig. 1;

Fig. 4 is an enlarged fragmentary perspective view looking upon the gas-heated, steel-engraved press roll showing the mounting of the same upon the frame and the over-running clutch drive chain mechanism therefor;

Fig. 5 is an enlarged fragmentary sectional view taken through the press roll mounting and the chain drive mechanism thereof and as viewed generally on line 5—5 of Fig. 4;

Fig. 6 is a diagrammatic and perspective view of the gas-heated top roll showing the connection of the fuel supply burner and the air fan supply connected thereon;

Fig. 7 is a fragmentary vertical sectional view taken generally on line 7—7 of Fig. 3, and showing the connection of the hydraulic devices with the top roll mounting members and showing diagrammatically the hydraulic fluid system;

Fig. 8 is a fragmentary vertical sectional view taken generally on line 8—8 of Fig. 3 and with a diagrammatic showing of the lubricating supply system for the top roll bearings;

Fig. 9 is a detail fragmentary and diagrammatic view of the seam jumper or feeler with its time delay and of the magnetically operated four-way valve for controlling the lifting of the top roll.

Referring now to the figures and particularly to Figs. 1 and 3, 15 and 16 represent respectively end frame structures longitudinally spaced from each other and adapted to be stood upright upon the floor and which have respectively base members 17 and 18 that are connected by floor bolts 19 to the floor surface. Each end structure comprises a base plate and vertically-extending plates held in spaced relationship from one another by appropriate spacing members 19' only certain of which are shown lying within and between the plates. The ends of the base plate extend beyond the vertically-extending plates to receive the bolts 19.

Each of the end structures is cut away as indicated at 20, Fig. 3, to provide an opening for a large two-part bearing indicated generally at 22. These bearings 22 support a large and heavy paper roll 23 that has a hard paper surface 23' thereon. This paper roll 23 has shaft extensions 23'' extending respectively through the respective bearings 22, and on the shaft extension extending through the bearing on the end structure 16 is a chain pulley gear 23a, shown diagrammatically in Fig. 2 that is connected by a chain drive 24 with a gear 25' of a gear reduction unit 25, Fig. 1, that is in turn connected to a variable speed drive mechanism 26 that is regulated by a control device 27 in the well known manner. A large heavy duty electric motor 28 drives the variable speed drive mechanism 26, the reduction gear unit 25 and the large paper roll 23 at a predetermined speed. A guard housing 29 is secured to the end structure 16 by brackets 30, to enclose the pulley 24, Fig. 1. These devices are all mounted on a base plate 26'.

The end structures are held transversely spaced from one another by a transversely-extending pipe 32 having a flange 33 on each end which is fixed by bolts 34 to the structure and a transverse pipe 35 having a flange 36 on each end and fixed to the structure by bolts 37 thereof. The transverse pipe 35 is in an elevated position and extends across the front of the machine between upstanding portions 15' and 16' of the respective end structures 15 and 16.

To the upstanding portion 15' of the end structure 15, there is pivotally connected by a pin 38, a press roll sup-

porting arm 39 having an enclosed oil bearing 41 in which a shaft extension 42 of a gas-fired engraved steel press roll 43 is journalled, Fig. 4. At the opposite side of the machine and pivotally connected to the upstanding portion 16' of the end structure 16 by a pivot pin 45 is a press roll supporting arm 46 having an enclosed oil bearing 47 in which an extension 48 of the top roll 43 is journalled. It will thus be seen that the press roll 43 is journalled between oil bearings 41 and 47 in the pivotable supporting arms 39 and 46 and that through these arms the roll 43 can be raised or lowered upon these arms being pivoted on the pivot pins 38 and 45 of the respective structures 15 and 16.

The press roll 43 has a steel surface which is engraved to treat cloth 49 in any desired manner, such as by embossing, and with cloth running thereunder and the press roll 43 being brought tightly down upon the cloth 49 as it is driven under the press roll 43 by the paper roll 23, the cloth 49 will be treated and its appearance changed. This roll 43 is hollow, as shown in Fig. 3, and has a gas burner pipe 50 extending therethrough in order to supply heating flames to the inner surface of the roll to heat the same so that a hot exterior surface thereof engages the cloth 49. A bracket 51 extends from the upstanding portion 16' of the end structure 16 over the gas pipe 50 to support the pipe. A U-bolt 52 is fixed to the pipe 50 to the end of the bracket 51, Fig. 1.

A carburetor 53 connects with the pipe 50 and to this carburetor through a flexible pipe 54 is delivered air under pressure from a large air blower 55 secured to the base plate 26' on which the variable speed and reduction gear mechanisms are mounted, Figs. 1 and 6. Fuel is delivered to the carburetor 53 by a fuel line 56 having a control valve 57. A pressure gauge 58 is connected to the air delivery pipe 54. The amount of heat being delivered to the press roll 43 can accordingly be controlled.

