

(No Model.)

3 Sheets—Sheet 1.

W. E. WHITTLE & J. R. REYNOLDS.
CLOTH SINGEING MACHINE.

No. 536,408.

Patented Mar. 26, 1895.

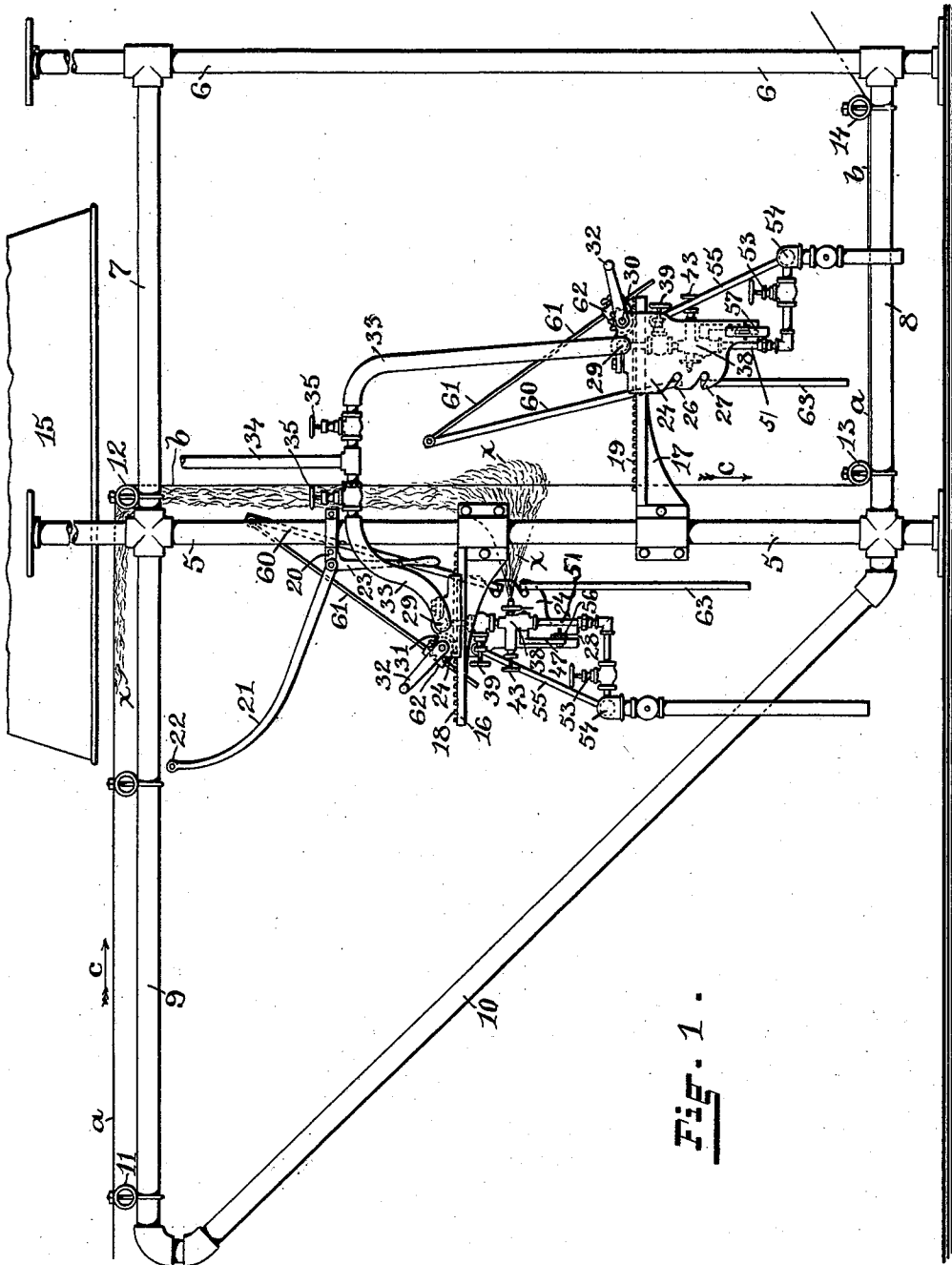


FIG. 1.

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(No Model.)

