

(No Model.)

H. C. CLEAVER.

APPARATUS FOR APPLYING PAINTS OR VARNISHES.

No. 567,452.

Patented Sept. 8, 1896.

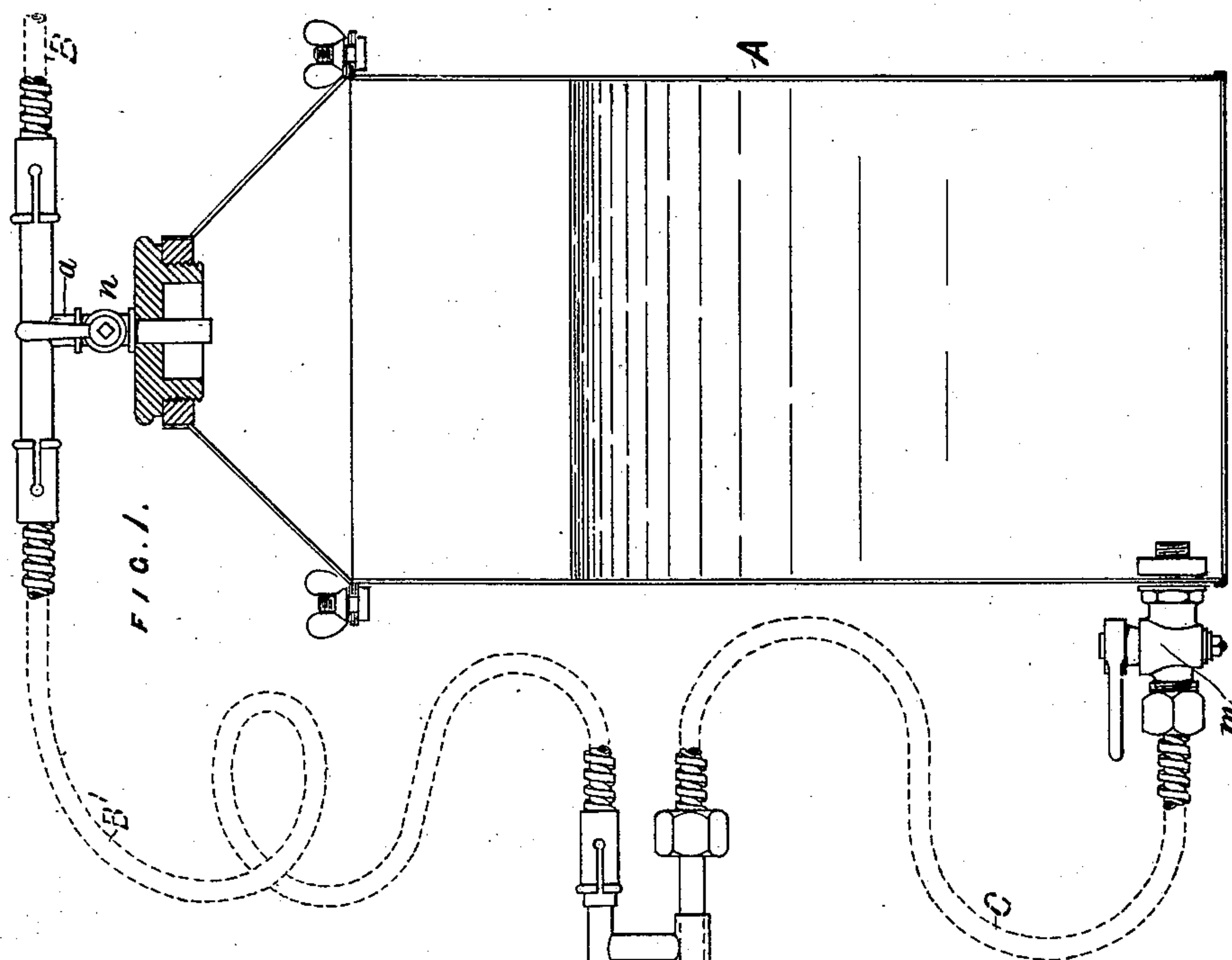


FIG. 2.