In order that the heat will be properly distributed to the roll 43 so that it will be kept free of hot spots, a drive mechanism indicated generally at 60, Fig. 4, is provided to keep the press roll 43 rotating as it is lifted from the cloth 49. This drive mechanism 60 comprises a sprocket 61 fixed to the shaft extension 42 of the roll 43 by a key 61', Fig. 5, and connected through a chain 63 with a double sprocket 64 that is journalled on pivot pin 38. On the end structure 15 is a shelf bracket 65 that supports an electric driving motor 66. This motor drives a reduction gear unit 67 that has an overrunning clutch 68, Fig. 5, from which extends a shaft 69 to which a sprocket 70 is connected and retained by a set screw 70'. This sprocket 70 through a chain 71 drives double sprocket 64 that is held in place on pin 38 by a set collar 72 and set screw 72'.

The gear ratios of this drive mechanism 60 are such that the surface speed of the press roll 43 is of the order of eighteen yards per minute. This surface speed is slightly less than the minimum surface speed of the paper roll 23 which can be varied from between twenty and sixty yards per minute by the variable speed drive mechanism 26 depending upon the cloth material being treated and the type of finish being applied by the press roll 43. Since the speed of the paper roll is always greater than the surface speed of the press roll the overrunning clutch 68 will be released as the paper roll 25 takes over the drive of the press roll but immediately upon the press roll being raised out of contact with the cloth being treated, the press roll 43 will be again driven by the drive mechanism 60 so that the flames from the burner 49 will continue to be distributed uniformly to the surface of the roll 43 and so that the roll will not become concentrated with heat in spots or be accelerated in starting or decelerated in stopping so as to improperly treat or scuff the cloth upon the return of the press roll into engagement therewith.

The press roll supporting arm 39 has an extension 74 through which extends a connecting member 75 that is shouldered at its lower end as is indicated at 76 and is made secure upon the arm extension 74 by a set collar 77, Fig. 7. The supporting arm 46 has an extension 78 through which extends a similar connecting member 79, that is shouldered at 80 and which is held in place by a set collar 81.

The connecting member 75 has a piston rod 82 pivotally connected to the same by a pin 83. This piston rod extends from a hydraulic cylinder device 84 that is pivotally supported by a pin 85 to a bifurcated pivot block 86 carried on the end structure 15. The connecting member 79 is connected by a pin 87 to a piston rod 88 extending from a hydraulic cylinder device 89 and which is pivotally supported by a pin 90 to a bifurcated block 91 that is supported on end structure 16.

The hydraulic cylinder devices 84 and 89 are connected together by conduits 92 and 93, Fig. 7. Conduits 94 and 95 are respectively connected to the conduits 92 and 93 to deliver and remove oil to and from the hydraulic devices 84 and 89. A pump 96 is used to supply hydraulic fluid under pressure to either side of the hydraulic device together through either conduit 92 or 93 whereby to either lift the roll 43 from the cloth or to apply heavy pressure upon the roll to effect the cloth treating operation. The pump 96 receives oil from a reservoir 97 through a pipe 98. The oil can be returned to the reservoir 97 from the pump through a similar pipe not shown. An electric motor 96' is mounted on the top of the reservoir 97 to drive the pump 96.

Interposed between the pump 96 and the hydraulic devices in the pipe lines 94 and 95 and connected thereto by pipe lines 99 and 100 is a four-way solenoid-operated valve 101 that has a solenoid 102 that is connected to a time-delay seamjumper or feeler control relay 103 having an upwardly pressed roller 104 engaging with the underside of the cloth 49 as it moves over a guide roll 105. Above the guide roll 105 are longitudinally spaced guide rolls 106 and 107 and rotatable in spaced plates 108 carried upon the respective end structures 15 and 16. A transverse support member 110 extends between the plates 108 and on this member intermediate the length thereof there is mounted the seam jumper or feeler 103.

The cloth 49 has certain transverse seams that connect the ends of pieces of cloth together and which thicken the cloth. This seam will cause the roller 104 of the relay 103 to be depressed so as to energize, after a short interval as when the seam is about to arrive under the press roll 43, the solenoid 102 and operate the four-way valve 101 so that fluid is delivered to the lower ends of the hydraulic devices 81 and 84 to cause the supporting arms 39 and 46 to be elevated and lift the press roll 43 from the paper roll 23 whereby to allow the seam to pass without being acted upon by the press roll. If the press roll 43 had acted upon the seam, it would have caused the paper roll surface to be unduly indented and soon require resurfacing. The feeler 103 may be adjusted to vary time delay according to the travel of the cloth 49 which will permit the seam to travel to a point near to the rolls before the valve 101 and the hydraulic devices are actuated to lift the roll 43. The amount of lift of the roll 43 is very slight, approximately one quarter of an inch and merely sufficient to permit the seam of the cloth to freely pass between the rolls. After the seam has passed, roll 43 is brought into contact with the cloth and paper roll and a heavy pressure is applied to continue to treat the cloth.

