Dec. 13, 1938. E. J. EADDY 2,140,420

METHOD OF CLEANING TEXTILE MACHINERY

Filed April 20, 1937 6 Sheets-Sheet 1

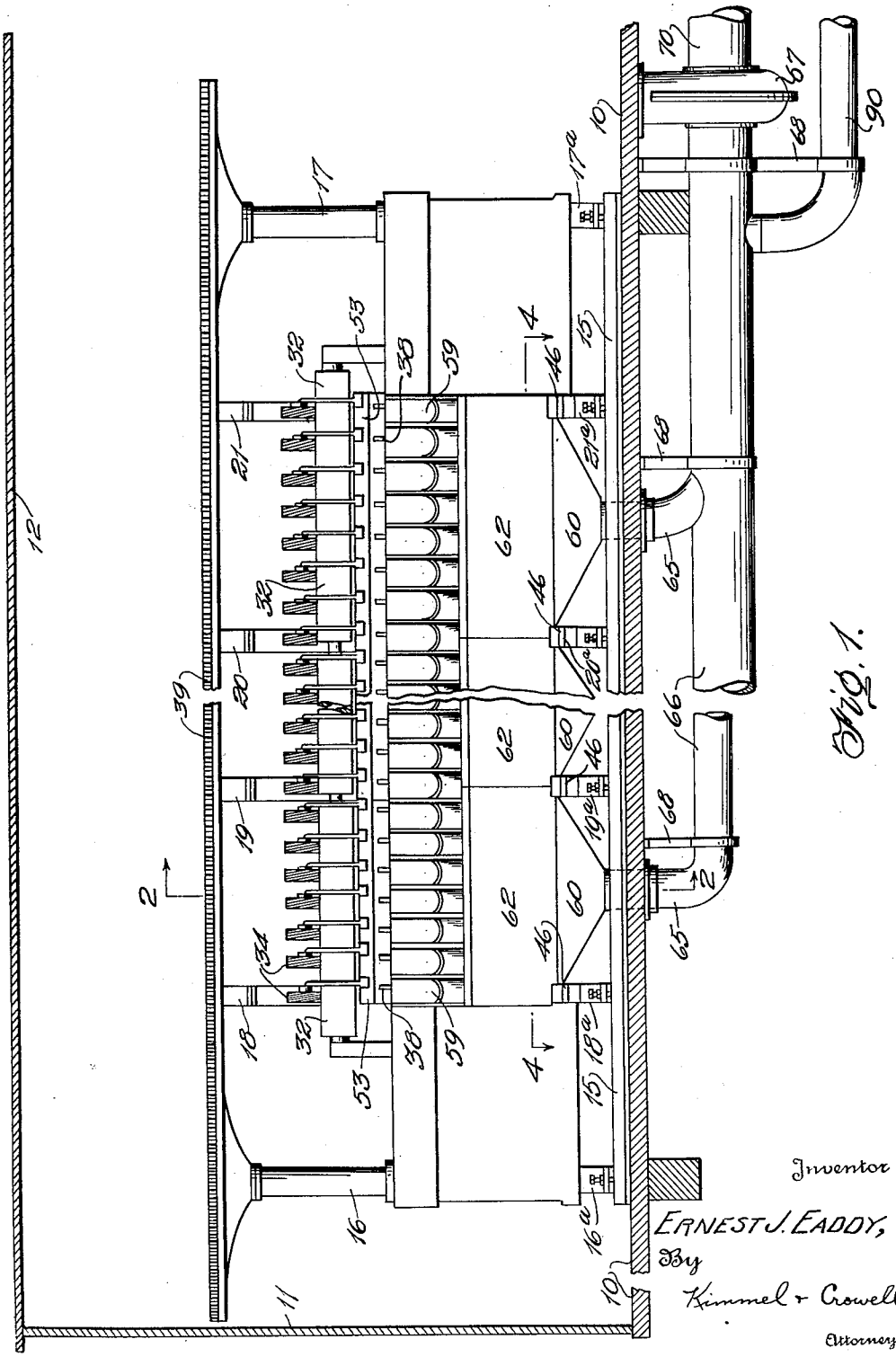


Fig. 1.

Inventor
ERNEST J. EADDY,
By
Kimmel & Crowell
Attorneys.

Dec. 13, 1938. E. J. EADDY 2,140,420

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Filed April 20, 1937 6 Sheets-Sheet 2

