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TUBULAR KNIT FABRIC SINGEING MACHINE

Filed March 12, 1941

3 Sheets-Sheet 1

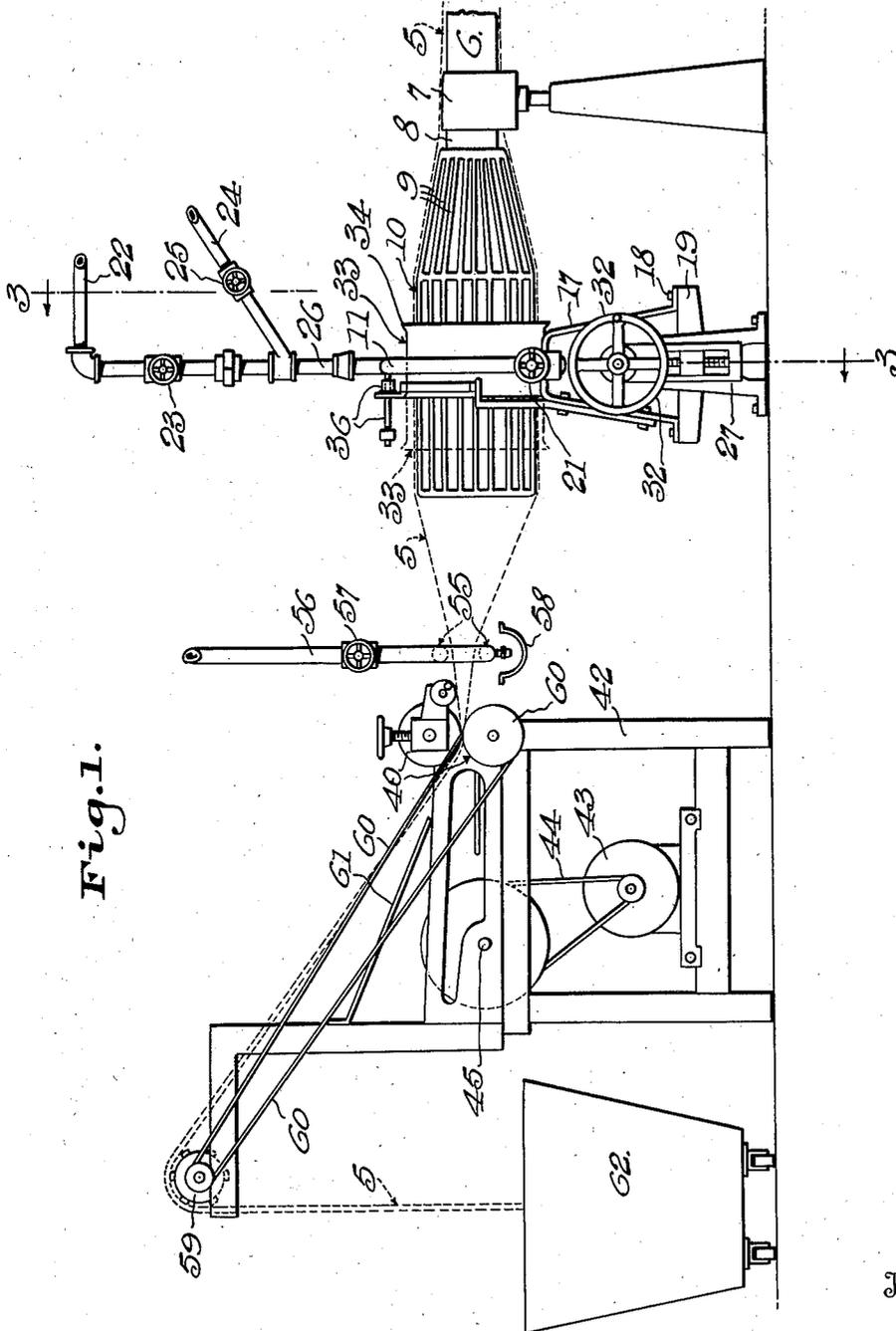


Fig. 1.

