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F. M. CROSSMAN

2,462,166

SINGING DEVICE FOR TEXTILE FABRICS AND THE LIKE

Filed Jan. 25, 1945

2 Sheets-Sheet 1

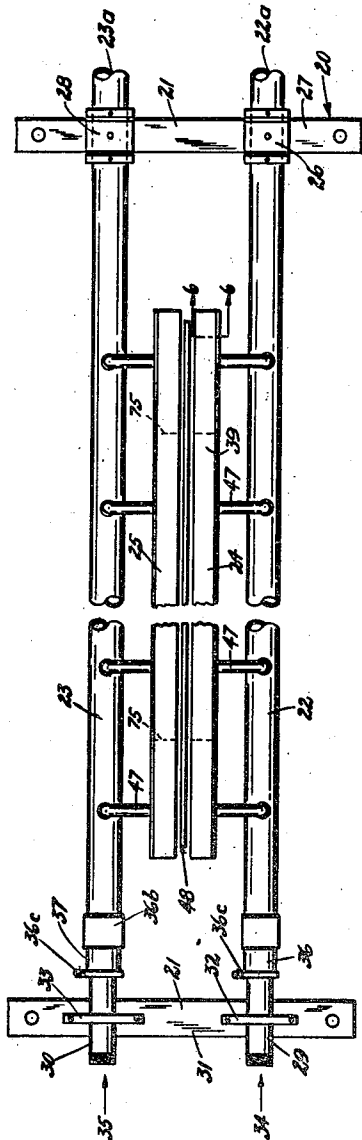
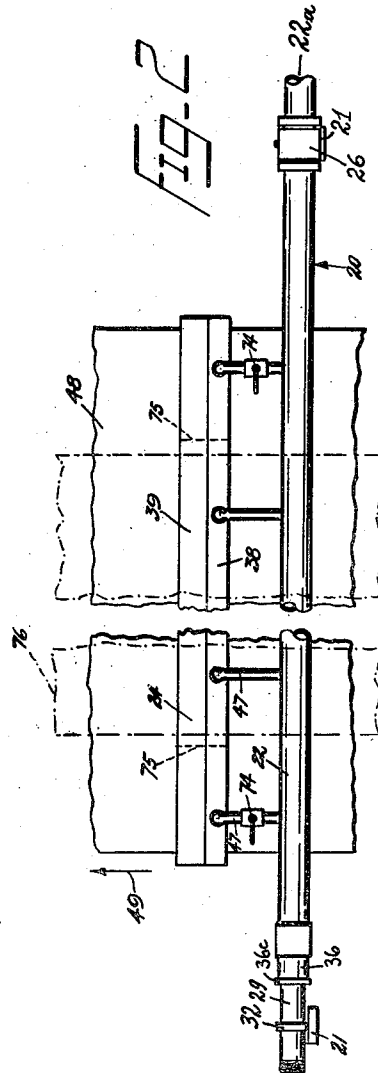


FIG. 1



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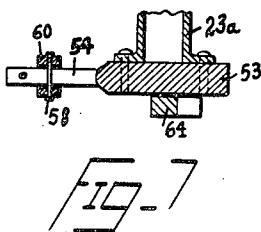
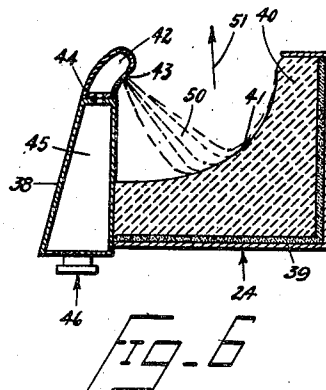
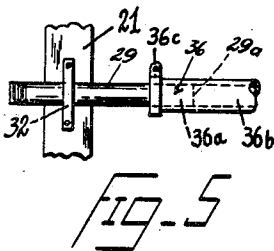
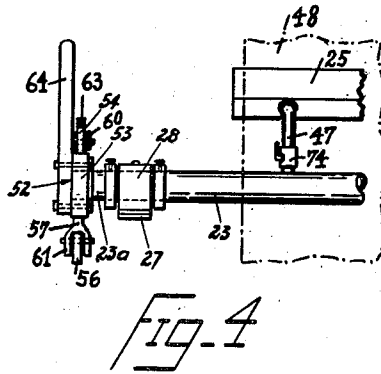
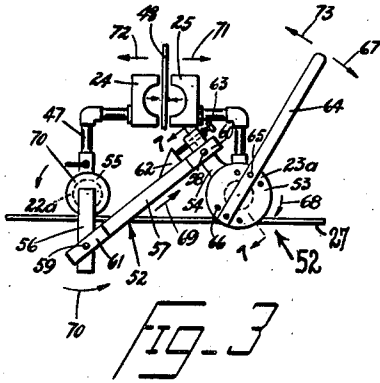
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SINGEING DEVICE FOR TEXTILE FABRICS AND THE LIKE