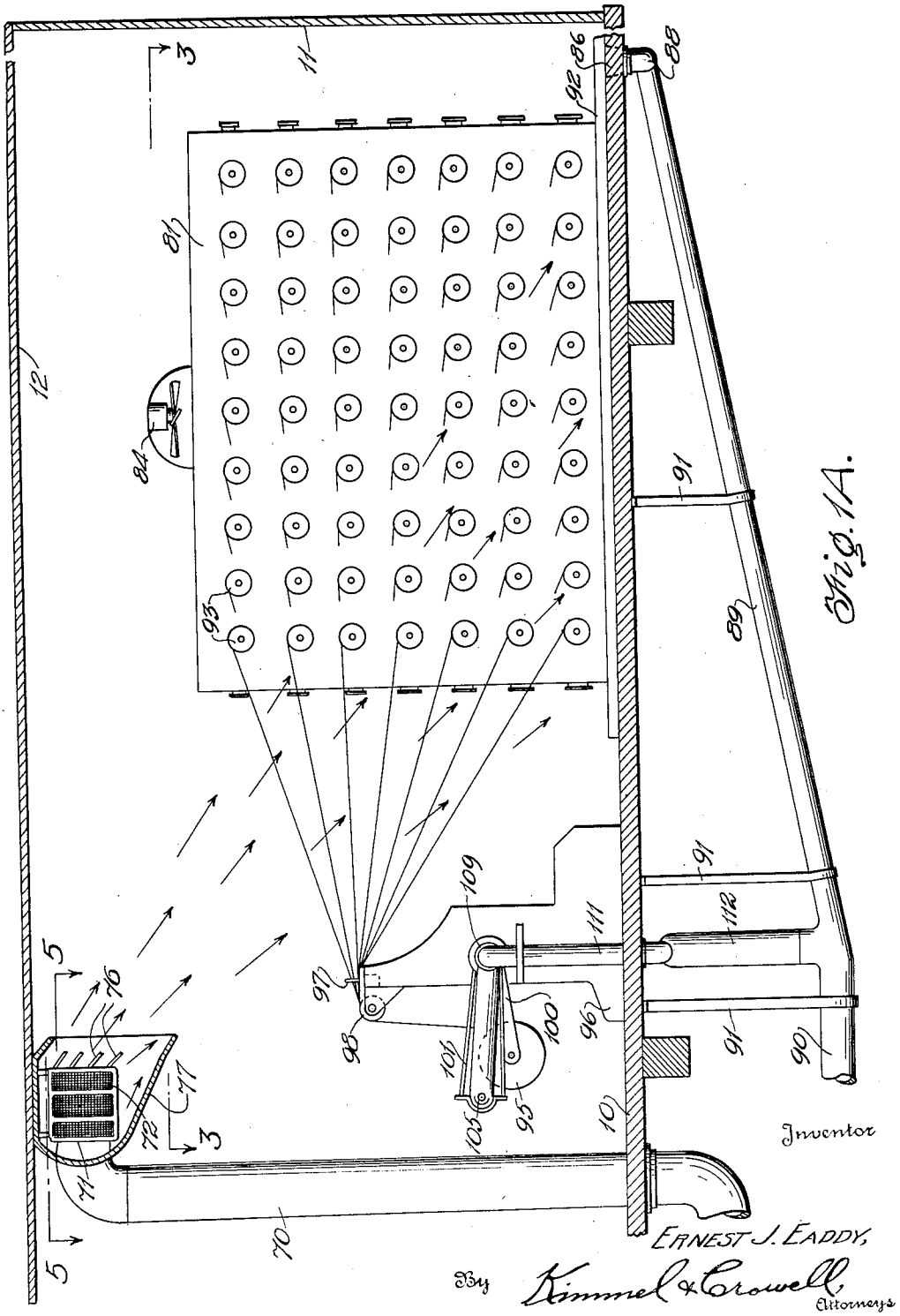


Fig. 1A.