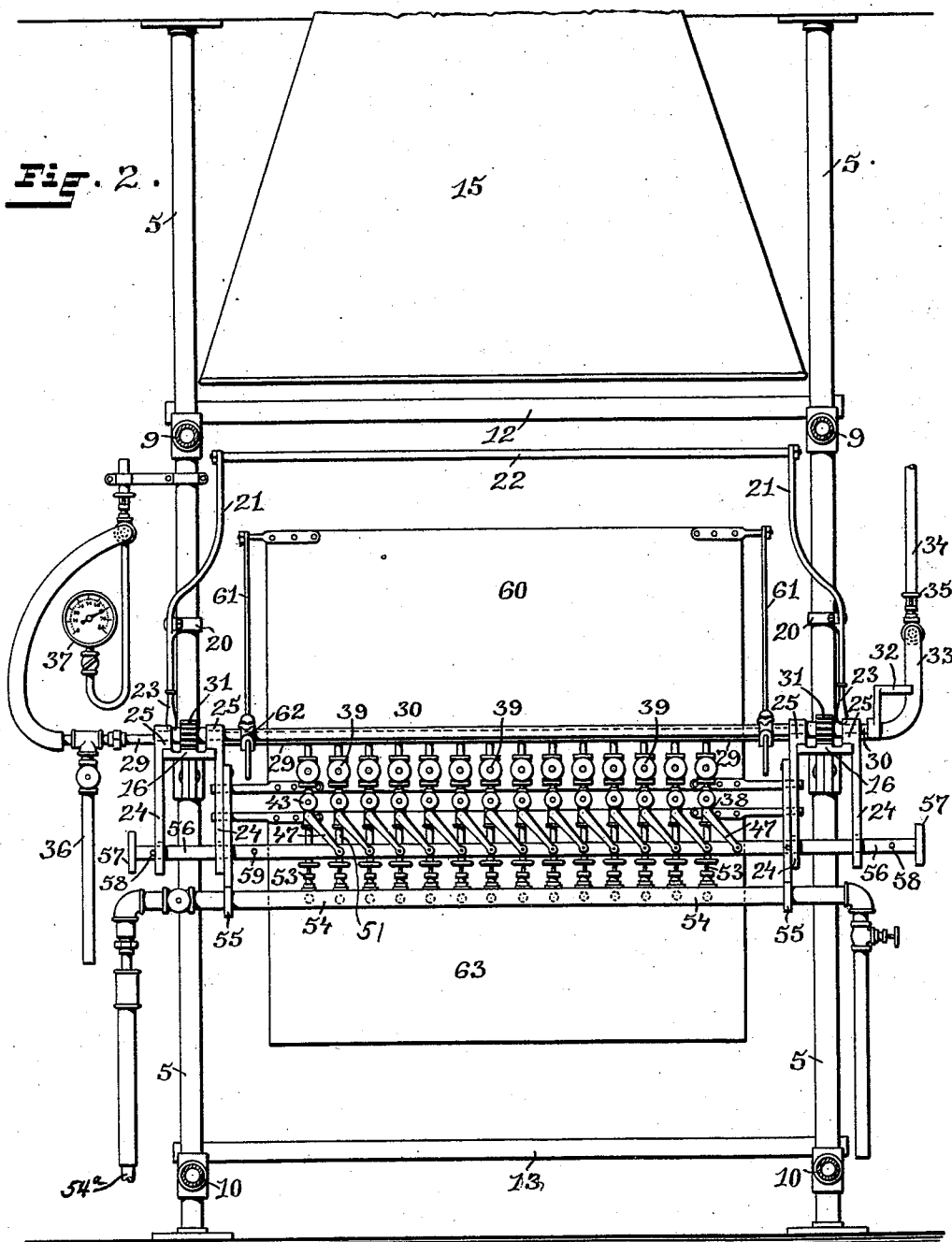
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(No Model.)

3 Sheets—Sheet 3.

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Fig. 3.

