

May 16, 1961

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2,984,263

METHOD AND APPARATUS FOR COLLECTING LINT AND FLY

Filed March 10, 1960

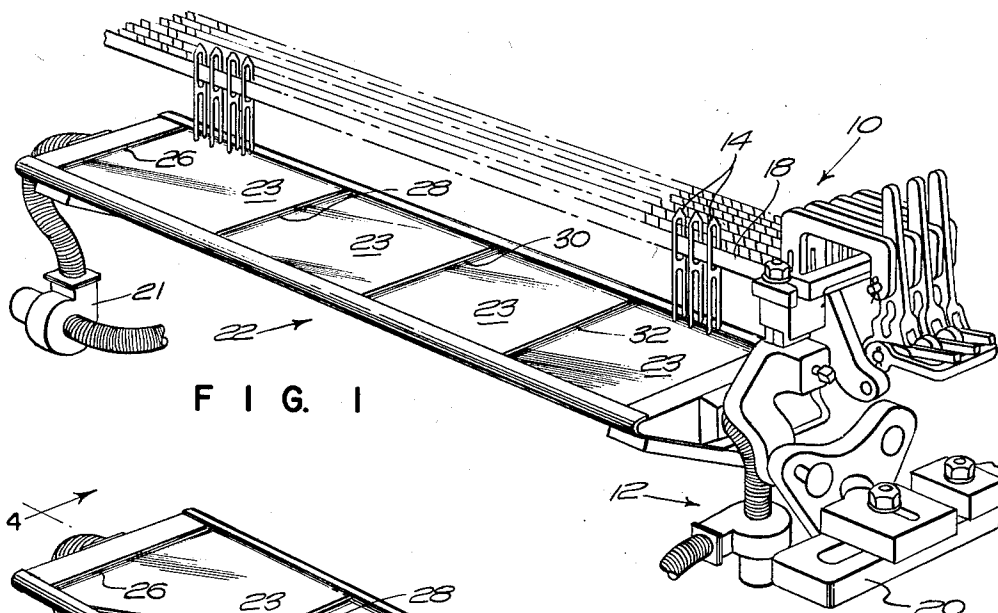


FIG. 1

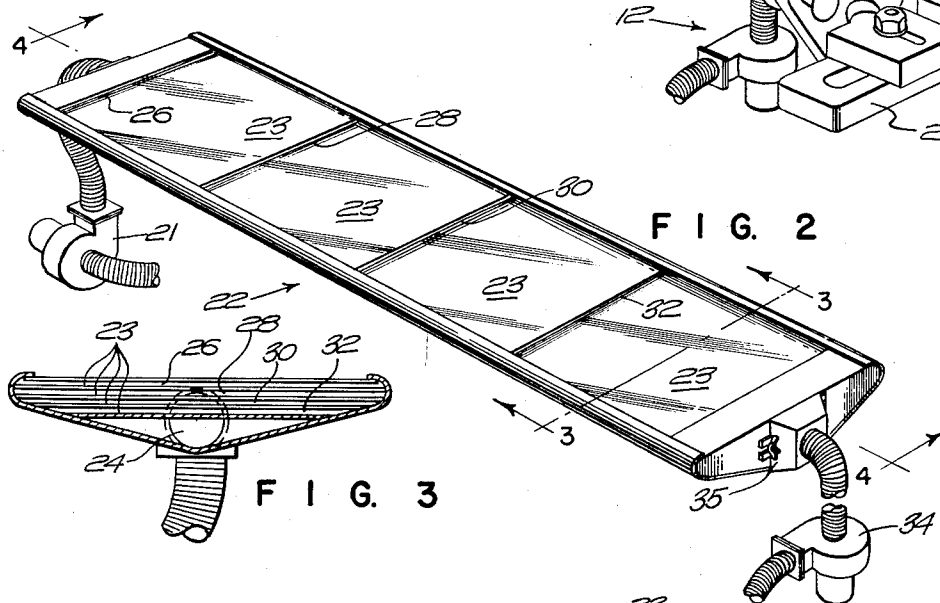


FIG. 2

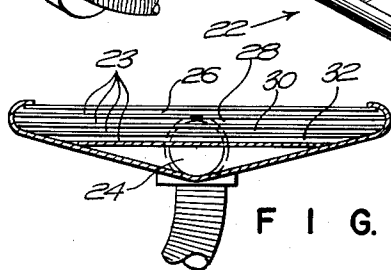


FIG. 3

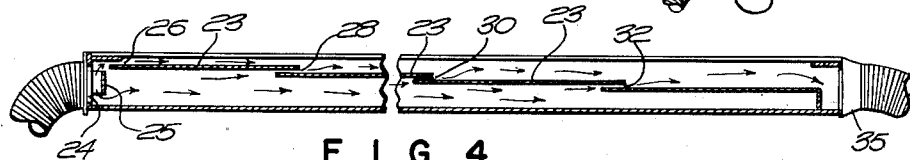


FIG. 4

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2,984,263

METHOD AND APPARATUS FOR COLLECTING LINT AND FLY

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Filed Mar. 10, 1960, Ser. No. 14,022

7 Claims. (Cl. 139—1)

This invention relates to looms and more particularly to a method and apparatus for collecting and removing lint and fly given off from certain areas of the loom during the weaving operations, the apparatus being fastened to the loom.