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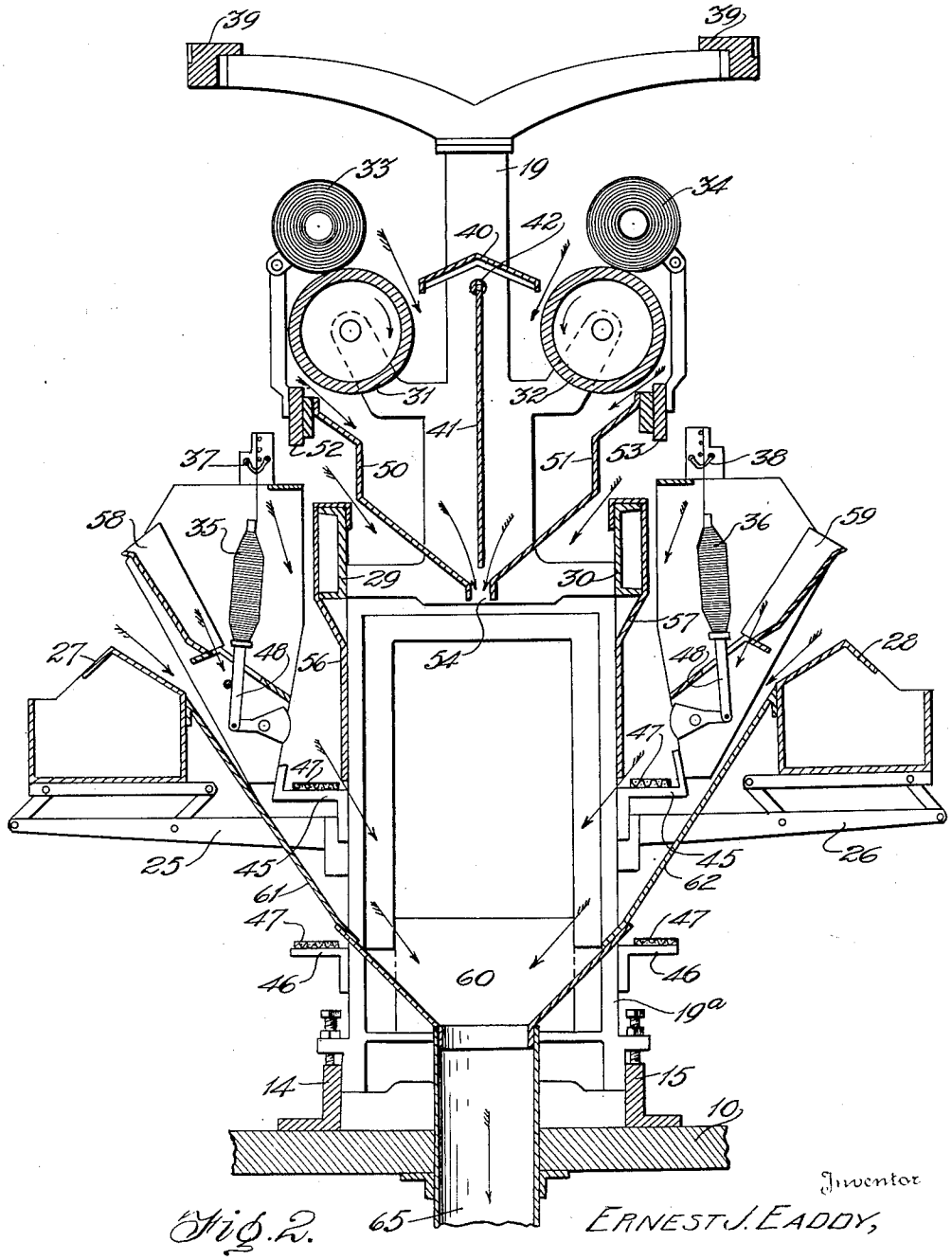


Fig. 2.

Inventor
ERNEST J. EADDY,

By Kimmel & Crowell,
Attorneys.

Dec. 13, 1938. E. J. EADDY 2,140,420

METHOD OF CLEANING TEXTILE MACHINERY

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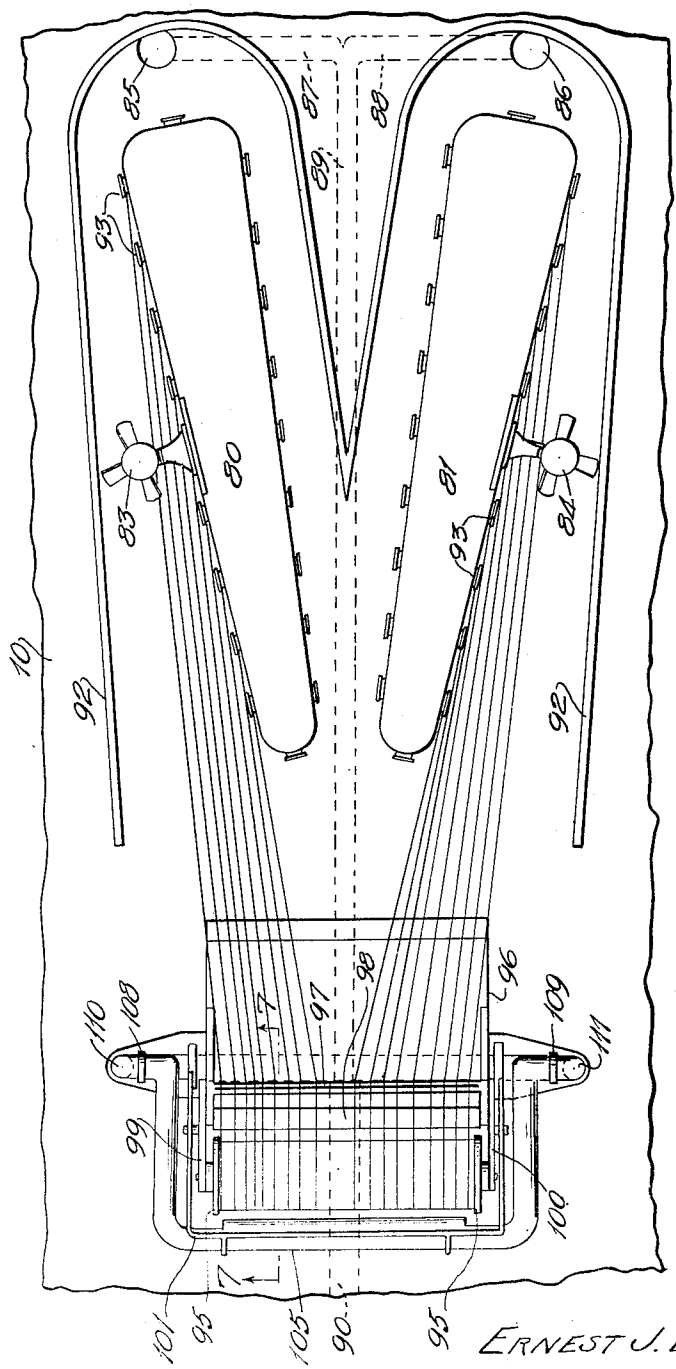


Fig. 3.