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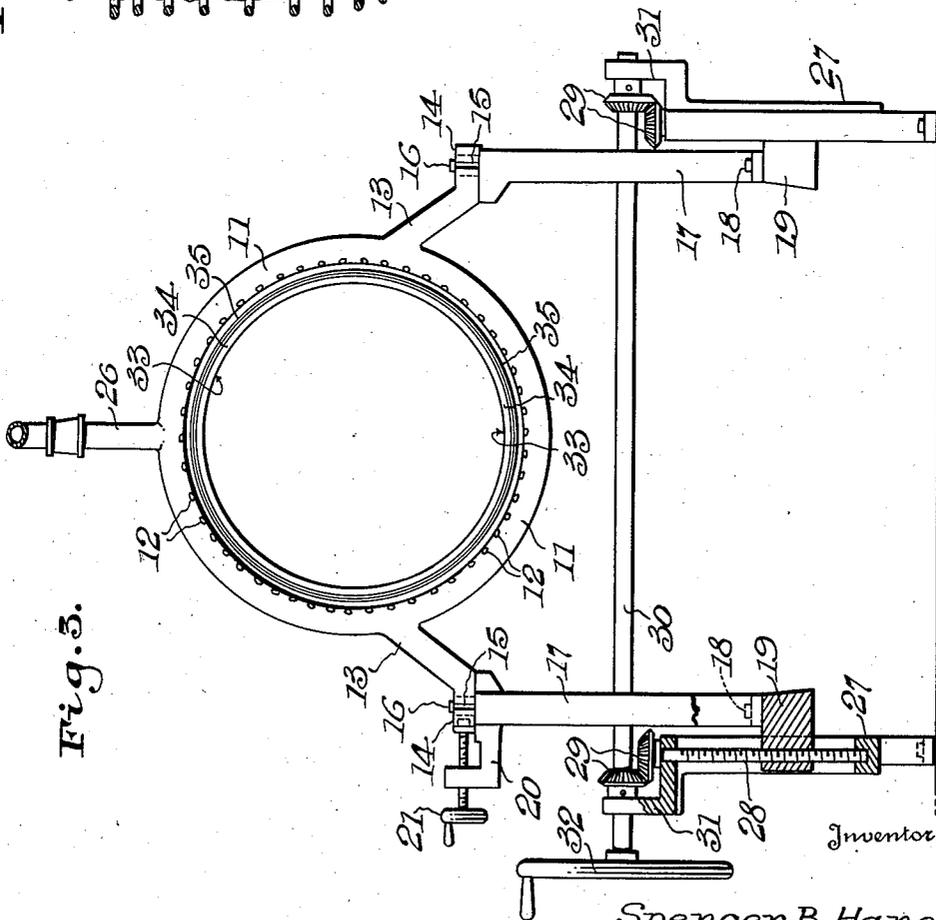
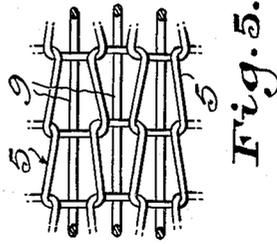
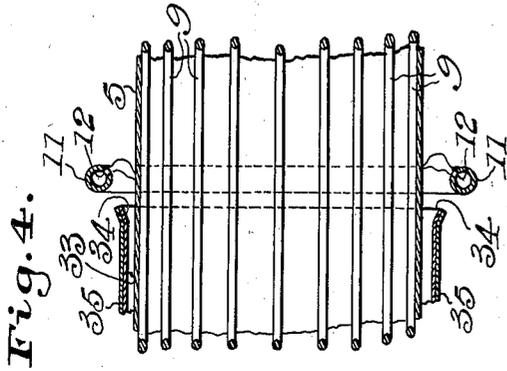
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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TUBULAR KNIT FABRIC SINGEING
MACHINE

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22 Claims. (Cl. 26—3)

The invention relates generally to the art of fabric singeing and primarily seeks to provide a novel machine structure in which continuously traveling tubular knitted fabrics can be efficiently singed with little if any fire hazard.

