Feb. 4, 1930. G. ERNE 1,745,920

DEVICE FOR SINGEING TEXTILE THREADS

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Fig. 1

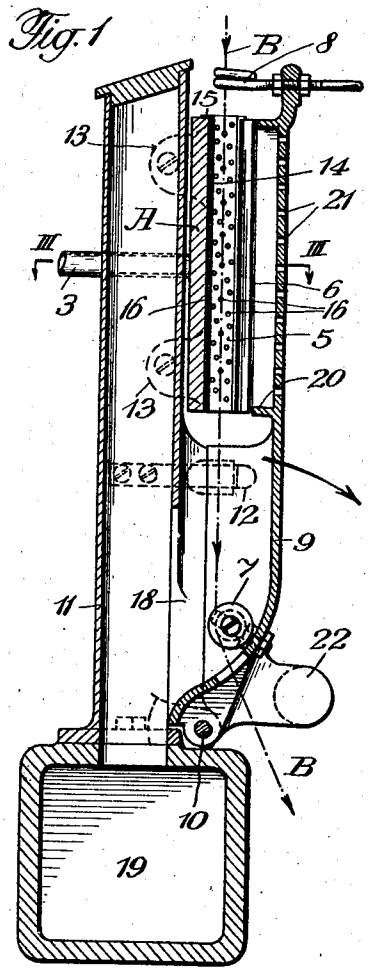


Fig. 2

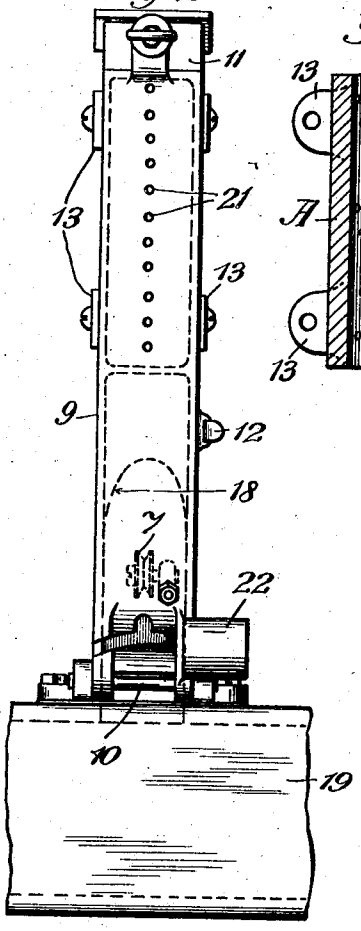
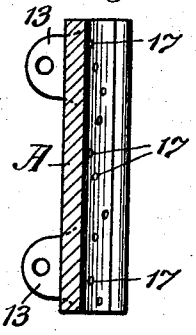