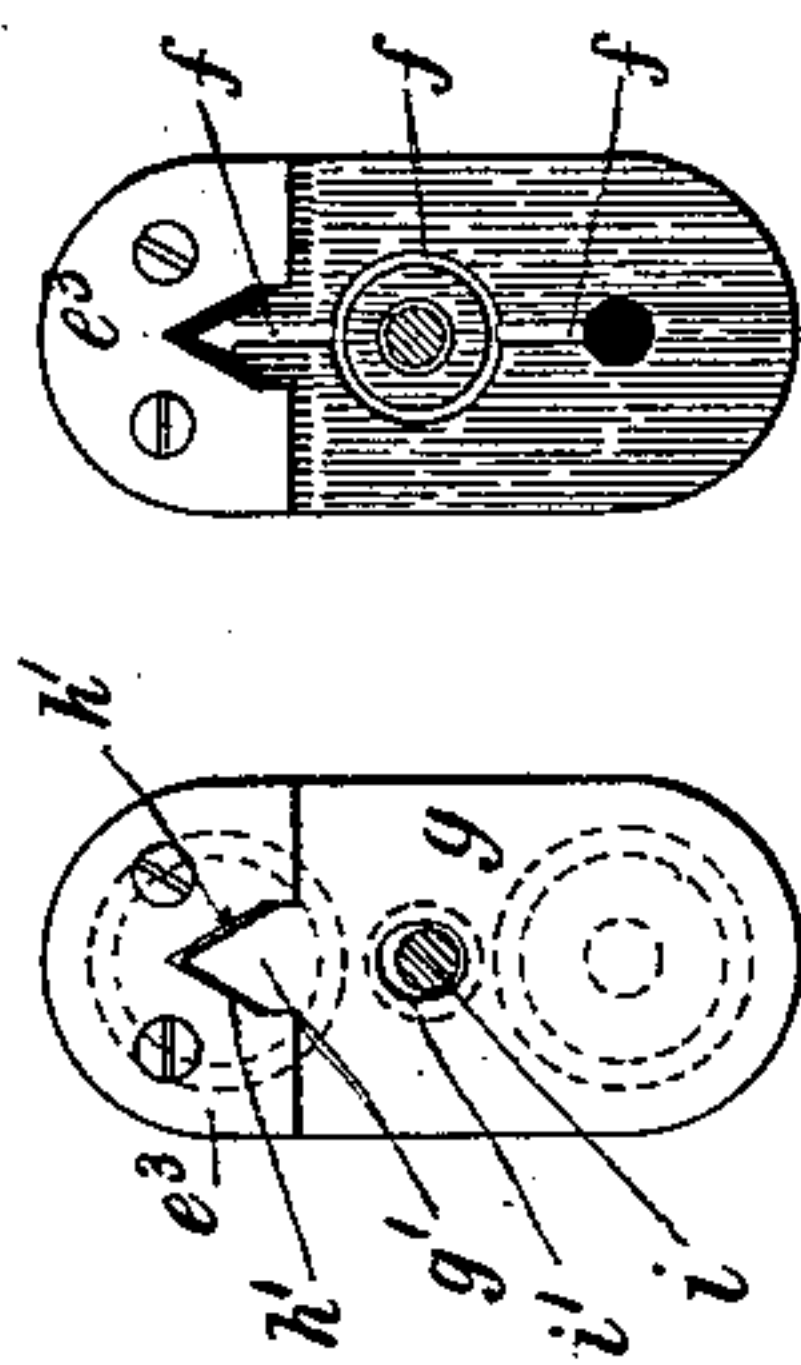


FIG. 3.

