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Act, 1907, being date of first Foreign Appli- } 18th Nov., 1909
cation (in the United States), }

Date of Application (in the United Kingdom), 4th Nov., 1910

At the expiration of twelve months from the date of the first Foreign Appli-
cation, the provision of Section 91 (3) (a) of the Patents and Designs Act,
1907, as to inspection of Specification, became operative

Accepted, 9th Feb., 1911

COMPLETE SPECIFICATION.

Improvements in Singeing Machines.

We, THOMAS ALLSOP, WALTER WOODHOUSE SIBSON, and WALTER FISKE HAGAR, Jr., all of No. 6721, Germantown Avenue, in the City and County of Philadelphia, State of Pennsylvania, United States of America, Manufacturers, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to improvements in singeing machines, and more particularly to machines for singeing hosiery.

Machines previously have been devised wherein the use of supporting boards for the stockings have been dispensed with, these machines including as component parts of their structure supporting forms which travel in a fixed path and upon which forms the stockings are placed and carried through the stages of treatment. This general type of singeing machines has now attained a distinct status in the art, and it is with regard to such type that the present invention is concerned.

The primary object of the present invention is the provision of a singeing machine which will simplify the construction of these machines and which embodies such an arrangement of parts that in placing the unsinged stocking upon the supporting forms the position of the latter in relation to the operator will be substantially the same as the position in which the board forms are usually held when placing the stockings thereon, thereby enabling the operator to stretch the stockings upon the forms with much the same movement as when placing the stockings upon the boards commonly employed heretofore. This permits the operator to manipulate the machine with greater speed in feeding the stockings to the machine, and correspondingly increases the output of the machine.

The invention further aims to provide a singeing machine which includes a novel form of stripping mechanism, whereby to remove the singed stockings from the supporting forms, the stripper acting upon the stockings with a positive movement while the stripper is travelling at a greater surface speed than the supporting forms.

The invention further aims to provide, in the construction of the machine, simple and efficient means for cooling the forms, so that when singeing stock-

[Price 8d.]

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ings in the "green" state the same will not be damaged by excessive temperature of the forms.

With these and other objects in view, which will appear as the nature of the improvements is better understood, the invention consists substantially in the novel construction, combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the appended claims. 5

In the drawings:—

Figure 1 is a side elevation of a singeing machine constructed in accordance with and embodying the herein-described invention. 10

Figure 2 is an end elevation thereof.

Figure 3 is a top plan view of the machine.

Figure 4 is a fragmentary elevation illustrating the connection for cooling the supporting forms when it is desired to adapt the machine for singeing stockings in the "green" state. 15

Figure 5 is a similar view in end elevation.

Figure 6 is a top plan view of one of the forms illustrating the connection of the feed and drip pipes therewith.

Figure 7 is a transverse sectional view of the form illustrated in Figures 4, 5 and 6. 20

Referring in detail to the drawings, the numeral 1 designates the frame of the herein-described machine, which frame may be of any suitable structure whereby a proper support is provided for the operative parts of the machine, and journaled in suitable bearings 2, arranged at the sides of the frame 1, is a main shaft 3 which extends transversely of the frame 1. Mounted upon the shaft 3 is a gear wheel 4 which meshes with the pinion 5 mounted upon a driving shaft 6 that is journaled within suitable bearings 7. One of these bearings is carried by the frame 1, while the other is arranged upon a longitudinally-extending beam 8 that is suitably supported within the frame 1. The shaft 6 is provided with tight and loose pulleys 9 and 10, respectively, for the application of power to said shaft. 25

Upon the main shaft 3, and adjacent to one of the ends thereof, is a spider 11, and bolted, or otherwise suitably secured, to said spider 11 is a plurality of radially-projecting arms 12 each of which carries a stocking support 13. Each of these stocking supports 13 is curved in the arc of a circle the center of which is the main shaft 3, and, consequently, as the shaft 3 rotates the supports 13 operate in a circular path. Each of the supports 13 is connected to its arm 12 through the medium of a substantially L-shaped bracket 14, whereby the forms are rigidly connected to said arms, but lie in a plane to one side of the plane in which the arms 12 are located. 30