Fig. 5



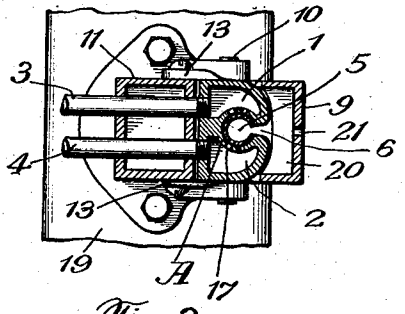


Fig. 3

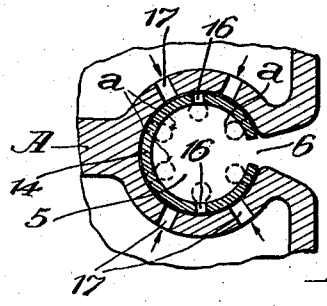


Fig. 4

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Fig. 6

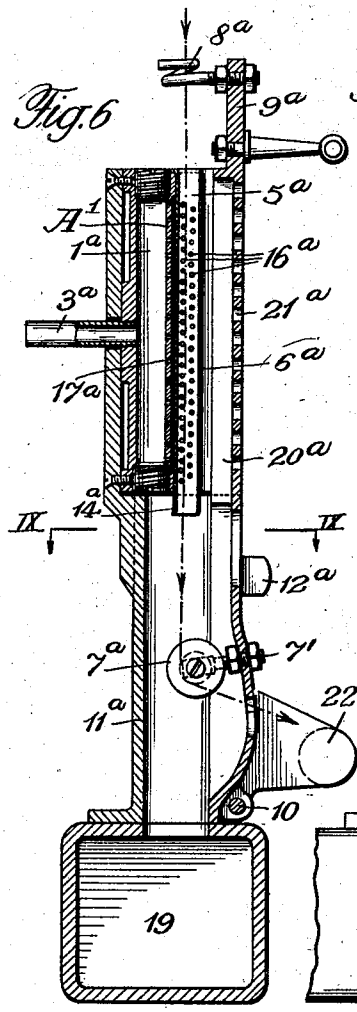


Fig. 7

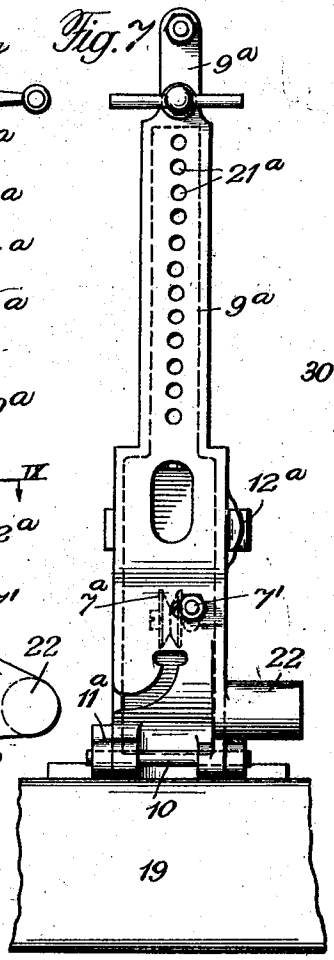


Fig. 13

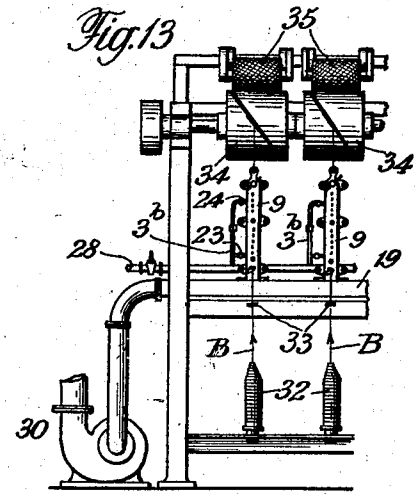


Fig. 14

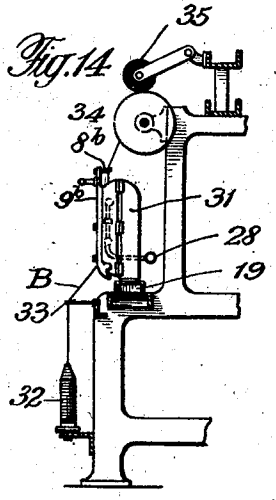


Fig. 9

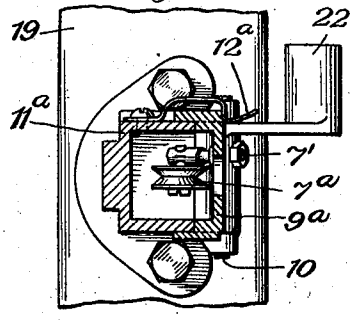
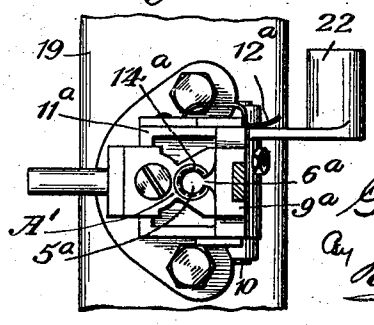