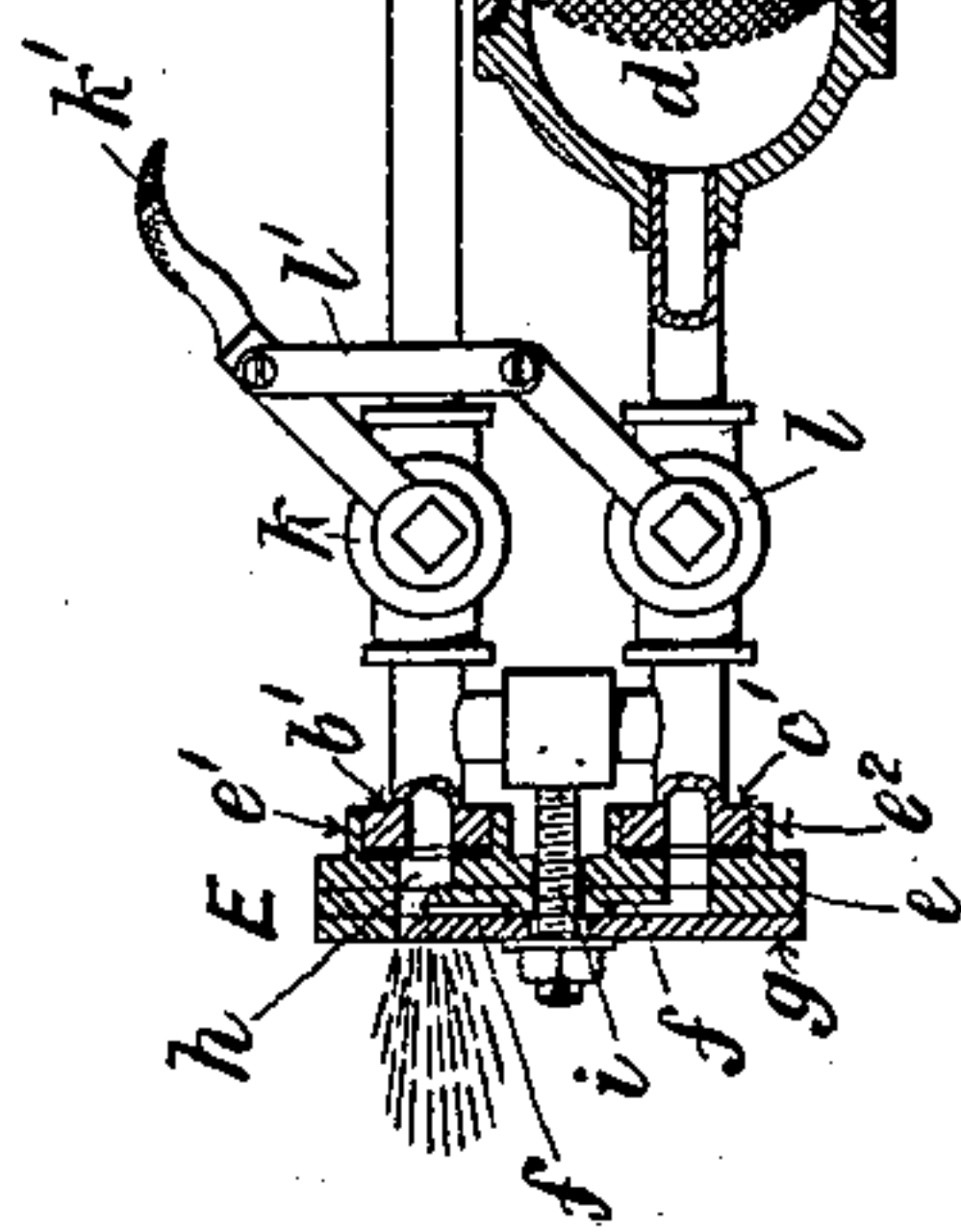