Arranged upon the sides of the frame 1, and projecting upwardly therefrom is a superstructure 15, and connected to one side of said superstructure, and projecting inwardly across the space of the latter, is a pair of burner tubes 16. These tubes are of the usual formation, their opposing faces being perforated, as in the usual manner, in order that the singeing flames may occupy the space between said tubes. The tubes 16 are supplied with a suitable gaseous mixture from any suitable source, it being unnecessary to illustrate the latter. It will be observed that the inner ends of the tubes 16 terminate at a point slightly removed from the side of the superstructure 15 which is opposite to that upon which said tubes are mounted, the purpose of this being to permit the stocking supports 13 to be passed between the tubes 16 by their respective arms 12, and, obviously, during such passage the unsinged stockings upon said forms will be subjected to the action of the singeing flames, thereby carbonizing the loose fibres in the manner well understood by those skilled in the art. 40

It has been previously indicated that the present invention contemplates the provision of a novel form of stripping mechanism, whereby to remove the singed stockings from the forms after the latter leave the singeing burners, and to 55

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operate this stripping mechanism at a greater surface speed than the speed at which the supporting forms travel. To the accomplishment of this end a sleeve 17 is mounted to rotate on the main shaft 3, and said sleeve carries a gear wheel 18 which meshes with a similar gear 19 mounted upon the inner end of the driving shaft 6, the gear 19 being of slightly greater diameter than the gear 18 for imparting to the latter greater speed. Also mounted upon the sleeve 17 is a sprocket gear 20 of comparatively large diameter, a sprocket chain 21 being mounted to pass around said gear 20. The chain 21 is also designed to work upon an upper sprocket pinion 22 carried by a shaft 23 which is journaled upon the superstructure 15, and also upon a lower sprocket pinion 24 carried by a shaft 25, the latter being journaled upon the frame 1. Spanning the space between the pinions 22 and 24 is a curved channel guide 26, which guide is concentric with the stocking supports 13, but spaced slightly inwardly therefrom, this guide being mounted upon supporting bars 27 and 28 arranged transversely of the superstructure 15 and the frame 1, and supporting the upper and lower ends of the guide 26 in proximity to the sprocket pinions 22 and 24. These pinions are arranged at the inner ends of the shafts 23 and 25, and occupy positions at substantially the middle portions of the stocking supports 13, and each of the latter is provided with an elongated slot 29 that extends longitudinally thereof, each of which slots is designed to receive a stripping finger 30 carried by the sprocket chain 21. This finger is of such length that when introduced to the slots 29 it will project therethrough, and said supports 13 are of such length, and likewise the slots 29, that when the finger 30 enters the slots the point of entrance will be in rear of the open end of the stocking as stretched upon the forms, so that the finger 30 will engage the open ends of the stockings and during its travel along the slots the finger 30 will force the stockings off the forms. Inasmuch as the stripping finger 30 moves in the same direction as the direction of movement of the supports 13, it is requisite that said finger shall travel at a greater surface speed than the speed of the supports 13 in order to remove the singed stockings from the supports, and through the medium of the varying diameters of the sprocket gear 20 and the sprocket pinions 22 and 24, this increase in surface speed is effected. It is obvious that if desired the chain 21 may be equipped with a series of the stripping fingers 30.

By the employment of the channel guide 26 it is also evident that as the sprocket chain 21 passes therethrough the stripping finger 30 will be held close up to the respective forms and maintained in rear of the open end of the stocking in order to effect a positive removal of the stocking from the form upon which it is carried.