Fig. 8



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Fig. 10

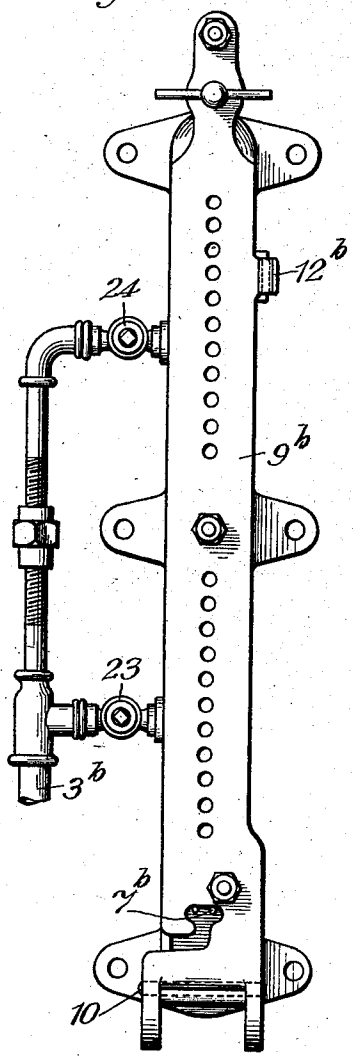


Fig. 11

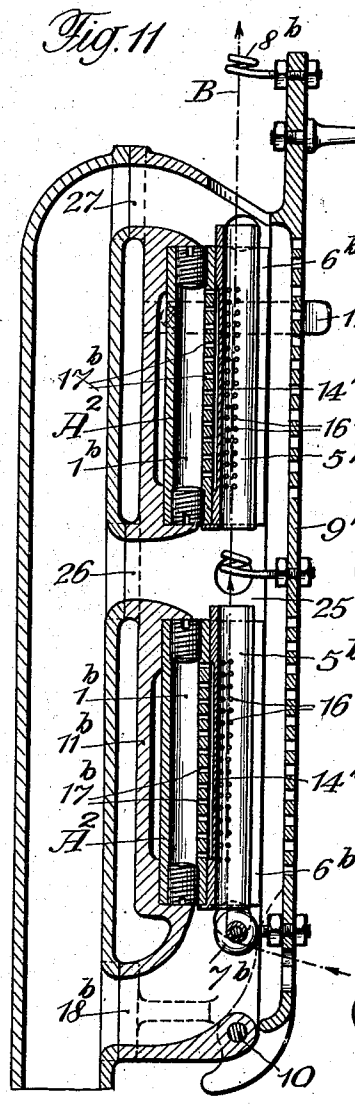
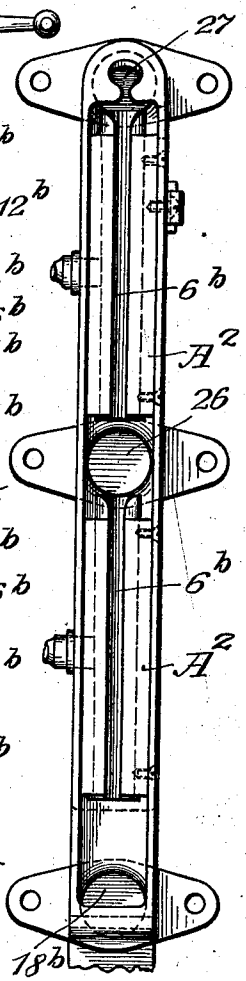


Fig. 12



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UNITED STATES PATENT OFFICE

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DEVICE FOR SINGEING TEXTILE THREADS

Application filed March 15 1928, Serial No. 261,894, and in Germany March 21, 1927.

The present invention relates to a gas operated device for singeing textile threads of the type having a tube forming the inner walls of a gas chamber, and through which the thread passes. With the known devices of this kind the gas burns directly after it leaves the aforementioned gas chamber from which it is discharged at a comparatively high pressure through a moderate number of perforations; thereby a high gas consumption results and the flames present in a limited number are easily extinguished by a strong draught of air caused by the thread passing at a high speed through the singeing space and by the artificially produced suction action for the purpose of discharging the residues of combustion from the singeing space.

With the gas operated singeing device according to the present invention the above mentioned drawbacks are eliminated inasmuch as the gas leaving the gas chamber by a limited number of perforations in the wall of the tube is distributed behind a sieve like insertion arranged in the tube and leaves the large number of perforations of this insertion at a reduced pressure in order to burn at the inner side of the insertion with small flames.

Tests have shown that in this manner for the same output of singed thread and without reducing the speed of the thread passing through the singeing space substantially less gas is consumed than hitherto and that the small flames formed at the inner side of the sieve which so to speak adhere to the latter are not extinguished even with a strong suction action in the singeing space.