Inventor
ERNEST J. EADDY,

By Kimmel & Crowell,
Attorneys.

Dec. 13, 1938. E. J. EADDY 2,140,420

METHOD OF CLEANING TEXTILE MACHINERY

Filed April 20, 1937 6 Sheets-Sheet 5

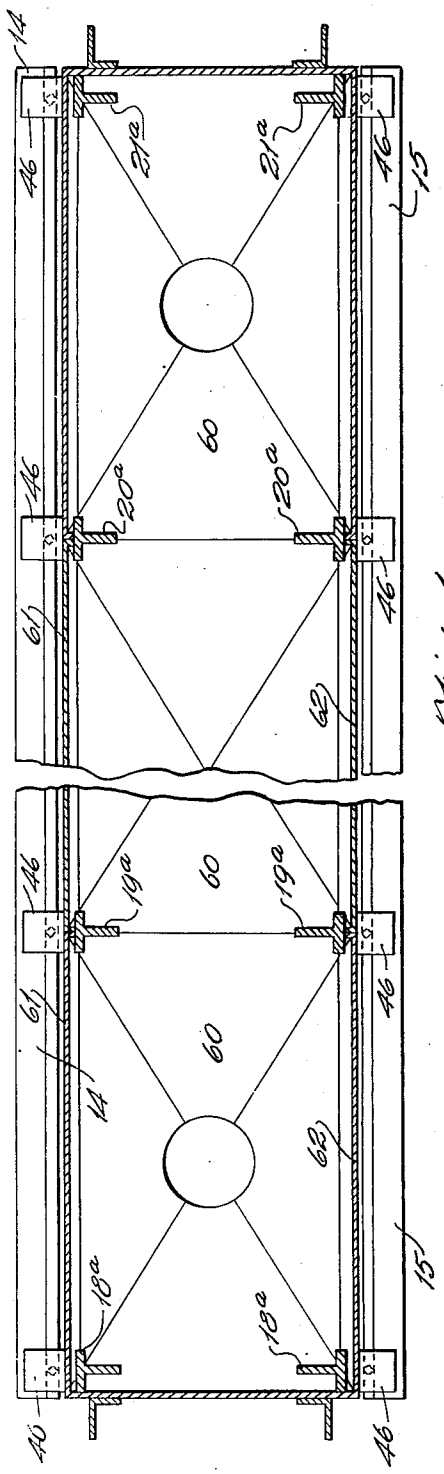


Fig. 7.

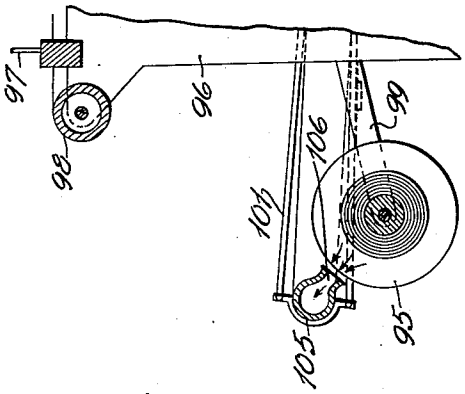


Fig. 4.

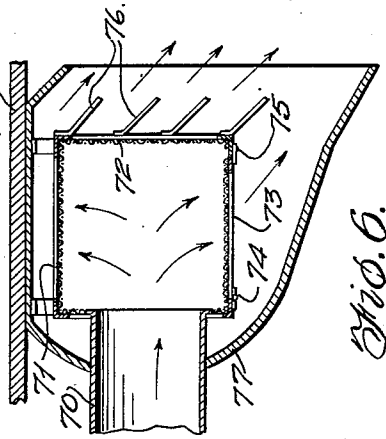


Fig. 6.

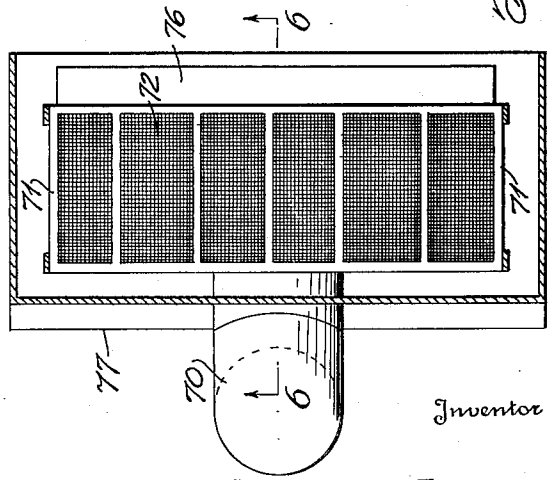


Fig. 5.

Inventor

ERNEST J. EADDY,

By Kimmel & Crowell,

Attorneys.