In its more detailed nature the invention resides in providing a novel machine structure including a circular flame source, and means for continuously drawing and guiding a tubular knit fabric through and in close proximity with said flame source.

An object of the invention is to provide a machine of the character stated embodying novel means for spreading the tubular fabric at the position of the flame so that the flame will effectively reach and singe the interstices in the fabric loops and wales.

Another object of the invention is to provide a machine of the character stated in which is included novel means for centering the flame source with relation to the traveling fabric.

Another object of the invention is to provide a machine of the character stated in which is included a flame shield insertable between the flame source and the fabric whenever the machine is brought to rest and automatically withdrawable from its fabric shielding position each time the machine is set into motion.

Another object of the invention is to provide a machine of the character stated including novel means for eliminating fire hazard and including a fire quenching spray and a set of combined fire snuffing and fabric drawing rolls.

With the above and other objects in view which will more fully appear, the nature of the invention will be more clearly understood by following the description, the appended claims, and the several views illustrated in the accompanying drawings.

In the drawings:

Figure 1 is a side elevation illustrating the invention.

Figure 2 is a plan view.

Figure 3 is a vertical cross-section taken on the line 3—3 on Figure 1.

Figure 4 is a horizontal section taken through the axis of the shiftable shield sleeve.

Figure 5 is a fragmentary plan view showing a fragment of tubular knitted fabric stretched over the skeleton spreader frame.

In the example of embodiment of the invention herein somewhat diagrammatically illustrated, the tubular knit fabric 5 is introduced into the machine over a pipe or turning head 6 between opposed feed rolls 7. In passing from the

pipe, the fabric passes over a cuff 8 which supports the converging or receiving end 9 of a cylindrical wire skeleton spreader frame 10 which is surrounded by a circular gas burner 11.

5 The jet apertures 12 in the circular burner 11 are directed inwardly and rearwardly at an angle with respect to the direction of feeding movement of the fabric. The jet apertures are so positioned because the forwardly moving 10 knitted fabric carries an air current with it in the direction of travel thereof, and directing the flame jets slightly counter to the direction of travel of the fabric this air current causes the flame jets to become substantially perpen- 15 dicular to the center of the burner, thereby to more efficiently contact and singe the traveling fabric. By reason of the provision of the skeleton spreader 9, 10, the greatest possible spread of the tubular knitted fabric is attained at the 20 point at which the singeing flame comes into contact with it so that the flame will blow into the fabric in such a manner as to get to the bottoms of the interstices or crevices or the lower- 25 most points of the wales or loops in such fabric.

The circular burner 11 is supported on arm extensions 13 terminating in supporting feet 14 which are longitudinally slotted, as at 15, to receive upstanding guide pins 16. The pins project upwardly from side frame brackets 17 supported, as at 18, on vertically adjustable blocks 19. The bracket 17 at one side has an extension 20 equipped with a threaded bore in which an adjusting hand screw 21 is operable. The free end of this screw is held captive in the adjacent burner ring supporting foot 14 and it will be obvious that by manipulating the hand screw 21 a measure of lateral adjustment of the position of the burner ring can be effected so as to perfectly center the same with respect to the 40 traveling fabric.

Gas is supplied to the burner ring 11 through a gas supply pipe 22 controlled by a valve 23, and air is supplied through a pipe 24 equipped with a control valve 25, both pipes 22 and 24 delivering 45 into a supply or mixing manifold 26 which preferably is disposed vertically and connects with the burner ring 11 in the manner best illustrated in Figures 1 and 3 of the drawings.