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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SINGEING DEVICE FOR TEXTILE FABRICS
AND THE LIKE

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5 Claims. (Cl. 26—3)

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This invention relates to devices and methods for singeing textile fabric, and has for its main object to provide means whereby such singeing may be done more efficiently than is the case with present devices and processes used for this purpose.

Another object of my invention is to provide means whereby such singeing operations may be executed in a more expeditious manner.

Still a further object of my invention is to provide novel singeing methods and means for textile fabric, which will act on both sides of the fabric simultaneously, and in which the singeing means at both sides will be adjustable as to their distances from the fabric, and their adjusting will be cooperative, one influencing the other, to make the adjustment at the two sides identical.

An object of my invention is to adopt novel means whereby infra red rays may be used for such singeing operations, particularly infra red rays produced by gas burning generators.

It is an aim of my invention to eliminate the necessity of using water cooled rolls and other complicated devices and features which are necessary with singeing equipments for textile fabric now in use.

Another novel feature and aim of my invention is to provide means whereby lighter or heavier fabrics may be singed by my device, the same being easily adjustable for the various cases.

An important further object is to provide a singeing device for textile fabrics, which will loosen and perfectly burn the particles to be singed, the fuzz of the fabric, etc., and which will blow the products of combustion away from the fabric without the necessity of using brushes, suction or exhausting devices used at present.

I also aim to provide a device of this character, which will be adapted to operate both with flame and with infra red rays, and wherein both may be adjusted for heavier or lighter fabrics, in an easy and effective manner.

Still further objects of this invention will be apparent as the specification of the same proceeds, and, among others, I may mention: to provide means of the character indicated hereinbefore, which will be comparatively simple in construction, inexpensive to manufacture and install, easy and reliable to operate, and which will be adapted to be added to existing devices and installations for singeing textile fabric.

In the drawings, forming a part of this specification and accompanying the same:

Fig. 1 is a diagrammatic plan view of a textile

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fabric singeing device embodying my invention, and

Fig. 2 is a side elevation thereof, while

Fig. 3 is an end view of the same;

Fig. 4 is a fragmentary side view of the end of my device wherein the adjusting means are applied to the same;

Fig. 5 shows a detail of the adjustable and rotatable connection of the combustible mixture manifold of my device into a pipe line of the same;

Fig. 6 is a sectional view on a larger scale of my specific infra red ray generator or producer, the section being taken on line 6—6 of Fig. 1;

Fig. 7 is a sectional detail taken on the line 7—7 of Fig. 3.

Referring now to the drawings more in detail, by characters of reference, the numeral 20 indicates my textile fabric singeing device, in general, being mainly composed of a frame structure 21, and two rotatable combustible mixture manifolds 22 and 23, respectively, carrying the respective infra red ray generators or producer devices 24 and 25.

A bearing 26 is provided on the right hand frame member 27 for the manifold 22, and, similarly, a bearing 28 is provided on said member for the manifold 23, so that the manifolds are rotatable in the respective bearings 26 and 28.

The gas air mixture is introduced into the manifolds through the respective stationary pipes 29 and 30 which are secured on the left hand frame member 31, as at 32 and 33. The gas air mixture may come from any appropriate source through stationary pipes secured at the ends of the stationary manifold terminations 29 and 30, as indicated by the arrows 34 and 35.

A usual so-called swing joint 36 is inserted between the stationary termination 29 and the rotatable manifold 22, and, similarly, swing joint 37 connects the stationary pipe 30 to the manifold 23. The construction of such so-called swing joints, permitting a rotation of a pipe line member against another one, and still keeping it gas tight, is well known in this art, and my preferred construction thereof is indicated in Fig. 5.

Such swing joints usually operate in the manner that one pipe end 36a projects into the other one 36b, and is surrounded by an adjustable sealing member 36c, which permits its rotation and its axial movement, if necessary, but which still will keep the joint gas tight.

I employ this type of connection for the reason that the frame 21 for a textile fabric singeing

installation often is already in existence, and my novel singeing device has to be built thereon to replace the inefficient and awkward former singeing equipment, so that, in many cases, a longitudinal or axial adjustment is needed between the rotatable manifolds and their respective stationary connections 29 and 30.