Dec. 13, 1938. E. J. EADDY 2,140,420

METHOD OF CLEANING TEXTILE MACHINERY

Filed April 20, 1937 6 Sheets-Sheet 6

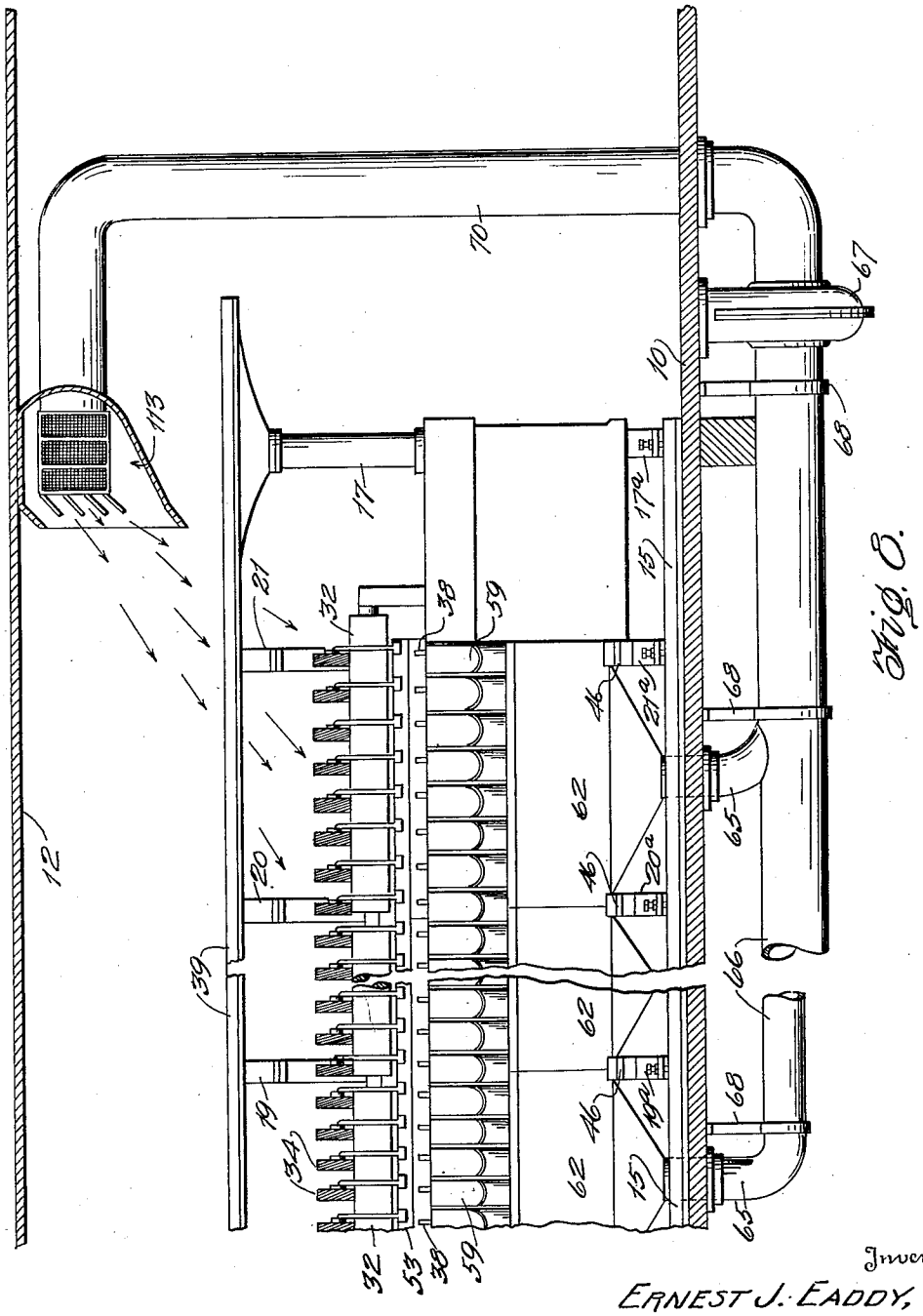


Fig. 6.

Inventor
ERNEST J. EADDY,

By Kimmel & Crowell.
Attorneys.

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UNITED STATES PATENT OFFICE

2,140,420

METHOD OF CLEANING TEXTILE MACHINERY

Ernest J. Eaddy, Spartanburg, S. C.

Application April 20, 1937, Serial No. 138,054

3 Claims. (Cl. 15—269)

This invention relates to the cleaning of textile machinery from lint accumulations causing particles of lint to adhere to threads passing through a machine and has special reference to a method of so cleaning textile machinery.

In all textile machinery the passage of threads therethrough is frequently accompanied by particles of line being detached from the threads. These lint particles accumulate and are picked up by the later passage of threads thus forming gouts or wads which tend to catch on certain parts of the machine and cause breakage of the caught threads with consequent stoppage of the machine. Furthermore, even if these wads or gouts do not cause breakage but pass through all machinery until they are woven or knitted into fabric they cause bumps or unevennesses in the final fabric.

One important object of the invention is to provide an improved method, as herein set forth, whereby air currents are caused to flow over and through those parts of the various machines at which there is a tendency for lint to accumulate.