In order to properly guide the supporting arms 39 and 46 in their vertical movement, the ends of the respective extensions 74 and 78 are respectively vertically slotted as indicated at 111 and 112, and extending upwardly respectively through the respective slots are guide posts 113 and 114 which are flattened on their opposite sides of their upper ends to have flush guiding engagement with the sides of the respective slots 111 and 112. In order to limit the downward movement of the arms 39 and 46 at times of emergency, a pin 115 may be inserted in each

of the guide posts 113 and 114. Each guide post is made secure to an end structure by a nut 116 as shown in Fig. 3. By means of these guide posts the arms 39 and 46 are positively held against lateral displacement as they are worked up and down to raise and lower the press roll 43.

Because of the heavy pressure under which the roll 43 is applied, the bearings 41 and 47 in which the extensions of the roll 43 are journalled, an adequate supply of lubricating oil is necessary. For this purpose there is provided an oil system that comprises a reservoir 120, Fig. 8, from which oil is drawn through a pipe 121 by a pump 122 that is driven by an electric motor 123 and by which this oil is driven under pressure through a pipe 124 having a shut off valve 125 for delivery of the oil under pressure through a filter 126, pipe 127 having a valve 128, an oil cooler 129, a pipe 130 having a valve 131 and delivered to a transverse distributing pipe or conduit 132.

At the opposite ends of the transverse pipe 132 are respectively throttle valves 133 and 134 having respectively viewing gauges 135 and 136 and to which there is respectively connected flexible hose connections 137 and 138 leading to the respective bearings 41 and 47. Leaving the bearing 41 is a conduit 141 that combines with a conduit 142 from the bearing 47 to return the oil through a conduit 143 to the reservoir 120. The oil cooler 129 has a cold water inlet 144 and an outlet 145 for cooling the oil passing therethrough. The oil is continuously delivered to the bearings 41, 42 and returned through conduits 141, 142 and 143 to the reservoir. The amount of oil being delivered can be varied by the control valves 133 and 134 and the oil filter 126 and cooler 129 can be taken out of the system for cleaning or repair by turning valves 125 or 128 and 131.

On the rear edges of the end structures 15 and 16 are shelf brackets 147 that support a roll of cloth 149 which is to be treated, Fig. 3. This roll has a wood center 150 through which a shaft 151 extends. On the respective brackets 147 are upstanding journal yokes 152 into which the ends of the shaft 151 are slid so that the roll 149 of cloth will be supported therein for rotational movement on the rear of the machine.

From the roll 149, cloth is delivered over the guide rolls 105, 106 and 107 journalled between the bracket plates 108 and from these guide rolls after being contacted by the seam feeler 103, the cloth is delivered under the press roll 43 and against paper roll 23. The driving relationship with which cloth is effected normally is through the driving paper roll 23. As the cloth 49 continues from the paper roll 23, it passes over a guide roll 154 and thence downwardly over a large hollow cooling roll 155 through which a cooling medium can be passed then upwardly over guide rolls 156, 157 to a roll 158 which is built up from the treated cloth. This roll 158 has a center through which there extends a square driving shaft 159 connected to an electric motor 160 carried on a bracket 162 extending forwardly on the forward edge of the end structure 16, Fig. 1. On the front edge of the end structure 15 at the same level as the bracket 162 is a bracket 163 on which is fixed a journal yoke 164 in which the free end of the square drive shaft 159 rotates.

At times when the cloth seam is passing the press roll 43 and when the press roll is elevated, there is no longer a driving connection between the cloth and the paper roll 23, the continued driving of the cloth will accordingly be effected by the drive motor 160 and the roll 159. A pan 165 lies under the paper roll 23 to collect any moisture or liquid that may be leaving the paper roll.

It should now be apparent that there has been provided a cloth treating calendar machine which has a bottom paper driving roll and a top gas-heated press roll. The press roll is supported on pivot arms and is urged toward the paper roll by hydraulic devices to provide a heavy working pressure upon the cloth. Upon a seam being passed over a seam feeler 103, the press roll is lifted to allow the cloth to move so that the seam can pass free of

the rolls and the paper roll is thereby prevented from becoming indented by the seam. When the press roll forces the cloth upon the paper roll, the paper roll drives the cloth, but upon the cloth being made free of the paper roll, the drive of the cloth is continued by the cloth collecting roll 158 and motor 160 on the front of the machine. It will also be apparent that there has been provided a lubricating system that keeps the press roll bearings continually lubricated.