In order to provide for vertical adjustment of the burner ring 11 so as to suitably align it with the traveling fabric, the side blocks 19 are vertically-adjustably mounted on frame standards 27, and a vertically disposed captive screw 28 threads through a bore in each block 19 and is 55 connected by a bevel gear couple 29 with a cross

shaft 30 having bearing, as at 31, in the standards 27 and equipped with a hand wheel 32. It will be obvious that by turning the hand wheel and rotating the screw 28, upward or downward movement can be imparted to the blocks 19 and the burner ring 11 supported thereby.

In order to prevent burning of the tubular fabric should operation of the machine be discontinued while the ring burner 11 is functioning, there is provided a flame shielding sleeve 33 which is shiftable into and out of shielding position within the burner ring. The sleeve 33 has its ends flared, as at 34, and is equipped with an asbestos covering band 35. The sleeve is longitudinally-slidably mounted, as at 36, and has slot and pin connection at 37 with a shifter lever 38 pivotally mounted, as at 39, upon one of the side frame brackets 17. It will be obvious that by manipulating the lever 38 the sleeve can be moved between effective and ineffective positions respectively illustrated in full and dotted lines in Figure 2. See also Figure 1. When the sleeve is in its effective position illustrated in full lines in Figures 1 and 2, it will be interposed between the flames jetting from the ring burner 11 and the tubular knit fabric which is spread upon the skeleton frame 10.

The tubular knitted fabric is drawn over the spreader frame 9, 10 and through the major portion of the machine by sponge rubber draw rolls 40 which are rotatably supported in bearings 41 on a supporting frame 42 which also supports a motor 43, the drive shaft of which is connected by pulley and belt connections 44 with a driver shaft 45 also rotatably supported on the frame and in turn connected by adjustable belt and pulley connections 46 with one of the draw rolls 40.

A clutch equipment 47 is provided on the drive shaft 45 and is subject to manipulation by a shifting lever 48 pivoted, as at 49, on the machine frame and link-connected, as at 50, with the shield sleeve shifting lever 38 hereinbefore referred to. By reason of these connections, each time the clutch is shifted to discontinue operation of the machine, the shifter lever 38 will be moved to effect a shifting of the shield sleeve from the ineffective position illustrated in dotted lines in Figure 2, to the effective or flame shielding position illustrated in full lines in Figure 2.

Just in advance of the draw rolls 40, the singed fabric passes between spaced guides 51 mounted on a reversely threaded guide adjusting screw 52 which is rotatable in suitable bearings 53 supported on the machine framing. The screw is equipped with a hand wheel 54, and by turning this hand wheel the spaced relation of the guides 51 can be altered at will.

It will be obvious that by provision of the shiftable shield sleeve 33, destructive burning of the fabric incident to machine stoppage is avoided, and means are provided for additionally guarding against fire hazard. For this purpose upper and lower steam spray pipes 55 are provided just in advance of the draw rolls 40, and the singed fabric passes between these pipes and is subjected to steam spray which will extinguish any smoldering fabric portion. The fire hazard is additionally guarded against by provision of the draw rolls 40 which have a snuffing effect which will augment the smolder extinguishing effect of the spray pipes. Steam is supplied to the pipes 55 through a supply pipe 56 equipped with a control valve 57, and a collecting trough 58 is pro-

vided beneath the pipes for collecting condensation drippage.

At the delivery end of the machine the singed fabric feeds over a slatted rotor 59 to which rotation is imparted through belt and pulley connections 60 from the lower draw roll shaft. In passing to the rotor 59 the fabric passes over a shield plate 61 which prevents fabric slack from depending sufficiently to contact operating parts of the machine. As it passes downwardly from the delivery rotor 59, the singed fabric falls into a collecting basket or truck 62.

In the foregoing description, there is disclosed a machine or apparatus capable of efficiently singeing constantly traveling tubular fabrics. In this machine, the fabrics are spread so that a very efficient singeing is assured, and means are provided for practically eliminating fire hazard.

It is of course to be understood that the details of structure and arrangement of parts may be variously changed and modified without departing from the spirit and scope of my invention.