A second important object of the invention is to provide a novel method, as herein set forth, whereby particles of lint detached from threads passing through a textile machine and floating in the air will be entrained in a moving air stream and thereby prevented from forming lint accumulations.

A third important object of the invention is to provide an improved method, as herein set forth, whereby constructive details of textile machinery are utilized to guide air currents in such manner as to pass over and through those parts of the machinery subjected to accumulations of lint.

A fourth important object of the invention is to provide an improved method, as herein set forth, for removing floating lint from the machinery, the method utilizing structural features of the machine for guiding induced air currents through the spaces wherein the lint floats.

A fifth important object of the invention is to provide an improved method of freeing textile machinery from lint, as hereinafter described, which method includes the production of guided air currents by suction means, the currents passing through those parts of the machine which are subjected to the production and collection of lint being drawn away from the machine and suitably trapped at a distance from such machine.

A sixth important object of the invention is to provide a novel method of cleaning textile machinery from lint, as hereinafter set forth, wherein air is passed through a textile machine to entrain the lint produced in said machine, is then filtered to free the air from the entrained lint and again utilized for further cleaning of a textile machine.

It is a well known fact that where a direct draft is produced by fans and directed upon textile machinery for cleaning the same, that this draft merely scatters the lint and other particles and contaminates the air in the room in which the machinery is located. Furthermore, the dust, lint and other particles which are removed from the machinery ultimately settle upon the yarn. These lint particles sometimes produce gouts when settled on the yarn which are objectionable because they reduce the quality of the cloth and hinder production by causing breaking of the yarn in the weaving process.

It is evident that by using an induction draft the air is not contaminated with these particles but instead, the particles are drawn directly into the ducts. This method produces a more healthful working condition for the operators and also eliminates the dust and fly from the room which otherwise would materially affect the quality of yarn when it has settled thereon.

It is a further object of this invention to provide a method of cleaning textile machinery which comprises a system of hoppers and ducts connected to a fan for creating an induction draft to clean the textile machinery, and a filtering means disposed on the other side of the fan and having one side thereof connected to the duct which discharges into the same room from whence the air was drawn so that the filtered air is recirculated in the same room. This has a very decided advantage, especially where the temperature or humidity on the outside of the building is different from that on the inside. For example, if the temperature on the inside of the room is 55.2 degrees higher than the temperature on the outside, then for every cubic foot of air drawn from the outside to the inside of the room there would be required one B. t. u. to raise this temperature to normal room temperature. It is seen, therefore, that by filtering this air and re-circulating the same, that the temperature of the air is not disturbed materially, therefore, the cost of re-heating this air is negligible. At the same time the humudity of the air in the mill is preserved.

A system as shown and described having a 240 spindle capacity would require about 24,000 cubic feet of air per minute to be drawn therethrough in order to produce proper cleaning effects. Therefore, it is seen that if re-circulation and

filtering were not employed it would require continuously, approximately 450 B. t. u. per minute, to raise room temperature one degree F. above the outside temperature, while a difference of 30 degrees F. in outside and inside temperatures would require about one pound of coal per minute.

The invention consists in general of certain steps and sequences of steps hereinafter fully described and particularly pointed out in the claims, apparatus for carrying out the method being shown in the accompanying drawings which illustrate means for maintaining a spooler, a beaming device and creel free from lint. It is to be clearly understood, however that the invention is not in any way confined to the particular means or particular machines illustrated and described since the method forming this invention may be carried out by a wide variety of arrangements and in connection with any textile machine which it is desired to maintain in a condition free from accumulations of lint either on parts of the machine or on threads passing through such machine.

A still further object of the invention is to provide a method for maintaining textile machinery in a clean condition, as hereinafter fully set forth, which method includes enclosing certain portions of the machinery and withdrawing the air with entrained lint and the like from the interior of the enclosed portion.

In the accompanying drawings like characters of reference indicate like parts in the several views, and;

Figure 1 is a vertical sectional view taken through a portion of a room showing an automatic spooler in elevation with the invention applied thereto;

Figure 1A is a vertical sectional view taken through the other portion of the room showing in elevation the filtering means, the creel and warper;

Figure 2 is a transverse, vertical sectional view taken through the automatic spooler along line 2—2 in Figure 1 and showing the bobbin supply boxes located on each side thereof;

Figure 3 is a plan view taken along line 3—3 in Figure 1A;

Figure 4 is a sectional plan view taken along line 4—4 in Figure 1;

Figure 5 is a sectional plan view taken along line 5—5 in Figure 1A;

Figure 6 is a transverse, vertical, sectional view taken along line 6—6 in Figure 5;

Figure 7 is a vertical, sectional detail view taken along line 7—7 in Figure 3; and

Figure 8 is an elevation illustrating a method whereby the air drawn through a machine is cleaned and then caused to flow back to the machine.

Referring more specifically to the drawings, the numeral 10 denotes a suitable floor of a room having walls 11 and a ceiling 12. Mounted on floor 10 are angles 14 and 15 which form a base upon which are mounted end frames or samsons 16 and 17 and intermediate frames or samsons 18 and 19, 20 and 21 of an automatic spooler.