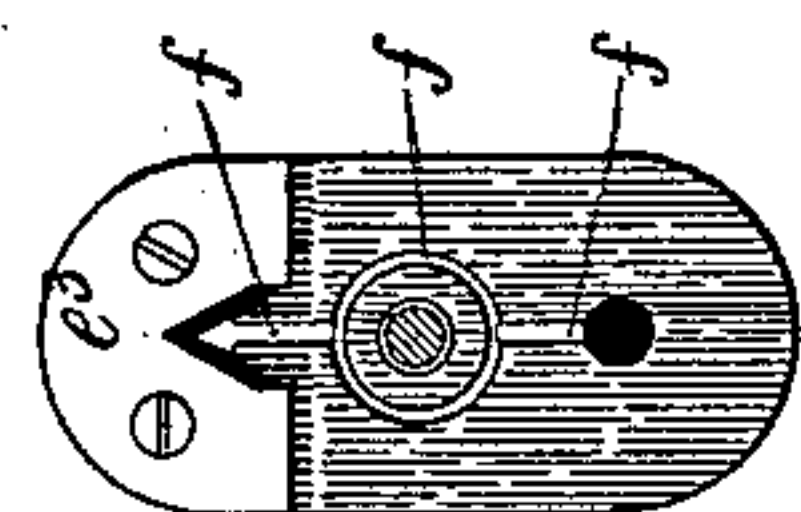
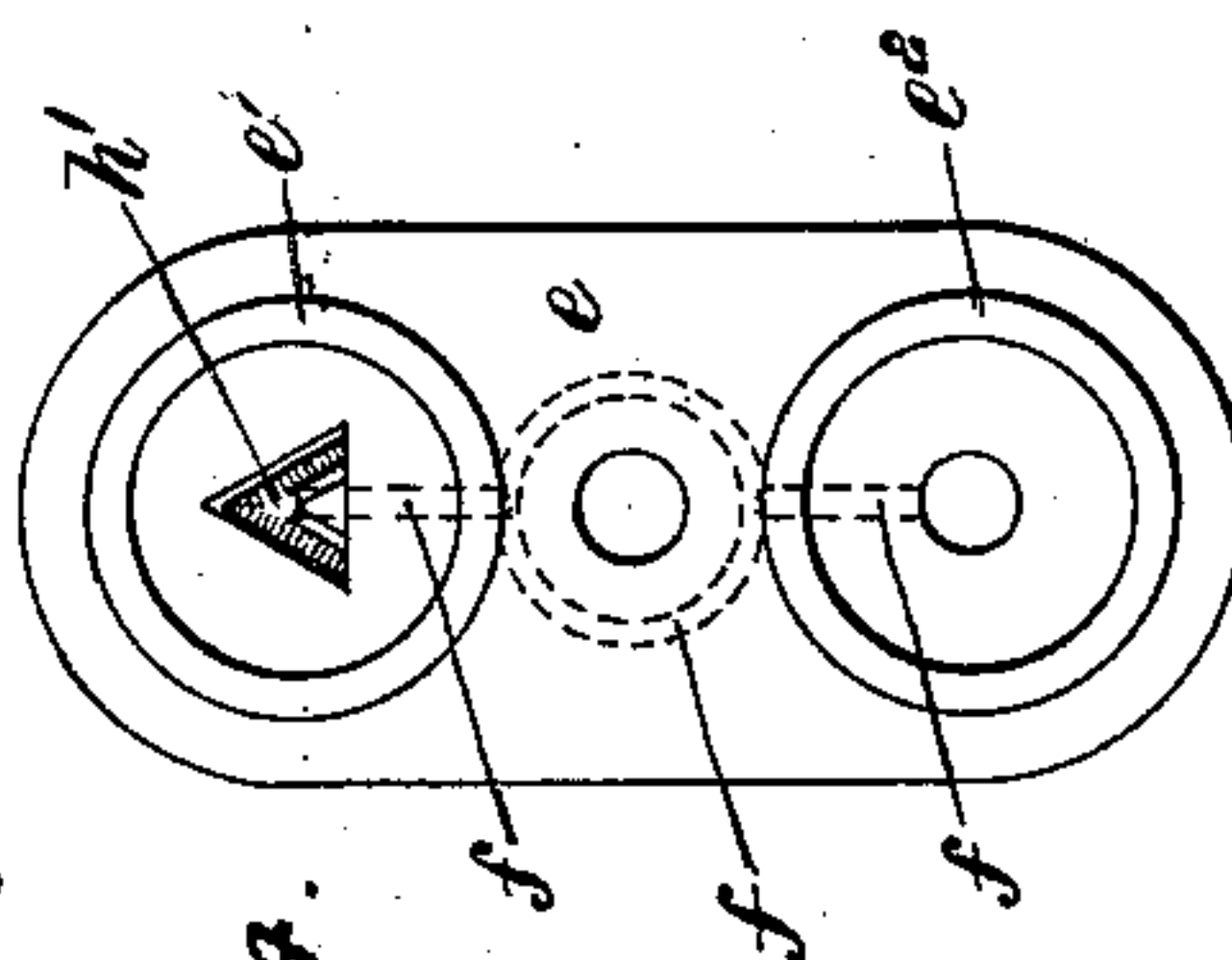