I claim:

1. In a machine of the character described, means for continuously feeding a tubular knitted fabric, means circular in transverse section and effective for spreading the traveling fabric to lay open the knit mesh thereof, and a circular gas burner disposed concentrically with respect to the axis of the spreading means for directing open flame into the spread mesh of said traveling fabric.

2. In a machine of the character described, means for continuously feeding a tubular knitted fabric, means for spreading the traveling fabric to lay open the knit mesh thereof, a circular gas burner for directing open flame into the spread mesh of said traveling fabric, and means for adjusting the burner vertically and horizontally to place its center with relation to the center of the traveling fabric.

3. In a machine of the character described, means for continuously feeding a tubular knitted fabric, means for spreading the traveling fabric to lay open the knit mesh thereof, and a circular gas burner for directing open flame into the spread mesh of said traveling fabric, said burner having flame jet emitting orifices therein directed inwardly toward the traveling fabric and angularly in a direction opposite the direction in which said fabric is traveling.

4. In a machine of the character described, means for continuously feeding a tubular knitted fabric, means for spreading the traveling fabric to lay open the knit mesh thereof, means for singeing the traveling fabric at the place at which it is spread, and means automatically operable to shield the fabric from the singeing means each time operation of the fabric feeding means is discontinued.

5. In a machine of the character described, means for continuously feeding a tubular knitted fabric, means for spreading the traveling fabric to lay open the knit mesh thereof, a circular gas burner for directing open flame into the spread mesh of said traveling fabric, and a flame shielding sleeve surrounding the traveling fabric and automatically shiftable into position for shielding the fabric from burner flame each time operation of the fabric feeding means is discontinued.

6. In a machine of the character described, means for continuously feeding a tubular knitted fabric, a circular gas burner for directing open flame into the mesh of said traveling fabric, a flame shielding sleeve surrounding the traveling

fabric, and means for shifting the sleeve longitudinally to selectively position it between the fabric and the burner in fabric shielding position or away from said burner to expose the fabric to flame emitted from the burner.

7. In a machine of the character described, means for continuously feeding a tubular knitted fabric, a circular gas burner for directing open flame into the mesh of said traveling fabric, and a flame shielding sleeve surrounding the traveling fabric and automatically shiftable into position for shielding the fabric from burner flame each time operation of the fabric feeding means is discontinued.

8. In a machine of the character described, means for continuously feeding a tubular knitted fabric, means for spreading the traveling fabric to lay open the knit mesh thereof, and means for singeing the traveling fabric at the place at which it is spread, said spreading means comprising a skeleton frame composed of circumferentially spaced longitudinal rods and including a tapered receiving nose portion.

9. In a machine of the character described, means for continuously feeding a tubular knitted fabric, means for spreading the traveling fabric to lay open the knit mesh thereof, and means for singeing the traveling fabric at the place at which it is spread, said feeding means including draw rolls disposed beyond the spreading means and effective to snuff out fabric smolder.

10. In a machine of the character described, means for continuously feeding a tubular knitted fabric, means for spreading the traveling fabric to lay open the knit mesh thereof, means for singeing the traveling fabric at the place at which it is spread, and spray means disposed beyond the spreading means and effective to extinguish fabric smolder.

11. In a machine of the character described, means for continuously feeding a tubular knitted fabric, means for spreading the traveling fabric to lay open the knit mesh thereof, means for singeing the traveling fabric at the place at which it is spread, said feeding means including draw rolls disposed beyond the spreading means and effective to snuff out fabric smolder, and spray means disposed adjacent said rolls and effective to extinguish fabric smolder.

12. In a machine of the character described, means for continuously feeding a tubular knitted fabric, a circular gas burner for directing open flame into the mesh of said traveling fabric, a flame shielding sleeve surrounding the traveling fabric, means for shifting the sleeve longitudinally to selectively position it between the fabric and the burner in fabric shielding position or away from said burner to expose the fabric to flame emitted from the burner, said feeding means including draw rolls, power means for driving said rolls, clutch means shiftable for starting or stopping operation of said rolls, and means actuated each time said clutch means is shifted for moving said sleeve shifting means to effectively place or displace the sleeve accordingly as said rolls are stopped or started.