An automatic spooler is divided into a plurality of sections such as shown in the drawings between samsons 18 and 19 or between samsons 20 and 21. Extending from the opposite sides of each samson are suitable brackets 25 and 26 having mounted on the ends thereof bobbin supply boxes 27 and 28, these boxes being shown in Figure 2, but omitted in Figure 1 in order to more clearly disclose the invention.

Secured to each side of the intermediate portions of the samsons 18 and 21 are longitudinal channels 29 and 30 which serve as struts for rigidly tying the samsons together. Rotatably mounted in the upper portion of the samsons are cylinders 31 and 32 which rotate in the direction designated by the arrows and cause the cheeses or packages of yarn 33 and 34 to likewise rotate and draw the yarn from the bobbins 35 and 36 upwardly through combs 37 and 38 respectively, to cause the same to be wound onto the packages. A suitable trackway 39 is disposed on the upper side of samsons 18 to 21 and the end frames 16 and 17, upon which a carriage (not shown) is adapted to travel and cause empty bobbins to be replaced by a full bobbin of yarn in the spooler.

Also disposed between each of the frames 18 to 21 is a cover plate 40 and a suspended baffle 41 pivoted as at 42. On opposite sides of each samson are upper brackets 45 and lower brackets 46 upon which a conveyor belt 47 is adapted to travel for receiving the empty bobbins after the same have been doffed from the bobbin holders 48 and convey the bobbins to a suitable container (not shown) at the end of the spooler.

The parts thus far described are conventional in conventional spoolers but it is deemed necessary to disclose this much of the old structure in order to more clearly describe the invention.

In order to use an induced draft to clean the machinery as disclosed in the drawings, it is necessary to install suitable baffles in various portions of the machine so that the draft may be directed through the natural openings of the machine to remove the dust, lint and fly therefrom and also to prevent the same from collecting thereon. Suitable baffles 50 and 51 have been secured between each of the samsons or in each section of the spooler, to longitudinal struts 52 and 53 of the machine. These baffles 50 and 51 converge downwardly, forming an opening 54 through which the downward current of air passes together with the dust, lint and fly from the upper portions of the machine and particularly that dust and fly which is created by cylinders 31 and 32 and the cheese rolls 33 and 34.

While cylinders 31 and 32 do not, in themselves, create the induction draft, it is seen that since the upper side of the rolls rotate inwardly that the induction draft created by the fan, which will be presently described, will be materially assisted in collecting the fly and lint and transferring it downwardly through the opening 54.

Secured to longitudinal channels 29 and 30 are conventional baffles 56 and 57 which extend downwardly and have the lower edges thereof secured to the sides of the frames 16*a* to 21*a*. These baffles will cause the draft which passes downwardly through the bobbin boxes 58 and 59 to thoroughly cleanse the interior portions of these boxes as well as the exterior of bobbins 35 and 36. A current will also be drawn downwardly through the openings which exist between the lower edges of baffle plates 56 and 57 and the conveyor belt 47.

Baffle plates 61 and 62 are secured to the upper edges of hoppers 60, said baffle plates having the upper edges thereof abutting the inside edges of bobbin supply boxes 27 and 28. By placing the upper edges of these plates in the position shown in Figure 2, it is seen that the dust and lint from the top of the supply boxes will also be drawn downwardly into the hopper 60. The

structure described in Figure 2 is typical of the structure in each of the sections of the spooler. In other words, the structure between samsons 20 and 21 and the other samsons and frames of the machine, not shown, is identical to the structure between samsons 18 and 19 and frames 18a and 19a; therefore, like reference characters will be given like parts and other description will not be made for the other sections.

Connected to the lower end of hoppers 60 are vertically disposed pipes 65 which lead into a horizontally disposed pipe 66, said pipe 66 increasing in size as it progresses to the right in Figure 1, since this pipe serves as a trunk line.

Pipe 66 leads to the intake opening of a suitable fan 67 which fan is connected to the lower side of the floor 10. The pipe 66 is held in position by suitable means such as hangers 68 suspended from the lower side of floor 10.

Fan 67 exhausts into a suitable duct or pipe 70 which extends upwardly through the floor 10 and leads into a filter 71 which is suspended from the ceiling 12. The filter 71 is lined with a suitable filtering material 72 such as textile fabric or wire fabric and has a suitable hinged door 73 in the lower side thereof pivoted as at 74 and having latch 75. This door may be opened when it is desired to remove the accumulated fly, dust and lint caught by the fiftering material 72. The filter 71 has baffle plates 76 on the front edge thereof for directing the exhaust current of air downwardly onto the creeling apparatus which will be presently described.

A shield 77 encircles the filter 71 and causes the currents of air which pass through the filter to be directed downwardly in the direction of arrows as shown in Figures 1A and 6.

The exhaust from filter 71 is directed downwardly onto the creeling apparatus 80 and 81 and onto the surrounding floor to cause the dust and lint particles which fall onto the floor directly beneath the creels to be blown toward the rear of the machine. The creels 80 and 81 have conventional fans 83 and 84 for blowing the particles from the strands of yarn as it is drawn from the creel to the warper thereby preventing it from collecting on the yarn.