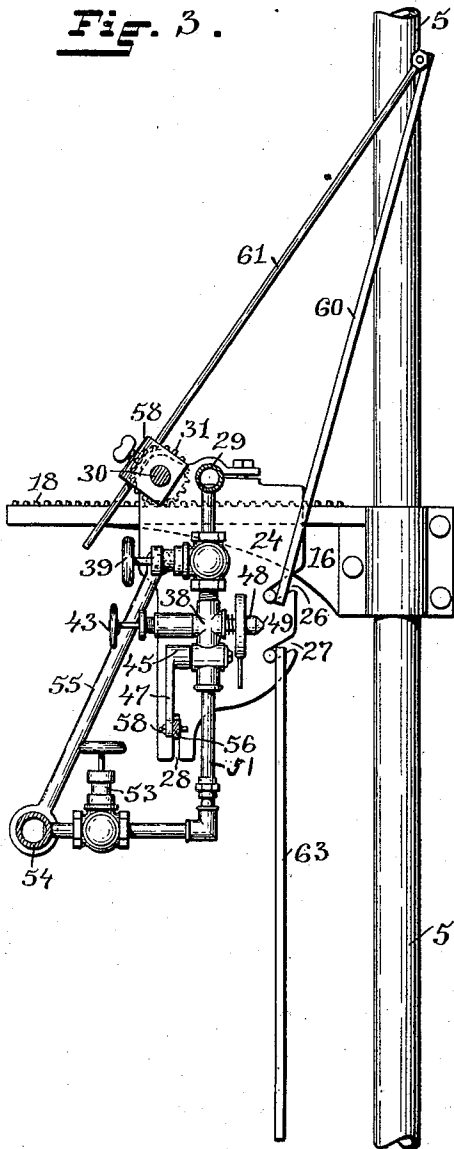
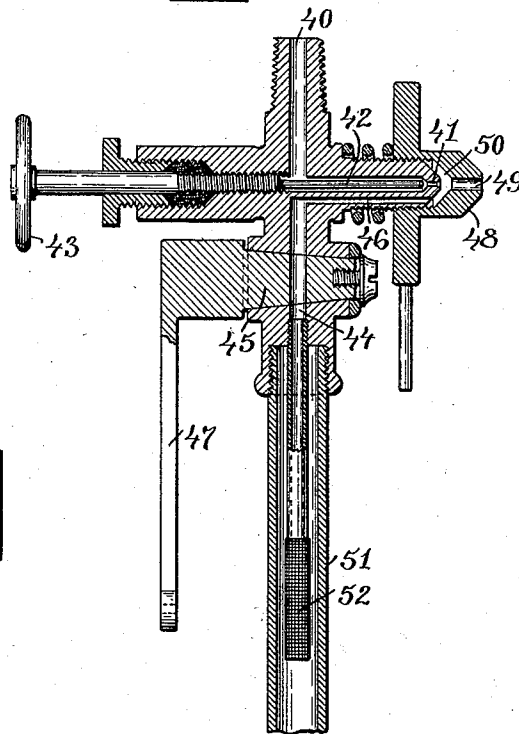


Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM EDWARD WHITTLE AND JOHN RICH REYNOLDS, OF PROVIDENCE,
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CLOTH-SINGEING MACHINE.

SPECIFICATION forming part of Letters Patent No. 536,408, dated March 26, 1895.

Application filed October 17, 1894. Serial No. 526,135. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM EDWARD WHITTLE and JOHN RICH REYNOLDS, of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Cloth-Singeing Machines; and we hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention has reference to improvements in cloth-singeing machines.

One object of the invention is to more thoroughly subject the cloth to the action of flame so that the fibrous particles adhering to the warp and filling may be removed from between the threads as well as from the surface of the cloth.

Another object of the invention is to subject a greater length of cloth to the action of a flame serving as a heating flame in its first action on the cloth and later, when the more intense portion of the flame is reached by the cloth, as a singeing medium.

Another object of the invention is to so construct a cloth-singeing machine that, while a portion of the cloth is being acted upon by flame under pressure, the surplus flame may be utilized as a heating medium to raise the temperature of the cloth before it reaches the intense portion of the flame or greatest volume thereof.

Another object of the invention is to so construct a cloth-singeing machine, in which a flame under pressure is used as a singeing medium, that the cloth to be acted upon is yieldingly supported before the singeing flame.

Another object of the invention is to so construct a cloth-singeing machine, in which a flame is used as a singeing medium, that the flame impinging on the cloth is carried along the cloth in a direction opposite to that in which the cloth is moving.

Another object of the invention is to so construct a cloth-singeing machine that the singeing flames may be more fully controlled than in those heretofore constructed.

Still another object of the invention is to so construct a cloth-singeing machine, in which flame under pressure is used as a singe-

ing medium, that the cloth may be flexibly supported between two oppositely directed flames.