In the singeing of stockings in the "green" state, it is desirable that the temperature of the forms or supports shall be maintained relatively low, in order to prevent injury to the fabric of the stockings. By referring to Figures 4 to 7, inclusive, the means employed for adapting the machine for use under these conditions is illustrated, and the same contemplates providing the main shaft 3 with bores 31 and 32 separated from each other by a central partition 33. The bores 31 and 32 are closed by stuffing boxes 34 and 35, respectively, through which boxes are projected a feed pipe 36 and a drip pipe 37, respectively, and through these pipes 36 and 37 a suitable cooling medium, such as water, is admitted to and removed from the shaft 3, this medium, however, before passing out from the shaft 3 into the drip pipe 37 being caused to circulate through the respective stocking supports. That this may be accomplished the bore 31 is connected by a pipe 38 with an annular supply pipe 39, which latter pipe is tapped at suitable intervals by an inlet pipe 40 which is projected into the support 13 immediately contiguous thereto. Each support is provided with one of the pipes 40 in order to be supplied with the cooling medium, and each support is likewise provided with an outlet pipe 41 which, in turn, is connected to an annular pipe 42. The latter collects the cooling agent as it leaves the supports 13, and is connected by a pipe 43 with the bore 32 so that the drip

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collected by pipe 42 is discharged into said bore, whence it leaves the shaft 3 by the drip pipe 37.

The stocking support 13 is hollow, as clearly illustrated in Figure 7, and in order that the stripping finger 30 may cooperate therewith for removing the singed stocking therefrom, but at the same time to retain the cooling agent within the support and circulate it properly therein, the support 13 is provided with a longitudinally-extending depression 44 for receiving the stripping finger 30. Therefore, when the finger is introduced into the depression 44 it is obvious that a sufficient portion of its length will be projected in rear of the open end of the stocking to strip the latter from the support as the stripping finger moves forwardly thereon. It will also be observed that the depression 44 divides the support 13 and the inner ends of the pipes 40 and 41 extend within the support at the sides of the depression, so that as the cooling agent is projected by the pipe 40 within the support the cooling agent passes forwardly along one side thereof; thence around the forward end of the support, and back to the pipe 41 by way of the channel at the other side of the depression. This insures a complete circulation of the cooling agent and maintains the supports 13 at a sufficiently low temperature to preclude damage or injury to the stockings incident to the presence of chemicals which are necessarily present while the stockings are in the "green" state.

If desired, the supports 13, in lieu of being provided with the elongated slots 29, as illustrated in Figures 1, 2 and 3, may be constructed as disclosed in Figures 6 and 7, that is to say, they may be provided with a groove or depression, without necessarily employing a cooling agent. The employment of the cooling agent is merely to adapt the machine for the singeing of stockings when the latter are in the "green" state, thus adapting the machine for this special use, as well as for use under the general conditions that prevail in the singeing of stockings when it is unnecessary to employ a cooling agent for the forms.

In the operation of the herein-described machine the supports 13 are caused to move in the direction of the feathered arrow illustrated in Figure 1. In such movement the free ends of the supports move upwardly at the side of the machine which is opposite to the side whereat the channel guide 26 is positioned, the free ends moving downwardly over the guide 26. The operator takes position at the side where the free ends of the forms move in an upward direction, and as the latter rise they become positioned in relation to the operator substantially the same as the position in which the board forms heretofore commonly employed are positioned when placing the stockings thereon. In this position of the supports 13 the operator may stretch each stocking thereon with much the same movement as has previously been the case in placing the stockings upon the board forms. That is to say, the operator opens the mouth of the stocking in order to introduce the free end of the support 13 therein, and with a movement of the stocking toward him, and the advancing movement of the support 13 away from him, it will be seen that the stocking is readily stretched upon the support in an expeditious manner, thereby enabling the supports 13 to rotate at a comparatively high rate of speed. As each support 13 recedes from the operator, it is apparent that the full length of the stockings will be stretched thereon, being entirely freed of wrinkles, whereupon the support carrying the stocking enters the space between the singeing burners 16. At this point the loose fibres of the stockings become carbonized, and as the supports continue to advance they are each projected over the channel guide 26. The chain 21 is so timed in its movement that the stripper finger 30 will enter the slots 29 of the supports when a suitable portion of the length of the supports has passed over the channel guide 26 to permit the finger 30 engaging the mouth of the stocking when said finger enters the slots. It being borne in mind that the chain 21 is operating at a greater surface speed than that of the supports 13, when the finger 30 engages the stockings the latter are pushed forwardly, and as the finger continues to advance

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the entire length of the stockings becomes displaced from the supports, and the stockings thereby successively fall from the machine in a completely singed state. After being thus freed of the singed stockings, the supports 13 continue around to the point where the operator is located, at which point they again receive unsinged stockings, and this cycle of operations is continued indefinitely.