13. In a machine of the character described, means for continuously feeding a tubular knitted fabric, means for spreading the traveling fabric to lay open the knit mesh thereof, means for singeing the traveling fabric at the place at which it is spread, said feeding means including draw rolls disposed beyond the spreading means and effective to snuff out fabric smolder, spaced fabric

travel guides disposed adjacent said rolls, and means for varying the spacing of said guides.

14. In a machine of the character described, means for continuously feeding a tubular knitted fabric, means for spreading the traveling fabric to lay open the knit mesh thereof, means for singeing the traveling fabric at the place at which it is spread, said feeding means including draw rolls disposed beyond the spreading means and effective to snuff out fabric smolder, a drag rotor disposed beyond the draw rolls and over which the fabric passes, and a shield for supporting fabric slack between the rolls and said rotor.

15. In a machine of the character described, means for continuously feeding a tubular knitted fabric, a skeleton spreader frame for spreading the traveling fabric in tubular form to lay open the knit mesh thereof, and means uniformly spaced from the traveling fabric at all points in a plane extending transversely across said fabric where it is spread in tubular form for singeing the laid open knit mesh of said fabric.

16. In a machine of the character described, means for continuously feeding a tubular knitted fabric, a skeleton spreader frame generally circular in transverse section and along and over which said fabric is fed for being spread so that its knit mesh will be laid open, and means disposed in uniformly spaced relation to all spread mesh portions of the traveling fabric throughout its circumference for directing open flame through said spread mesh portions for singeing the same.

17. In a machine of the character described, means for continuously feeding a tubular knitted fabric, rigidly mounted means circular in transverse section and effective for spreading the traveling fabric to lay open the knit mesh thereof, and a circular gas burner disposed concentrically with respect to the axis of and surrounding the spreading means for directing open flame into the spread mesh of said traveling fabric.

18. In a machine of the character described, means for continuously feeding a tubular knitted fabric, stationarily supported means for spreading the traveling fabric to lay open the knit mesh thereof, a circular gas burner surrounding the spreading means for directing open flame into the spread mesh of said traveling fabric, and means for adjusting the burner vertically and horizontally to place its center with relation to the center of the traveling fabric.

19. In a machine of the character described, means for continuously feeding a tubular knitted fabric, skeleton frame means for spreading the traveling fabric to lay open the knit mesh thereof, and a circular gas burner surrounding said skeleton frame means for directing open flame into the spread mesh of said traveling fabric, said burner having flame jet emitting orifices therein directed inwardly toward the traveling fabric and angularly in a direction opposite the direction in which said fabric is traveling.

20. In a machine of the character described, means for continuously feeding a tubular knitted fabric, skeleton frame means for spreading the traveling fabric to lay open the knit mesh thereof, and means disposed about said skeleton frame means for singeing the traveling fabric at the place at which it is spread, said feeding means including draw rolls disposed beyond the spreading means and effective to snuff out fabric smolder.

21. In a machine of the character described, means for continuously feeding a tubular knitted

fabric, skeleton frame means for spreading the traveling fabric to lay open the knit mesh thereof, means for singeing the traveling fabric at the place at which it is spread, and spray means disposed immediately beyond the spreading means and effective to extinguish fabric smolder.

22. In a machine of the character described, means for continuously feeding a tubular knitted fabric, skeleton frame means for spreading the

traveling fabric to lay open the knit mesh thereof, means for singeing the traveling fabric at the place at which it is spread, said feeding means including draw rolls disposed beyond the spreading means and effective to snuff out fabric smolder, and spray means disposed adjacent said rolls and immediately beyond said skeleton frame means and effective to extinguish fabric smolder.

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