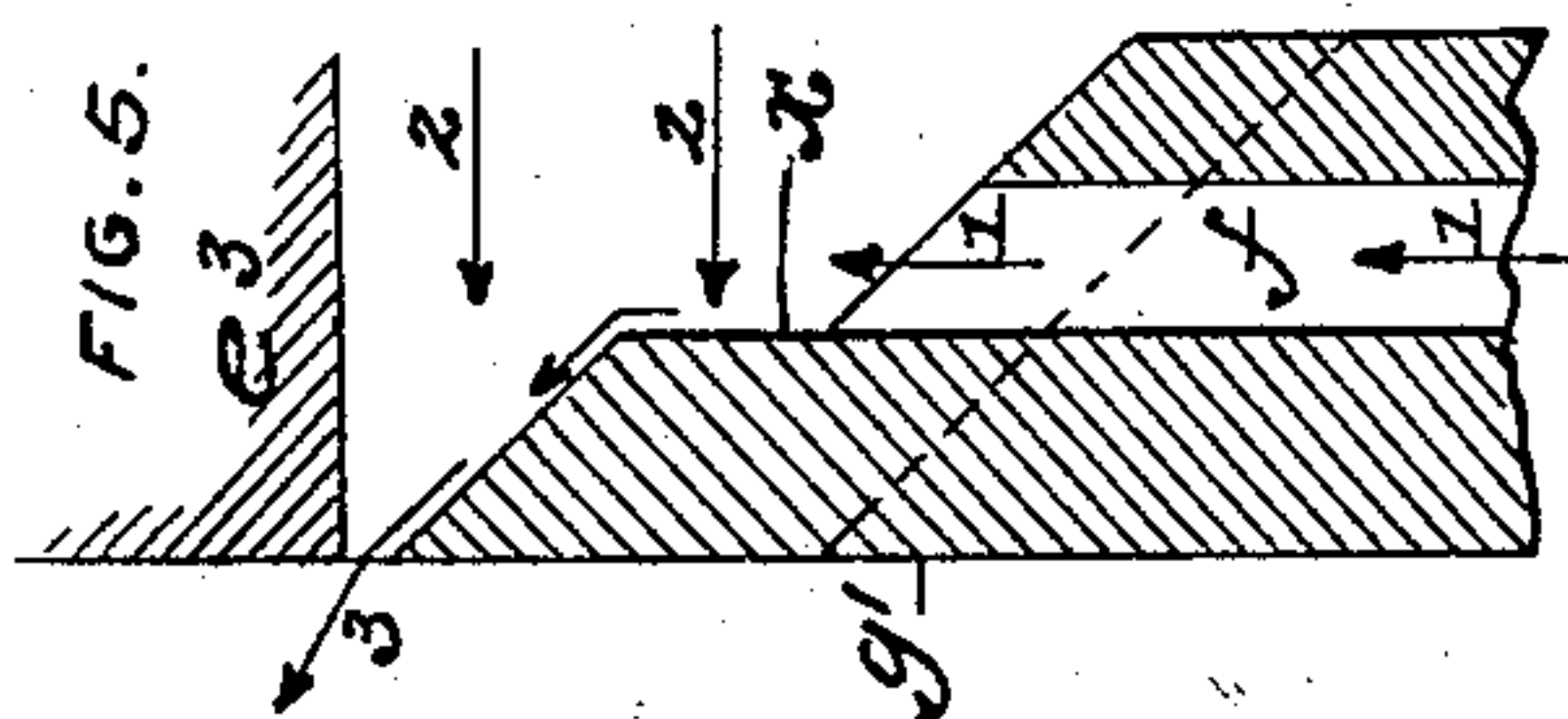