The preferred construction and operation of my gas burning infra red ray generators or producers 24 and 25, has been illustrated and described in my co-pending application for Letters Patent of the United States, for a Gas burning infra red ray generator, filed July 7, 1942, No. 450,017, now abandoned.

Its construction also is illustrated in Fig. 6 for the unit 24, while, of course, the unit 25 will be identical except oppositely placed.

As will be seen from Fig. 6, and as described in my said co-pending application, a gas air mixture chamber 38 is provided to which is attached a metal angle piece 39, carrying the refractory lining body 40, having the curved inner surface 41.

The upper end 42 of the combustion mixture chamber 38 is turned inwardly, towards the refractory lining 40, and has a plurality of flame orifices 43 in its inner wall, and an adjustable perforated baffle 44 is inserted between the main body 45 of the casing 38, and its flame producing upper end 42. The gas air mixture is introduced into the chamber or casing 38, as indicated at 46.

I provide comparatively long infra red ray generators 24 and 25, and a plurality of feed pipes 47 for the same, said feed pipes branch out from the respective rockable or swingable manifolds 22 and 23, rising upwardly and then inwardly to join the respective units 24 and 25.

The fabric to be singed is indicated at 48, and it will be caused to move upwardly, as indicated by the arrow 49, between the two oppositely set infra red ray generators 24 and 25.

As will be understood, a plurality 43 of gas mixture orifices in the generator units will produce a uniform unbroken flame 50 along the length of my special refractory body 40 made incandescent by the flame impinging on the surface 41 thereof, and sweeping therealong, as also indicated in Fig. 6.

When the refractory body becomes incandescent, it will produce infra red rays, which will be thrown outwardly along the longitudinal opening in the generator unit, as indicated by the arrow 51. The infra red rays of the two oppositely placed units 24 and 25 will strike the fabric 48, moving between them, and will do the singeing operation in an incomparably quicker, cheaper, and also more perfect manner, than is the case with the present singeing devices.

As it also will be understood, infra red rays of over 1450 Angstroms will be produced by my special refractory material made incandescent at a temperature of over 2200° F.

The intensive penetrating quality of the infra red rays, and their ability to quickly scorch the surface and the interstices of the fabric, to be singed, will result in extremely quick operation, requiring a fast movement of the fabric 48, which may be brought about by any of the usual means employed in singeing machines (not shown), but this operation also will require a very fine adjustment of the infra red ray generators at the two sides of the fabric, and, obviously, in a normal case, the distance of each of the units from its respective side must remain equal all the time.

I adjust my infra red producer so that it will emit a flame along the outer edge thereof, and the scorched material will be burned by the same, and also will be blown away by the pressure of the products of combustion, which in this case will entirely be composed of CO₂, being the result of a perfect combustion over the incandescent surface of the special refractory body acting as a catalyst.

To attain these objects there is provided a regulating mechanism generally indicated by the numeral 52 and illustrated in Figs. 3 and 4 in the drawing. The regulating mechanism 52 is secured to the respective ends 22a and 23a of the rotatable gas mixture manifolds 22 and 23 projecting from the bearings 26 and 28.

As will be seen in said figures a disc 53 closes the end 23a of the manifold 23, being secured thereon and rotatable therewith.

An arm 54 projects from the disc 53. The end 22a of the other manifold 22 is also closed, by a disc 55 secured thereon and rotatable therewith, and disc 55 has an arm 56 secured to it.

A link member or rod 57 is pivoted to both arms, as at 58 and 59, the respective ends 60 and 61 of the link member 57 being forked, as will be understood. A lug or ear 62 is provided on the link member 57, and an adjustable screw 63 passes through a screw threaded bore in the arm 54, its inner end engaging the lug 62.

An operating lever or arm 64 may be secured on the disc 53, as by the bolts 65. Preferably a plurality of bores 66 are provided in disc 53 to secure the operating arm 64 thereon in various desired positions.

It will be seen that if the adjusting arm or lever 64 is turned outwardly, as indicated by the arrow 67, it will turn the disc 53 in a clockwise direction (arrow 68) and with it the arm 54. The arm 54 will carry the link member 57, in the case described, in a right handed direction, as indicated by the arrow 69, and through it will pull the arm 56 in an anti-clockwise direction (arrow 70) turning the closure disc 55 for the manifold 22 similarly in an anti-clockwise direction.