Still another object is to so construct a cloth-singeing machine that the machine may be more fully controlled by the operator, to increase or diminish the force of the flame and the supply of fluid material therefor, to regulate the distance of the burners from the cloth, or to instantaneously shut off the fluid supply to all burners.

The invention consists in the combination with a singeing machine provided with a horizontal system of burners from which flames under pressure may be directed in a horizontal plane, and having guides for yieldingly supporting the cloth in a vertical plane as it passes the burners of a ventilator located immediately above said burners.

The invention also consists in the peculiar arrangement of the burners and the means for simultaneously closing the fluid fuel supply pipes thereof close to the mouth-pieces.

The invention also consists in the vertical supports, the brackets extending from the supports and the singeing medium adjustably mounted on the supports.

The invention also consists in the novel arrangement of the burners in combination with the shields.

The invention also consists in the combination with the vertical supports, of the cloth-lifting frame pivotally secured thereto.

The invention still further consists in such other novel features of construction and combination of parts as may hereinafter be more fully described and pointed out in the claims.

Figure 1 represents a side view of the improved singeing machine, the cloth being represented as under the action of a single compound plane, the direction of which is indicated, as it is forced against the cloth opposite the burners and then passes upward toward the ventilator hood, being deflected by the portion of the cloth passing in a horizontal direction, portions of the burner carriage being broken away. Fig. 2 represents an end view of the machine showing the arrangement of the burners and their connections, the shields, and the cloth-raising device. Fig. 3 represents an enlarged sectional view of portions of the machine to more clearly

show the connections of the supply-pipes with the burners, together with other details of construction. Fig. 4 represents a vertical enlarged sectional view of one of the burners.

5 Similar numbers and letters of reference designate corresponding parts throughout.

It is well known that, in order to perfectly singe cloth, it is necessary to raise the temperature of the same immediately before it is presented to the singeing medium whether this medium be gas-jets or hot metallic-plates. For this purpose heated rolls have heretofore been used over which the cloth was passed before being presented to the singeing medium. As it has not been practical to locate these heating rolls immediately adjacent to the singeing devices the temperature of the cloth was lowered in passing from the roll to the singeing medium, the first office of which was to again raise the temperature of the cloth before the singeing could be accomplished. This it has been impossible to accomplish, owing to the small portion of cloth acted upon by the singeing medium and to the necessary speed at which the cloth must be moved to economically treat the same, and it has heretofore been considered important to so confine the flame, where such has been used, by means of mouth-pieces covering burners, and to locate these mouth-pieces so near the cloth to be singed that little opportunity has been given the flame to spread over the cloth. Again it has heretofore been the custom to support a roller immediately above the singeing flame, so that, when the cloth was presented to the action thereof, the roller bearing against the opposite side of the cloth would not only prevent the passage of the flame through the interstices between the threads, but, by consolidating the loose fibers by its pressure, would impose an obstacle to their singeing. It is true that ventilating devices have been used to draw confined flames through cloth in singeing machines, but this has been for the purpose of decreasing the cross-section of the flames, limiting their action to but a small area of cloth.

In carrying our invention into practice we pass the cloth to be singed through a machine, in which the surface under action by the flame is flexibly supported in line with a ventilator hood, and subject the cloth to the action of unconfined flame first acting at right angles to the cloth, and then, from its specific gravity and the currents of heated air directed toward the ventilator and along the cloth, in a direction opposite to that in which the cloth is moving. By this means the body of flame, when it first strikes the cloth, passes partially or wholly through the same, burning away the surplus fibers and then passes along the cloth serving as a heating medium for the approaching cloth.

Referring to the drawings the frame of the machine consists of two side-frames each comprising vertical standards 5 and 6 connected by the upper and lower members 7 and

8, and the extension formed by the upper bar 9 and the inclined bar 10 joined together by suitable fittings; these bars, members and standards being generally tubular to lessen the weight of the same. The frames are connected together by the guide-bars 11, 12, 13 and 14, as well as such other suitable cross members as may be necessary to secure the side frames rigidly together. Above the central portion of the frame is supported a ventilator of which the hood 15 is shown in the drawings.

Secured to the standards 5—5 at different heights and extending in opposite directions are the bracket-arms 16 and 17 each of which is furnished on its upper surface with a toothed rack 18 or 19. Above these arms the clamps 20—20 are fastened to the standards 5—5, and to these clamps are pivoted the upwardly-curving arms 21—21 connected by the cross-bar 22 and furnished with the depending handles 23—23 by which the arms 21 are actuated to raise the cross-bar 22 upward above the level of the guide 12.