FIG. 5.



WITNESSES.

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HOWARD CRUNDEN CLEAVER, OF LONDON, ENGLAND.

APPARATUS FOR APPLYING PAINTS OR VARNISHES.

SPECIFICATION forming part of Letters Patent No. 567,452, dated September 8, 1896.

Application filed August 10, 1895. Serial No. 558,888. (No model.) Patented in England May 20, 1893, No. 10,117; in France May 12, 1894, No. 238,499; in Belgium May 12, 1894, No. 109,953, and in Germany May 24, 1894, No. 81,393.

To all whom it may concern:

Be it known that I, HOWARD CRUNDEN CLEAVER, furniture manufacturer, of 3 Eden Street, Hampstead Road, London, N. W., England, have invented new and useful Improvements in Spraying Apparatus for Applying Paints or Varnishes to Surfaces, (for which I have obtained Letters Patent in the following countries, namely: Great Britain, dated May 20, 1893, No. 10,117; France, dated May 12, 1894, No. 238,499; Belgium, dated May 12, 1894, No. 109,953, and Germany, dated May 24, 1894, No. 81,393,) of which the following is a full, clear, and exact description.

My invention has for its object to enable oil-paint, flatting-paint, and varnish to be applied to surfaces with greater rapidity, uniformity, smoothness, and lightness than is possible by means of a brush.

The invention consists, essentially, in means for atomizing such viscous paint or varnish and projecting it in the form of spray upon the surface to be covered. I am aware that it has been heretofore proposed to spray mobile liquids, such as distemper and other colors, suspended in an aqueous vehicle, but oil-paints and varnishes, by reason of their viscous and adhesive nature, require special means, which it is the object of this invention to supply.

According to my invention the paint or varnish is atomized and projected in the form of fine spray by the action of an air-blast upon the paint or varnish as it is expressed by the pressure of the air through an exit-orifice, where it is met by the blast of air directed immediately across the said orifice. By this means the paint or varnish is projected so lightly upon the surface that a second coat may be applied as soon as the previous one becomes tacky, a uniformly-smooth surface being quickly obtainable without the skill necessary to avoid leaving brush-marks. Furthermore, the operation of rubbing down the painted surface, technically known as "papering" or "felting down," before applying another coat (which is indispensable in coach-building and fine decorative work) is rendered unnecessary.

In the accompanying drawings, forming

part of this specification, I have represented, in Figure 1, a longitudinal sectional elevation of the apparatus; and in Figs. 2, 3, 4, and 5, detail views, on an enlarged scale, of the atomizing-nozzle, which is an essential feature of my invention. Of these detail views, Fig. 2 is a face view of the nozzle, Fig. 3 is a face view thereof with the cover-plate removed, Fig. 4 is a rear view thereof on a still larger scale, and Fig. 5 is a sectional elevation of the upper or outlet portion of the nozzle.