The final result of the swinging of the arm 64 in a clockwise direction, or outwardly, as shown by arrow 67, will be an outward turning of the manifold 23 (arrow 68) and a similar outward turning of the manifold 22 (arrow 69) and a similar outward turning of the manifold 22 (arrow 70). Such a turning of the manifolds will obviously cause the respective generator units 24 and 25 to move outwardly, away from one another, as indicated by the arrows 71 and 72, thereby increasing the space between the two units and their distances from the fabric 48.

Similarly, if the adjusting lever 64 is turned in the opposite direction, inwardly, (arrow 73), the movements described hereinbefore will be performed in an opposite direction, and the two infra red ray generator units 24 and 25 will approach each other and their distance from the respective sides of the fabric 48 will be reduced, while both will always remain identically spaced therefrom.

I use the lever 64 for a quick preliminary adjustment of the two infra red ray units depending on the thickness of the material to be singed. For a final adjustment, as it is necessary with such sensitive, extremely fast operating, devices, the adjusting screw or bolt 63 will be used. It will be seen that if the screw will be rotated in

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one direction, it will pass through the arm 54 inwardly, and press against the lug 62, whereby a pressure will be exerted thereon, which is transmitted to the link member 57, and therethrough to the arm 56, thereby causing the manifold 22 to turn in an outward direction to a very small degree, commensurate with the dimension of the threads of the bolt 63 and the amount of its rotation. Such a movement of the arm 56, however, will carry the link member 57 with it, and the arm 54, the disc 53, and, of course, the manifold 23, in an opposite direction to the movements of the arm 56, disc 55 and the manifold 22, respectively, and it will be seen that the generator units 24 and 25 will be caused to move further apart, in a very fine measure. Upon the reverse turning of the screw 63, the distance between the generator units will be set closer together to attain a fine adjustment. Furthermore the screw 63 contacting the lug 62 limits the inward movement of the burners toward each other when the handle 64 is swung in a counterclockwise direction, looking at Fig. 3, so as to make sure that the burners do not contact the cloth.

Some of the outermost, or end, gas air mixture feeding pipes 47, I may provide with independent closure valves 74, and the respective portions of the generator units 24 and 25 may be provided with corresponding transverse closure walls 75. In case a narrower fabric is to be singed, as indicated at 76, the end feeding or branch pipes 47 may be closed, thereby putting the ends of the respective generator units 24 and 25 out of operation, so that only the portions of those units corresponding to the narrower fabric 76, will now be activated.

As has been mentioned, the flames 50 of my device may be adjusted as through the operation of the adjustable baffle 44 in my infra red ray generator, or in cases where other flame producing devices are used, the flames may be adjusted by any other methods well known in this art, and in this way they may be made longer or shorter, or hotter or cooler, in case heavier or lighter textile material is to be singed. It is obvious that in such a manner the infra red rays produced will be influenced accordingly, but also I may use the flames themselves for singeing, if desired, in combination with the infra red rays by lengthening the flames to project from the confines of the trough-like burner, shown in Fig. 6, to a desired extent.

With the present devices for singeing textile material, only incomplete incineration of the fuzz and similar particles is produced, and such devices generally employ brushes to remove these particles from the fabric, and a large portion of these particles will be only partly burned and they will fill the air of the singeing room, in some cases the air in the room being entirely filled with white unburned particles, with the obvious harmful effects, and necessitating specific blowers and exhausting devices. All this is automatically eliminated by the operation of my device. The expeditious, efficient, and perfect removal and incineration of such particles by my device will also eliminate the necessity of repeated singeing operations on the same fabric, as is very often needed with the devices used at present.

One of the important features of my singeing device is the fact that it eliminates many of the complicated mechanisms that now are being used in various singeing devices or are proposed in patents for such.

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The novelty of my invention also is due to the fact that I definitely singe, or scorch, the fuzz which remains on the surface of all textile materials which require singeing and a smooth surface. This fuzz is also embedded in the interstices of the warp and in order to properly singe or bring them out, pressure has to be applied so that they are blown out from in between the interstices and then singed.

Another specific novelty of my singeing device lies in the fact that I use a high manifold gas mixture pressure which has a dual purpose: the gases which are used for combustion over my special refractory create an incandescent surface which projects infra red rays. These infra red rays in themselves do not carry any temperature until they strike the object to be heat treated and then the infra red ray scorches the surface fuzz, while the projecting flame, produced in my special burner burns away the scorched fuzz on the surface simultaneously on both sides of the cloth. This way only one passage of the cloth is required between the burners as against the several returns for the same usual with singers at present.