After the particles are blown onto the floor, the exhaust air from the filter 71 blows these particles rearwardly of the creel frames to openings 85 and 86 where it is drawn by the suction produced by the fan 67 downwardly through the floor into pipes 87, 88, 89, 90 and back into pipe 66, where it is pulled through the fan 67 and forced into the filter 71. Hangers 91 are used to suspend pipes 89 and 90 from the lower side of the floor 10.

In order to cause these particles to be gathered at the openings 85 and 86, a curb 92 is provided which, in the present instance in Figure 3, resembles a rough W in its plan view. This curb (Figure 1A) extends a slight distance above the floor level in order to properly direct these particles to the openings. The creels 80 and 81 have a plurality of packages of yarn 93 thereon which are wound onto a warp beam 95 of warper 96. The strands leading from the packages 93 pass through comb 97, over roller 98 and then onto the warp beam. This warp beam is rotatably mounted in arms 99 and 100, which arms support guard rail 101.

It is well known in the art of creeling and warping that movement produced by the rotation of warp beam 95 will cause all of the strands from the packages of yarn 93 to move rapidly toward the warp beam at approximately 900 yards per minute. This swift movement of the ends will cause an induced draft to be set up which will be overcome by the exhaust draft from the filtering apparatus 71, thereby causing the fly and lint which falls upon the floor to be directed rearwardly to the openings 85 and 86 instead of toward the warper 96.

It is also desirable to cleanse the warp beam 95 during the operation of the creeling apparatus; therefore, a slotted pipe 105 has been mounted in parallel relation to the warp beam 95 and this pipe is located with its slot 106 adjacent the surface of the warp beam. This slot 106 extends appproximately the length of the warp beam and collects the lint particles from the surface of the beam by virtue of the induced draft set up by the fan 67. The pipe 105 is U-shaped and has each end thereof pivotally connected as at 108 and 109 to vertically disposed ducts 110 and 111 respectively. These ducts lead downwardly through the floor 10 and are connected to vertically disposed duct 112, said duct 112 having its lower end connected to pipe 90.

It is thus seen that the lint, fly, dust and other foreign particles which are created by the rotation of the warp beam will be collected and transferred downwardly through the pipes 110, 111, 112 and 90 back into the pipe 66. From this pipe, the dust, lint, and other foreign particles will be drawn through fan 67 and forced upwardly through pipe 70 into filter 71 where the air is filtered and the exhaust is used to blow the trash from the creel frames 80 and 81 into suction openings 85 and 86.

In the form of the invention shown in Figure 8 means are illustrated for carrying out this invention by returning the used and cleaned air to the machine thus appreciably lessening the power required to circulate air through the machine. As shown in this figure a portion of the machine illustrated in Figure 1 together with its pipes and blower or fan is illustrated as before. In this case however the pipe 70 leading from the fan supports a cleaning hood or filter 113 which has its outlet directed back to the same machine and no connection is shown to any other machine. By this means the air from the filter is in motion towards the machine so that less power is required to produce suction drafts through the machine than would be necessary were the air around the machine in a quiescent state.

It is particularly to be noted that the method set forth employs certain of the machine surfaces as guide means for directing the induced air streams along desired paths and that with some types of machines many of the baffle plates herein illustrated may be omitted, reliance being had on the machine surfaces themselves to confine at least some of the air streams to desired paths.

By filtering the air and using the same over and over again in the mill, the temperature and humidity of the air is not materially affected; therefore, the air can be re-circulated through the room without the necessity of drawing in outside air which is very often of different temperature and humidity from that of the room.

To draw in outside air would necessitate additional expense. By using an induction draft for cleaning the machinery, the particles of dust, lint and fly are collected from the room and the air is purified or conditioned. This creates a decidedly more healthful working condition for the employees as the air is purer and more free from lint and dust than it would be if a direct clean-

ing machine were used, that is, cleaning machinery which does not collect any dust or lint from the machine but merely removes the lint from the machine by exposing the same to a direct blast of air.

It is to be understood that wherever the word "lint" is used throughout this specification and in the claims this term is to be understood as broad enough to cover not only what is generally known as "lint" but also to cover what is known as fly and to cover dust and in fact all matter tending to settle from the air on the machine or the material passing therethrough.

What I claim is:

1. That method of freeing textile machinery from lint and fly which includes drawing lint and fly laden air downwardly through the parts of the machinery, removing the lint and fly from the air, and returning the cleaned air to the machinery from above.

2. That method of freeing textile machinery from lint and fly which includes inducing a draft of air to flow downwardly through the machinery, confining the induced draft of air about those parts of the machinery capable of producing lint and fly, cleaning the lint and fly laden air and projecting the cleaned air onto the machinery from above.

3. That method of freeing textile machinery from lint and fly and for cleaning accumulations of the same from about the yarn or thread working portions thereof, which includes drawing the lint, fly, and lint and fly laden air downwardly through the thread or yarn working parts of the machinery into the interior of and from the machine, then cleaning said air in the vicinity of and returning said cleansed air for recirculating the same through said machine.

ERNEST J. EADDY.