A is the paint-holding vessel; B, the pipe through which compressed air is supplied from an air-reservoir (not shown) charged by a pump or other air-compressor.

a is a branch pipe leading through the screw-stopper of the vessel, or otherwise, for the supply of air to the upper part of the vessel to apply pressure to the surface of the paint therein and force it out through the paint-exit pipe C, which is connected to the lower part of the vessel A. The flexible air-pipe B' is connected to a rigid pipe *b*, and the flexible paint-pipe C is connected to a similar pipe *c*, the pipes *b c* being connected rigidly by cross-bars, so as to maintain their relative position and serve as the means of holding the atomizer in moving it over the surface to be painted. The pipe C should be made of flexible metallic tubing. In the pipe *c* is interposed a chamber D, divided by a transverse wire-gauze strainer *d*, preferably of the concave form shown, for the purpose of arresting any pellets of paint or other solid matters which would be liable to clog the spraying-orifices. To enable this strainer to be readily withdrawn and cleaned, the casing is made in halves screwed together, the edges of the gauze being clamped between the two parts, and the portion of the tube *c* attached to the rearmost half of the chamber sliding through a socket on the cross-bar, and the strainer has a handle *d'* to facilitate its removal.

The atomizer E is made preferably of the form shown, and when so constructed it consists of a plate or body portion *e*, provided at back with sockets *e' e''*, that fit on the ends *b' c'* of the pipes *b c*. An orifice through this plate connects the bore of the pipe *c* with a channel *f* in the sunk part of the face of plate *e*. This channel *f* is covered by a cap-

plate *g*, which is flush with the part *e*³ of the body portion, and the channel leads into another orifice *h* opposite the bore of the air-pipe *b*. This orifice *h* is gradually contracted until it assumes the form of a narrow slit, preferably of Λ shape, as shown at *h'* in Fig. 2. The channel *f* leads in a direction normal to the direction of the blast passing through the orifice *h*, and it opens into said orifice through a surface which is inclined to the direction of the blast, so as to form an extended surface from which the air can readily blow off the paint. The slit *h'* is formed between the beveled Λ -shaped edges of the tongue portion *g'* and the recess in the part *e*³, the tongue *g'* having parallel sides adapted to fit between the sides of said recess and the cover-plate *g* being slightly adjustable by sliding in the direction of its length, so as to enable the breadth of the slit *h'* to be varied as required. For this purpose the screw *i*, by which the atomizer is secured to pipes *b* *c*, passes through an oblong hole *i'* in plate *g* and receives a nut which serves also to retain the cover-plate *g* in position. The groove *f* is of half-round section, and by making it open into an orifice of much larger diameter, which is gradually contracted to a very narrow Λ -shaped slit, the paint may be very finely atomized by a blast having a pressure of about five pounds per square inch. As the slit *h'* is formed between part *e*³ and the sharp beveled edge of the tongue *g'* the friction of the paint and blast in passing through the slit is reduced to a minimum, and the tendency of the paint to clog the orifice (which it would be liable to do were the slit formed between parallel surfaces) is avoided.

The pipes *b* and *c* are provided with stop-cocks *k* *l* to regulate the blast and the flow of paint, respectively, these stop-cocks being coupled by a link *l'* and operated by a thumb-lever *k'*, so that they will be turned on and off together. *m* is a stop-cock to be closed when the strainer is being cleaned, and *n* is a stop-cock for shutting off the air from the vessel A (when the apparatus is not in use) to prevent the formation of a film by the surface-drying of the paint in the vessel A.

Owing to the viscosity and specific gravity of the paint or varnish, the outlet-pipe C is connected to the bottom of vessel A, and the latter should be supported when the apparatus is in use as nearly as possible as high as or higher than the surface to be painted or varnished, so as to assist the air-pressure in projecting the paint through the exit pipe and nozzle.