While various changes may be made in the detail construction, it shall be understood that such changes shall be within the spirit and scope of the present invention as defined by the appended claims.

What is claimed is:

1. A cloth-treating machine comprising end frame structures laterally spaced from each other, a heavy paper roll journalled between the end frame structure, means for driving said paper roll at variable surface speeds, a heated press roll and means for pivotally mounting said press roll upon said end structures for vertical adjustment with respect to the top of the paper roll, means for driving said press roll at a predetermined surface speed less than the surface speed of the paper roll, hydraulic means associated wtih said mounting means for applying pressure to a cloth being treated between said press roll and paper roll, said drive mechanism for the press roll including an overrunning clutch whereby upon engagement of the press roll with the paper roll the press roll may be driven free of its drive mechanism and by the paper roll but upon release of the press roll from the paper roll, the press roll will be continued to be rotated by its drive mechanism and to maintain the distribution of the heat throughout the same, and avoid scuff marks on the cloth when contact by the rolls is resumed because there is no moment of inertia to overcome as the roll is rotating at the time of contact.

2. A cloth-treating machine comprising end frame structures, a large paper roll journaled between the end frame structures and means for driving said paper roll, said end frame structures having upstanding portions, supporting arms respectively pivotally connected to the respective upstanding portions, a heated press roll mounted above said paper roll and journalled between said arms intermediate the length of said arms, said arms respectively having extensions, guide posts respectively extending upwardly from the respective end structures and extending upwardly through the extensions to respectively guide the movements of the extensions and to hold the same against lateral displacement, hydraulic devices respectively connected to the respective end structures and piston rod means connected with the respective extension supporting arms, whereby said hydraulic devices may either lift said extensions to free the press roll from the paper roll or pull down the extensions and to create pressure of the press roll onto the cloth and to the paper roll.

3. A cloth treating calender comprising end frame structures, a large paper roll journalled between the end frame structures, said end structures having upstanding portions extending upwardly above the top of the paper roll, supporting arms and pivot pin means respectively pivotally connecting the respective arms to the upstanding portions of the end structures above the axis of the paper roll, a heated press roll journalled in the free ends of the supporting arms and having an extension at one end thereof, a drive gear connected to the extension of the press roll, a double sprocket gear connected to one of the pivot pin means for the supporting arms, a power device mounted on one of the end structures and including an overrunning clutch, and drive chains extending respectively between the power device and the double sprocket and the drive gear on the press roll extension power means for vertically adjusting the supporting arms to bring the press roll into engagement with a cloth running over the paper roll, whereby at times of

performing the cloth treating operation the press roll may run free and be driven by the paper roll but upon disengagement from the cloth will be continued to be operated to prevent concentration of heat on any portion of the surface of the press roll, and avoid scuff marks on the cloth when contact by the rolls is resumed because there is no amount of inertia to overcome as the roll is rotating at the time of contact.

4. A cloth treating calender as defined in claim 3 and control means for said power adjusting means for the supporting arms including a time delay relay seam feeler adapted to engage the cloth and to be operated in response to a seam in the cloth whereby to effect the lifting of the press roll from the cloth until the seam is passed from thereunder and consequently to cause the reengagement of the overrunning clutch of the drive parts serving to rotate the press roll.

5. A cloth treating calender comprising end frame structures, a large paper roll journalled between the end frame structures, said end structures having upstanding portions extending upwardly above the top of the paper roll, supporting arms pivot pin means respectively pivotally connecting the respective arms to the upstanding portions of the end structures above the axis of the paper roll, a heated press roll journalled in the free ends of the supporting arms overlying the paper roll and having an extension at one end thereof, a drive gear connected to the extension of the press roll, a double sprocket gear connected to one of the pivot pin means for the supporting arms, a power device mounted on one of the end structures and including an overrunning clutch, and

drive chains extending respectively between the power device and the double sprocket and the double sprocket and the drive gear on the press roll extension, said supporting arms respectively have extensions thereon, connecting pins having portions depending from said extensions, hydraulic cylinder devices disposed respectively under said pin connections and extensions and having piston rods pivotally engaging the respective pin connections, said hydraulic devices respectively pivotally connected with the respective end structures and power control means for supplying fluid under pressure to said hydraulic devices.

6. A cloth treating calender as defined in claim 5, and said extensions respectively having vertically-extending slots in their respective ends thereof, guide posts extending respectively upwardly from the respective end structures and having their upper ends lying respectively in the respective slots of the respective arm extensions whereby to restrain the arm extensions against lateral displacement.

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