Several constructional examples of the subject matter of the present invention are illustrated on the accompanying drawing, in which:

Fig. 1 is a vertical section of a first constructional example,

Fig. 2 is a front elevation of Fig. 1.

Fig. 3 is a horizontal section along line III—III in Fig. 1,

Fig. 4 shows on a larger scale a horizontal section through the burner,

Fig. 5 shows a detail.

Figs. 6 and 7 show in a vertical section and in an end elevation respectively a second constructional example,

Fig. 8 is a plan view of Fig. 7 with parts shown in section,

Fig. 9 is a horizontal section along line IX—IX in Fig. 6,

Figs. 10 and 11 show a third constructional example in an elevation and a vertical section respectively,

Fig. 12 is an elevation corresponding to Fig. 10 with some of the parts removed,

Fig. 13 is a front elevation of a singeing machine in which singeing devices according to the third constructional example are used, and

Fig. 14 is a side elevation of Fig. 13.

Similar parts in the two modifications are indicated by reference characters having different exponents.

Referring now to the first constructional example illustrated in Figs. 1–5 the tubular burner body A comprises two hollow spaces 1 and 2 which together form the gas chamber. To these hollow spaces 1 and 2 a combustible gas is fed by pipes 3 and 4 respectively. 5 denotes the tubular burning and singeing space which is accessible from the side by a longitudinal slot 6 permitting to insert the thread B to be singed, the latter being conducted over a roller 7 in the lower part of the device and through an eyelet 8 in the upper part. The roller 7 and the eyelet 8 are arranged on a flap 9 hinged to the casing 11 by means of a pin 10 and held in its closed position by a leaf spring 12 fixed to the casing 11 and cooperating with an extension of the flap 9. By means of two lateral lugs 13 the burner body A is screwed to the casing 11.

The perforated insertion piece 14 is loosely slid into the burner body A and is supported by means of a flange 15 resting on the top part of the burner body and is provided with a slot extending over its whole length for permitting the insertion of the thread B. The large number of small perforations 16 provided in the insertion piece are evenly distributed over the whole surface of said piece so that the insertion piece forms a kind of sieve.

The combustible gas flowing through a moderate number of holes 17 from the gas chambers 1 and 2 impinges on the insertion piece 14 which acts as a baffle to the flow and the gas leaves the perforations 16 in a better distributed manner and at a reduced pressure, so that it burns by forming small flames *a* (Fig. 4). The large number of flames formed at the inner side of the insertion piece 14 and which extend only a little distance from the inner side and resemble thus beads cause a quick heating of the insertion piece 14. The thread B may run through the burner or the insertion piece 14 respectively without coming into direct contact with the bead-like small gas flames *a*, however, it is always exposed to the radiating heat of the little flames *a* and of the insertion piece 14.

Even at a high speed at which the thread B moves through the burner and with a small consumption of gas a complete singeing of the tuft on the thread is obtained. The residues of combustion formed thereby may be completely removed through an opening 18 arranged in the lower part of the casing 11 by a strong current of air caused by a suction conduit 19. In consequence thereof a perfect singeing action and an insignificant soiling of the burner results. This gas burner acts like an electric burner, with the latter however, fluctuations in the current may considerably impair the singeing action and moreover the danger exists that the heating resistance distorts. The sieve like insertion piece 14 which is, for instance, loosely inserted in the burner body A prevents by its flange 15 the escape of gas at the top between the burner body and the piece 14, on the other hand the latter may easily be removed from its seat for cleaning purposes.

The flap 9 incloses the burner and singeing space 5, opposite the slot 6 for introducing the thread, and a rib 20 contacts with the burners A at the upper and lower end as well as along the sides of the slot 6 so that the heat developed by the burner is retained within the latter as much as possible. Holes 21 provided in the flap 9 permit the access of additional air for combustion to the burner. On opening and closing the flap 9 the thread guides 7 and 8 and thereby the thread take part in the movement i. e. the thread is moved out of or into the burner, whereby the insertion or the removal of the thread into and out of the burner is facilitated. A knob 22 provided on the flap 9 limits the lowermost position of the opened flap 9.

In the second constructional example illustrated in Figs. 6–9 the part 11^a to which the burner body A′, which is provided with a gas chamber and a feed pipe 3^a, is fitted, forms a suction channel connected to the suction conduit 19 that is a straight continuation of the burning and singeing space.