The operation is as follows: The paint or varnish to be sprayed is forced by the air-pressure in the vessel A through the pipe C and strainer *d*, by which all pellicles are retained, the paint or varnish being caused to issue through the channel *f* into the orifice *h*, where it meets the blast by which it is blown off in a finely-divided state through the Λ -

shaped orifice *h'* and projected by the air-blast onto the surface to be painted. It will be observed that the liquid passing out through the paint-channel *f* is forced by the blast against the exposed upper portion of the wall of the paint-channel which is nearest to the outlet. Said upper portion therefore forms a spreading-surface against which the liquid is hammered by the blast, and this spreading-surface is continuous from the upper end of the paint-channel to the outlet, so that the liquid is continuously blown against the said surface by the blast until it reaches the outlet. It will be seen that the wall of the paint-channel which is nearest to the outlet is continued upward beyond the upper end of the opposite wall, thereby exposing the upper portion of the forward wall of the said passage to the blast for the purpose described. This will be particularly clear by reference to Fig. 5, in which the arrows 1 1 show the direction of the stream of paint passing out of the channel *f*. One wall of this channel terminates at a lower level than the opposite wall, and consequently the stream of paint is exposed on one side to the direct impact of the blast, (indicated by the arrows 2 2,) which strikes the paint stream perpendicularly to its exposed surface and flattens it against the surface *x*, this surface being the back of the tongue *g'* or the continuation of that wall of the channel *f* which is nearest to the outlet and being directly in the axis of the blast. The paint flattened by the impact of the blast against the surface *x* becomes spread upon the converging beveled surfaces of the tongue *g'*, and as it proceeds toward the outlet-slit *h'* it becomes thinner and thinner until it is finally blown out at the said slit.

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

1. A sprayer for oil-paint and varnish having an orifice of gradually-contracted area connected to an air-blast pipe, an independent passage for paint or varnish leading into said orifice and terminating at surfaces arranged at the opposite side to that from which the blast is delivered and inclined to the direction thereof and to each other, said surfaces terminating in acute edges forming the one boundary of a narrow Λ -shaped slit of which the other boundary is formed by the terminal edges of the correspondingly-shaped wall of the inclosing casing, substantially as specified.

2. The combination of a closed container for paint or varnish connected at top with an inlet-pipe leading from a supply of compressed air and having connected at bottom an outlet-pipe for the paint or varnish, of a sprayer for the paint or varnish formed by an orifice of gradually-contracted area connected by a pipe to a supply of compressed air, and by an independent passage for paint or varnish connect with the bottom pipe of the con-

tainer and leading into said orifice at surfaces arranged at that side of the passage which is nearest to the outlet, said surfaces being in the path of the blast to form a resisting plane 5 on which the paint or varnish will be spread, said surfaces terminating in acute edges forming the one boundary of a narrow Λ -shaped slit of which the other boundary is formed by the terminal edges of the correspondingly-shaped wall of the inclosing casing, substantially as specified. 10

3. An atomizer-nozzle for paints and varnishes formed of a plate or body portion e having through-orifices adapted to connect 15 with blast and paint pipes respectively, a groove or channel f connecting the orifices, an adjustable plate g covering and inclosing the groove provided with a Λ -shaped tongue g' having its Λ -edges beveled on the inner

face and received in a corresponding recess 20 in the part e^3 of the plate, the plate g being capable of adjustment in the direction of, and for the purpose of varying, the width of the Λ -shaped slit into which the orifice h gradually merges, substantially as specified. 25

4. A sprayer for oil-paint or varnish, having a gradually-contracted blast-orifice, and an independent channel for paint or varnish terminating within said orifice, that wall of said channel which is nearest to the outlet 30 being prolonged to form a surface exposed to the blast and on which the liquid will be spread, substantially as described.

HOWARD CRUNDEN CLEAVER.

In presence of—

T. W. NEUNARD,
C. G. CLARK.