Mounted on each of the bracket-arms 16 or 17 are the depending plates 24—24 each of which is furnished with a shoulder 25 bearing on the smooth surface of its bracket arm, these plates having also the inclined slots 26 and 27 and the vertical slots 28 in their lower portions. Four of these plates are connected together by the steam-pipe 29 to form a carriage at one side of the standard, and in these plates is journaled the shaft 30 having pinions 31—31 secured thereto at the portion between each pair of the plates 24 and intermeshing with the toothed rack 18 or 19 as the case may be. At one end of the shaft is the handle 32 by means of which the shaft and its pinions are rotated to move the carriage along the bracket arms to adjust its location with reference to the cloth.

The steam-pipe 29 of each burner carriage is connected by means of the flexible pipe 33 with the steam-supply pipe 34 provided with the valve 35 for controlling the same. To the opposite end of the steam-pipe are connected a drip-pipe 36, and a steam-gage 37.

Pendent from the steam-pipe 29 is a series of burners 38—38 each provided with a steam-valve 39, the construction of the burners being shown in Fig. 4 of the drawings. These burners have a steam inlet 40 which connects with the contracted outlet 41 by a passage extending at right angles with the inlet. In this passage is a valve-rod 42 governed by the thumb-nut 43 to regulate the passage of steam through the outlet. Below the steam-inlet is formed the oil-inlet 44 which is controlled by the rotatable valve 45 located as close as possible to the forwardly extending contracted passage 46 and operated to fully open or close in a quarter turn by the depending handle 47.

The outer end of the burner stem, it will be noticed, is conical in shape, the steam outlet extending through its apex while the oil out-

let extends through its conical wall, the steam thus being discharged at a point beyond the point at which the oil issues.

The outer surface of the burner stem is screw-threaded and on this stem is engaged the internal screw of the mouth-piece 48 having an orifice 49 and an internal chamber 50 in which the oil and steam mix as they issue from the stem, the point of ignition being at the outer end of the orifice 49.

To each of the burners is connected an oil-pipe 51 into which the strainer 52 extends, each of these pipes being connected, by a bent fitting provided with a valve 53, with the transverse pipe 54 which in turn is connected with any suitable oil supply by a flexible pipe 54'. To relieve the strain on the pipes 51 this transverse pipe is partially supported by the braces 55—55 secured to the pipe 54 and to two of the plates 24.

The lower ends of all the valve-arms 47 on one carriage are pivoted to the reciprocating bar 56 having handles 57 and stops 58 and 59. These bars are reciprocated in the slots 28 at the lower ends of the plates 24, the reciprocation of the bars throwing the valve arms to simultaneously close all the oil passages in each series of burners which, from their location, leave but a trifling amount of oil in a position to be ignited.

The upper shields 60—60 have pivots which are supported in the inclined slots of the plates 24. To the upper ends of these plates are pivoted the rods 61—61 which are adjustably secured in the clamps 62—62 loosely mounted on the shafts 30, so that by taking up or letting out these rods 61 the inclination of the shields may be varied. The lower shields 63—63 are furnished with pivots which are engaged in the inclined slots 27 of the plates 24, these latter shields being for the protection of the operator from any unusual downward spread of the flame.

The cloth *a—b* passes into the singeing machine and through the same in the direction indicated by the arrows *c—c*, passing over the guides 11 and 12 and then downwardly under the guides 13 and 14, thus being supported in a vertical plane during the singeing action thereon of the flame *x—x*. As the location of the cloth during this operation is directly beneath the ventilator-hood 15, the natural draft is in a direction opposite to that in which the cloth is moving but in the same plane. This draft is increased by the currents of air when the flames are in action, the flames thus ascending along the surface of the cloth and raising the temperature of the same. As the flame reaches the guide 12 this is also heated and also tends to raise the temperature of the cloth while beyond this guide the flame is deflected from its vertical movement by the horizontal portion of the cloth through which, or around which, a large portion of the flame must pass before escaping through the ventilator hood.

By the use of the system of burners herein

shown the flames may be regulated to singe fabrics composed of strips of different textures some of which require a more intense flame than others. By closing the steam and oil valves of the burners located opposite the strips of more open texture the intensity of the flame at these points is reduced while portions of the flames, from the burners at either side of those closed, will extend over these more open portions and serve to thoroughly singe without burning the same.