On account of the suction action directly generated in the burner and singeing space an effective removal of the residues of combustion and in consequence thereof a cleaner operation is obtained than in the case when the suction channel joins at an angle to the burning and singeing space, as in the latter case the suction acts only indirectly which is insufficient with coarse yarns having much tuft.

The suction channel has an angular cross-section and is formed on three sides by the part 11^a itself and on the fourth side by the flap 9^a. The removal of the residues of combustion by suction action is caused in the downward direction whereby the loss of heated air escaping in the upward direction is counteracted as much as possible in order to increase the output of the singeing operation.

The guide roll 7^a for the thread is adjustable by means of a screw threaded bolt 7′ passing through a transverse slot of the flap 9^a.

The suction channel may also be connected to the upper end instead of to the lower end of the burner.

The constructional example illustrated in Figs. 10–12 differs from that described above inasmuch as two similar burner bodies A^2 are arranged in two bearing parts provided inside the casing 11^b, which burners are detachably fixed to the casing by laterally disposed screws. Each burner body A^2 is provided with a gas chamber 1^b to which a branch of the gas supply pipe 3^b is connected, and each branch is provided with a cock 23 and 24 respectively.

The thread B running through the singeing device passes through the two burner bodies A^2 arranged one above the other, i. e. in series, whereby it is subjected to strong singeing action. By closing the cock 23 or 24 respectively the upper or the lower burner may be cut out at will if the singeing has to be carried out with one burner only in case a thread has to be treated which is easy to be singed. By opening the flap 9^b (which is omitted in Fig. 12) both burners are accessible.

Between the two burners A^2 a space 25 is provided in the casing 11^b which is connected to the suction conduit by means of a channel 26. Owing to this arrangement the residues of combustion formed by the operation of the singeing device are removed by suction action from the adjacent ends of the two burners through the collecting space 26 and the channel 26 and further from the remote ends of the burners by the channels 18^b and 27, the latter being also connected to the suction conduit.

This constructional example permits to

treat threads which are easier or more difficult to singe in a single quick passage through the singeing device by working only with one burner or with both burners. In both cases the operation may be made with an effective draught for completely removing all the residues of the combustion.

In Figs. 13 and 14 a singeing machine is shown in which several units of the singeing device shown in Figs. 10–12 are embodied. 28 denotes a main pipe for supplying the gas and 19 is the main suction pipe leading to a fan 30. From the pipe 19 branches 31 are connected to the channels 27, 26 and 18 of every singeing device. The thread B to be treated is unwound from a bobbin 32 arranged below every singeing device and passes over a guide roller 33, the lower guide roller 7^b, through the singeing device, the eyelet 8^b to a winding device 34, by which the singed thread is wound upon reels 35.

I claim:

1. In a device for singeing textile threads, a burner comprising a tube forming the inner wall of a gas chamber having a longitudinal thread inserting slot and provided with a moderate number of perforations in its wall for the passage of a combustible gas, and a sieve like member inserted in said tube provided with a similar slot and a large number of perforations for the passage of the gas at reduced pressure which burns in the shape of small flames at the inner side of said inserted member.

2. In a device for singeing textile threads, a burner comprising a tube forming the inner wall of a gas chamber having a longitudinal thread inserting slot and provided with a modern number of perforations in its wall for the passage of a combustible gas, and a sieve like member through which the thread to be singed passes, loosely inserted in said tube and provided with a flange by means of which it rests on said tube, said member being provided with a large number of perforations for the passage of the gas at reduced pressure which burns in the shape of small flames at the inner side of said inserted member and having a similar slot.

3. A device for singeing textile threads, comprising in combination, a casing, a burner comprising a tube fixed to said casing and forming the inner wall of a gas chamber and provided with a moderate number of perforations in its wall for the passage of a combustible gas, said tube being longitudinally slotted for the insertion of the thread to be treated, and a sieve like longitudinally slotted member inserted in said tube, slightly spaced therefrom, and provided with a large number of perforations for the passage of the gas at reduced pressure which burns in the shape of small bead-like flames at the inner side of said inserted member, means to guide the thread to be singed endwise through said burner, a suction conduit, and means for connecting said casing to said suction conduit for removing the residues of combustion by suction action.