When the machine is equipped with the cooling mechanism illustrated in Figures 4 to 7, the supports will be maintained at a relatively low temperature by the circulation of the cooling medium through the bore 31, the intermediate connecting pipes, the support, the pipes connecting the latter with the bore 32, and the bore 32, the cooling medium being removed by the drip pipe 37.

During the movement of the chain 21 the same passes through the channel guide 26, and by reason of the curvature of the latter, as well as its position, the stripper finger 30 is held within the slots of the supports 13 until said finger has advanced beyond the ends of said slots, and thereby completely removed the stockings from the supports, and it does not leave the channel guide 26 until it arrives at the sprocket pinion 24.

It will be observed that the spider 11 and the arms 12 constitute a carrier for the supports 13, and by reason of the latter being curved the same are deflected in relation to the arms 12, this deflection positioning the supports 13, as they arrive adjacent to the operator of the machine, in substantially the position in which the board forms, as previously used, have been held when stretching the stockings thereon. Furthermore, the chain 21, constitutes an endless carrier for the stripping finger, thus establishing a fixed path of movement for said finger as it advances to, acts upon, and recedes from the respective supports.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. In a singeing machine wherein the form travels in a fixed path, a supporting form for the stockings to be singed so mounted that in placing the unsinged stockings upon the form the position of the latter in relation to the operator will be substantially the same as the position in which the board forms are usually held when placing the stockings thereon, thereby enabling the operator to stretch the stocking upon the form with much the same movement as when placing the stockings upon the boards heretofore commonly employed.

2. The arrangement set forth in Claim 1, the construction being such that the supporting form is mounted for rotation in a circular path and having its longitudinal axis extending in the direction of movement of the form.

3. The arrangement set forth in Claim 1, means being provided for stripping the singed stocking from the form, said stripping means moving in the same direction as the supporting form but travelling at a greater surface speed than the form.

4. The arrangement set forth in Claim 1, the supporting form being hollow to receive a cooling medium and thereby permit singeing of stockings in the "green" state without liability of damaging the same by excessive temperature of the form.

5. A singeing machine substantially as shown and described.

Dated the 2nd day of November, 1910.

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Chancery Lane Station Chambers, London,
Agents for the Applicants.

Fig. 3.

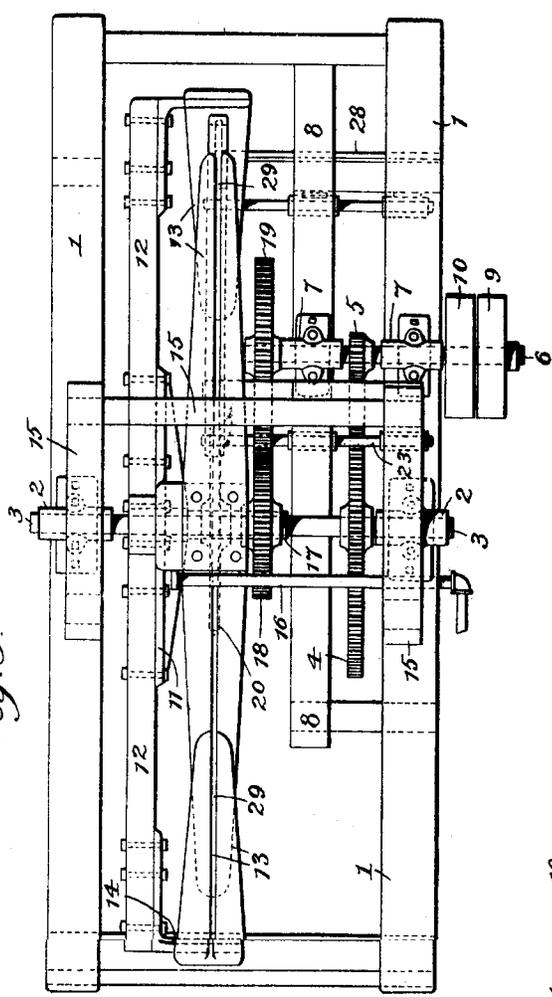


Fig. 4.