Another feature of the invention is the special and novel way of adjusting the distance between my two burners, as might be required for lighter or heavier cloth, by a simple link mechanism controlled in the final adjustment by a single screw indicated in the drawings by the numeral 63. Such adjustment in my device can be done while the singer is in operation.

It will be noted that the flames are not directed perpendicularly to the cloth at opposite sides. If this were done, the cloth would burn. The flame, on the other hand, is directed by the curved surfaces 41 of the incandescent blocks 40 in directions parallel to the direction of movement of the cloth. Thus the flame strikes the surface of the refractory material creating an incandescent surface of high temperature essential to produce infra red rays which are electromagnetic in nature. The surface of the refractory material is curved to direct the flames parallel to the cloth. Thus the infra red rays sear the filaments while the flame singes the seared filaments. Furthermore it will be noted that the infra red rays are directed in directions perpendicular to the cloth and toward each other and toward the cloth, so that the waves meet and penetrate the interstices of the cloth. Thus, while the flames pass along the cloth in directions parallel to the cloth and on opposite sides thereof, the infra red rays are directed perpendicularly to the cloth and penetrate said cloth.

While I have shown a preferred embodiment of my invention, it is to be understood that changes and variations may be resorted to in the elements, construction and combination of my invention, and I reserve my rights to such changes, variations and uses, as are within the spirit of this specification and the scope of the claims hereunto appended.

What I claim as new and want to protect by Letters Patent of the United States, is:

1. In a textile fabric singeing device through which a fabric moves, two gas burning infra red ray generators oppositely placed at the two sides of the fabric and facing one another, said generators being of elongated trough shapes, and at least as long as the width of the fabric moving through said device, with troughs facing each other at the two sides of the fabric, a refractory

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lining entirely covering their facing surfaces, a rotatable combustible mixture manifold at each side of the fabric, pipes projecting from said manifold to feed and to carry said generators, said combustible gas mixture entering said generators at substantially high pressure, and being adapted to produce substantially high temperatures at the surface of the lining.

2. In a device, as set forth in claim 1, the flame produced by the combustion of said gas mixture being adapted by said generators to sweep along said facing surface, and regulating means for said flame to cause it to reach to a desired distance beyond the further edge of the refractory lining.

3. In a device, as set forth in claim 1, said manifolds being rotatably mounted, means interconnecting said manifolds to said generators for bringing said generators closer to the fabric upon rotating said manifolds each in one direction, and to cause said generators to move away from said fabric upon rotating said manifolds each in an opposite direction.

4. In a device, as set forth in claim 3, a closure disk arranged at one end of each of the rotatable manifolds, a generally upwardly pointing arm of one disk, and a generally downward arm on the other, a link member pivoted to each arm whereby the rotation of one manifold will cause an opposite rotation in the other.

5. In a device, as set forth in claim 3, a closure disk arranged at one end of each of the rotatable manifolds, a generally upwardly pointing arm of one disk, and a generally downward arm on the other, a link member pivoted to each arm whereby the rotation of one manifold will cause an opposite rotation in the other, a third outwardly inclined arm secured on the first one of said disks, whereby to rotate its manifold for an approximate preliminary adjustment, a lug on said link adjacent to said first arm, and a regu-

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lating screw, passing through said first arm and being adapted to press on said lug when rotated for an outward movement, and thereby causing a final exact adjustment by moving said generators outwardly, and said screw moving away from said lug, when rotated in the opposite direction, and thereby permitting the generators to be moved toward each other in a desired exact manner and for another final adjustment.

FRANCIS M. CROSSMAN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
Re. 13,154	Gin	Oct. 4, 1910
602,813	Binder	Apr. 19, 1898
770,274	Edmunds	Sept. 20, 1904
1,280,232	Johnson	Oct. 1, 1918
1,701,333	Otis	Feb. 5, 1929
1,704,875	Vaughn	Mar. 12, 1929
1,726,678	Osthoff	Sept. 3, 1929
1,800,835	Hussa	Apr. 14, 1931
1,807,703	Osthoff	June 2, 1931
1,862,960	Kemp	June 14, 1932
1,928,973	Elliott et al.	Oct. 3, 1933
1,988,554	Hall	Jan. 22, 1935
2,195,357	Carter	Mar. 26, 1940
2,288,898	French	July 7, 1942

FOREIGN PATENTS

Number	Country	Date
1,746	Great Britain	1871
10,949	Great Britain	1894
324,182	Great Britain	Jan. 23, 1930
335,415	Great Britain	Sept. 25, 1930
806,872	France	Oct. 5, 1936