4. A device for singeing textile threads, comprising in combination, a casing, a burner comprising a tube fixed to said casing and forming the inner wall of a gas chamber and provided with a moderate number of perforations in its wall for the passage of a combustible gas, said tube being longitudinally slotted for the insertion of the thread to be treated, and a sieve like longitudinally slotted member inserted in said tube and provided with a large number of perforations for the passage of the gas at reduced pressure which burns in the shape of small bead-like flames at the inner side of said inserted member, means to guide the thread to be singed endwise through said burner, a suction conduit, and means for connecting said casing to said suction conduit for removing the residues of combustion by suction action, said casing forming a suction channel for said residues that it is in line with said burner.

5. A device for singeing textile threads, comprising in combination, a casing, a plurality of burners arranged in series and each comprising a tube fixed to said casing and forming the inner wall of a gas chamber and provided with a moderate number of perforations in its wall for the passage of a combustible gas, said tube being longitudinally slotted for the insertion of the thread to be treated, and a sieve like longitudinally slotted member inserted in said tube and provided with a large number of perforations for the passage of the gas at reduced pressure which burns in the shape of small bead-like flames at the inner side of said inserted member, means to supply gas to said burners, a section chamber, each burner having communication at both ends with said chamber, and valves inserted in said means for rendering inoperative any of said burners.

6. A device for singeing textile threads, comprising in combination, a casing, two burners arranged in series and each comprising a tube fixed to said casing and forming the inner wall of a gas chamber and provided with a moderate number of perforations in its wall for the passage of a combustible gas, said tube being longitudinally slotted for the insertion of the thread to be treated, and a sieve like longitudinally slotted member inserted in said tube and provided with a large number of perforations for the passage of the gas at reduced pressure which burns in the shape of small bead-like flames at the inner side of said inserted member, means to supply gas to said burners, valves inserted in said means for rendering inoperative any of said burners, means to guide the thread to be singed endwise through said burners, a suc-

tion conduit, and means for connecting said casing at the remote end of said two burners and at a collecting space intermediate of said two burners to said suction conduit for removing the residues of combustion by suction action.

7. A device for singeing textile threads, comprising in combination, a casing, two burners arranged in series and each comprising a tube fixed to said casing and forming the inner wall of a gas chamber and provided with a moderate number of perforations in its wall for the passage of a combustible gas, said tube being longitudinally slotted for the insertion of the thread to be treated, and a sieve like longitudinally slotted member inserted in said tube and provided with a large number of perforations for the passage of the gas at reduced pressure which burns in the shape of small bead-like flames at the inner side of said inserted member, means to supply gas to said burners, valves inserted in said means for rendering inoperative any of said burners, means to guide the thread to be singed endwise through said burners, a suction conduit, means for connecting said casing at the remote end of said two burners and at a collecting space intermediate of said two burners to said suction conduit for removing the residues of combustion by suction action, and a hinged lid on said casing giving access to both burners.

8. In a thread singeing device a tubular gas receiving chamber having a longitudinal slot and a few perforations in its concave face and a longitudinally slotted tube therein and spaced therefrom with the slots registering, and provided with a large number of perforations.

9. In a thread singeing device, a casing, a suction chamber in the casing a tubular gas receiving chamber therein having a longitudinal slot, and a few perforations in its concave face, and a longitudinally slotted tube therein and spaced therefrom with the slots registering, and provided with a large number of perforations, the perforations in the latter tube being out of register with the perforations in the gas receiving chamber and both ends of said tube having communication with the suction chamber.

10. In a thread singeing device, a double walled tube forming a gas receiving chamber between its walls longitudinally slotted for the insertion of a thread and perforated for forming gas jets, a hinged flap for covering the slot, and thread guides on the flap above and below the tube, said guides operating to insert the thread into the tube through the slot when the flap is closed.

11. In a thread singeing device, a plurality of double walled tubes forming a gas receiving chamber between its walls longitudinally slotted for the insertion of a thread, means to supply gas to the tubes, a hinged flap common to the tubes for covering their slots, and thread guides on the flap for inserting the thread into the tubes through the slots when the flap is closed, means to cut off the gas supply to individual tubes and an exhausting casing containing said tubes, both ends of said tubes directly communicating with said casing.

In testimony whereof I have signed my name to this specification.

GEORG ERNE.