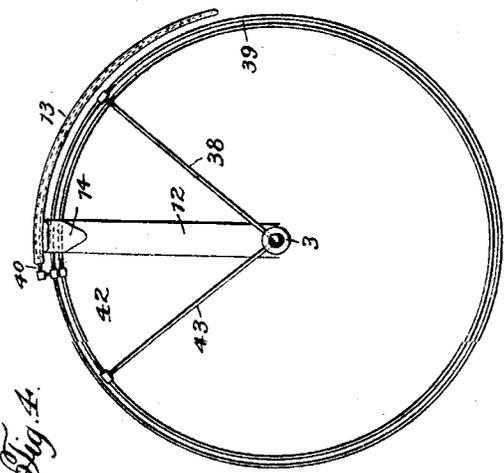


Fig. 5.

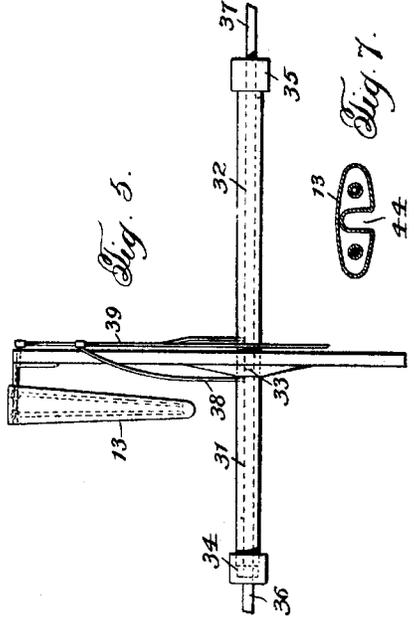


Fig. 7.



Fig. 6.

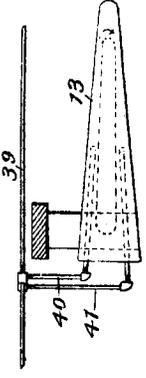
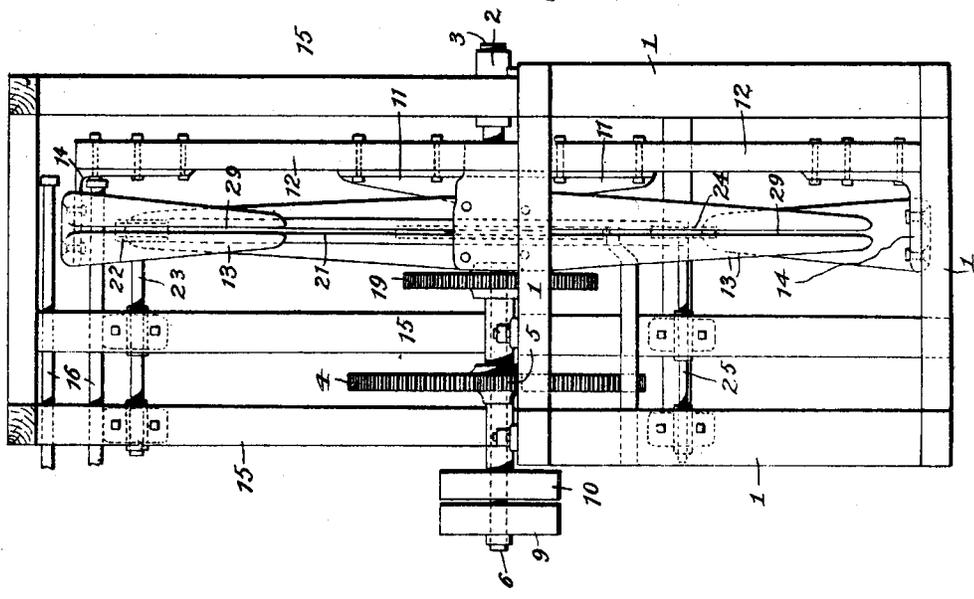


Fig. 2.



[This Drawing is a reproduction of the Original on a reduced scale.]

Rotated 90° and reduced to 80% to fit on page.