When the machine is to be placed in operation the valves 35 and 39 are opened to admit steam to the burners, the valve-rods 42 then being adjusted, by means of the thumb-nuts 43, to regulate the opening to the contracted passage 41. The cloth is now drawn forward in position before the first series of burners, being held in position by the frictional contact with the guides 11, 12, 13 and 14 together with the tension or strain exerted by the mechanism for drawing the cloth forward. The oil-valves 53—53 being now opened and the bar 56 reciprocated to open the valves 45 the streams of oil are drawn forward, by the steam issuing from the contracted passages 41, into the chambers 50 where it is mixed with the steam, then being forced by the steam pressure through the orifice 49 at the outer end of which it is ignited by a torch, then passing onward in a compound flame at or nearly at right angles with the cloth and impinging thereon with sufficient force to partially or wholly penetrate the same before being acted upon by the air currents and drawn upward. When it is desired to shut off the flames before the entire length of the cloth has passed before the flame, the rod 56 is reciprocated to simultaneously close the valves 45 of the entire series, thus cutting off the oil supply thereto. At this time, if the cloth is stopped in its movement, it may be desirable to lift the cloth from contact with the heated guide-bar 12 to prevent the scorching of the cloth and for this purpose the handles 23 are thrown away from the standards 5—5 to elevate the ends of the arms 21 and to lift the cloth from contact with the guide 12 by means of the rod 22. After being singed the cloth may be subjected to any usual process for wetting the same.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. In a cloth-singeing machine, the combination with side frames, and horizontal guides supported by the side-frames respectively at the upper and lower portions thereof and adapted to sustain the cloth, in its passage through this portion of the machine, in a vertical plane, of a series of atomizer burners supported in the machine and having their mouth-pieces on a horizontal plane intermediate the planes of the guides.

2. In a cloth-singeing machine, the combination with a frame having the standards 5—5, the horizontal guides 12 and 13, sup-

ported by the standards respectively at the upper and lower portions thereof; and supports extending laterally from the standards intermediate the guides, of a series of atomizer-burners supported by said supports.

3. In a singeing-machine, the combination with side-frames, upper and lower guide-bars extending between the side frames and located in the same vertical plane, supports on the side-frames, and a ventilator device located above the supports, of a carriage mounted on the supports, a series of atomizer burners supported by said carriage between the upper and lower guide-bars, and supply-pipes connecting with the burners.

4. In a cloth-singeing machine, the combination with vertical standards, and horizontal brackets secured thereto, each bracket having a toothed rack, of a carriage, consisting of side plates, movable on said brackets, a steam-pipe connecting the side plates, a shaft journaled in the side plates having pinions engaging the racks, and a handle for rotating the shaft, a series of burners depending from the steam-pipes and having mouth-pieces adapted to direct the spray to be burned in a horizontal direction, an oil supply-pipe connecting the lower portions of the burners, valves in said burners for controlling the oil supply, each of which valves is furnished with an operating arm, and a reciprocating rod, to which each of the valve arms is pivoted, adapted to simultaneously actuate the valve arms to operate the valves, as described.

5. In a singeing machine, the combination with vertical standards, and horizontal brackets secured thereto, of a carriage adjustably mounted on the brackets, atomizer burners forming part of said carriage and having mouth-pieces adapted to direct the spray to be burned in a horizontal direction, an upwardly-extending shield pivotally mounted on the carriage, and means for adjusting the inclination of the same.

6. The combination with the vertical standards, and the brackets 16—16 extending from the standards and furnished with the toothed racks 18, of the plates 24—24 mounted on the brackets, the steam-pipe 29 connecting these plates, the shaft 30 journaled in the plates and having the pinions 31 intermeshing with the toothed-racks 18, and the handle 32 for rotating the shaft, the atomizer-burners 38 depending from the steam-pipe and provided with the valves 45 having the arms 47, the bar 56 to which the lower ends of the valve-arms 47 are pivoted, the oil-supply pipe 54 connected with the burners by bent fittings, and supply pipes connecting respectively with the pipes 29 and 54, as and for the purpose described.

In witness whereof we have hereunto set our hands.

WILLIAM EDWARD WHITTLE.
JOHN RICH REYNOLDS.

Witnesses:

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M. F. BLIGH.