In the weaving of cloth, the accumulation of lint and fly on the loom making such cloth is a very serious problem because such an accumulation is very likely to result in defects in the cloth or interfere with the loom operation. The yarn which is used in weaving cotton and woolen cloth is formed from substantially parallel oriented fibers which are twisted together. Occasionally, some of these fibers will have only one end anchored in the yarn and the other end free. During the weaving operation each strand of yarn is drawn off a warp roll on the loom and passed through an opening in a drop wire which is supported by the strand so as to fall down and actuate the stop motion of the loom to stop the loom if the strand breaks. The drawing of the yarn through this drop wire opening causes some of the fibers and some sizing, usually starch, to pull away or break off as lint and fly. A large portion of this lint falls down below the drop wires where it was formed, but, being very light, it may before reaching the floor be carried by air currents back to the yarn or to the cloth being woven or to surfaces of the machinery. If it falls on the yarn or cloth, it is normally too small to create a defect, but if it accumulates on the exposed surfaces of the machinery and later falls in a bunch onto the yarn or cloth, a defect will be produced thereby lowering the quality of the cloth. It is the prevention of such an accumulation to which my invention is directed.

A number of ways have been proposed to handle this problem, including periodically passing a blower over the machinery to blow the lint and fly off the machinery surfaces. These prior proposals have been successful in varying degrees, but, although most parts of the machine are blown clean to a great extent the lint and fly is still within the confines of the room and eventually falls to the floor where it may possibly be lifted again by a blast of air from the overhead blower and where it requires frequent periodic manual sweeping to be removed. To automatically remove the lint and fly from the weave room various apparatuses have been developed. For example, in one mill a system having a trough placed in the floor beneath each loom with a large vacuum device connected thereto was installed to continuously draw in the lint and fly as it is formed and transfer this matter to a central collection point. This system has been successful to a large extent, but the cost of such success is extremely high because of the extensive ducting required and the power required to provide adequate suction. In addition, such a system must be installed while the mill is being built so that the connecting ducts between the troughs and the vacuum device can be made an integral part of the mill structure. Such a system would be even more costly if

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it were designed for existing mills having looms already installed and operating.

It has also been recently proposed to utilize an overhead traveling suction device with a nozzle which hangs therefrom down to the floor and which sucks up the lint and fly from the floor as the device passes over it. The success of this device has not been determined at this time due to the difficulty in overcoming the problem of bringing the nozzle into the region where the lint and fly generally lies, e.g., under the machines rather than in the aisles and the further problem of adequately collecting this matter from the cleaner which is constantly moving around the room.

The objects of my invention are that each loom have its own collection system, that this system be located on the loom at the place where a great deal of the lint and fly is formed and that the system operate continuously to collect said lint and fly before it has an opportunity to come to rest on the machinery surfaces.

A preferred form of my invention is a collection system mounted directly on the loom under the stop motion mechanism, since a large portion of the total lint and fly is produced at this position due in large part to the friction occurring between the yarn and the drop wires and between the adjacent moving strands of yarn which make up the warp and which rub together during the weave operation. Of course, lint and fly accumulates at points on the loom other than the drop wires, but, the quantity is such that the use of a traveling blower has been acceptable for keeping lint and fly off the machinery surfaces at these other points without the requirement that it be removed immediately.

My system primarily utilizes the property of a properly directed high velocity stream of air to cause a low pressure area in its surrounding environment which draws the lint and fly to it and then to transmit the lint and fly to a desired collection point with this stream. The use of such an airstream with its eductive properties is much more efficient than the use of a vacuum and thus enables applicants to collect large portions of the lint and fly produced without the use of large, powerful and expensive equipment.

Consideration of the specification and the drawing attached thereto will provide a better understanding of my invention.

In the drawing:

Figure 1 is a perspective view of the stop motion portion of a loom with a preferred embodiment of my invention attached thereunder;

Figure 2 is a clearer showing of the open channel collector taken by itself;

Figure 3 is a transverse section of the collector taken along line 3—3 of Figure 2; and

Figure 4 is a longitudinal section of the device taken along line 4—4 of Fig. 2 and showing the path of the airstream in the channel.

Figure 1 shows the stop motion mechanism 10 of a loom 12. More particularly drop wires 14 are carried on warp strands 16 passing above reciprocating notched bars 18. Mounted on loom frame 20 across the width of the loom and beneath the stop motion mechanism is an open channel 22 with its open side uppermost and covered by stepped overlapping plates 23. At one end of this channel is an opening 24 through which air is delivered via a baffle 25 from blower 21. Along the channel are spaced openings 26, 28, 30 and 32 between the plates 23. Because the baffle properly distributes the air flow, air delivered by blower 21 will pass not only through openings 28, 30 and 32 but also through opening 26 (see Figure 4). At the end of the channel opposite to that of blower 21 is another small blower 34

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with its suction end connected through a removable collection baffle box 35 to an opening 36 in the channel.

Both blowers operate constantly while the loom is operating, and, depending on the cloth to be woven, the blower and sucking device may each be adjusted to give optimum performance in accordance with the size and quantity of the lint and fly produced. Air blown from blower 21 through opening 26 will tend to flow parallel to the covers 23 and the bottom of the pan toward opening 28. As it moves toward opening 28 friction and defusion will tend to cause the air stream to slow down and to leave the vicinity of channel 22. However, when the air stream reaches the vicinity of the opening 28 a new blast of air leaving this opening also parallel to the covers 23 of the channel will cause a lower pressure to exist at this point than the pressure at a point immediately above and behind the opening. As a result the stream emanating from 26 will tend to be sucked down toward opening 28 and will become part of the stream issuing from opening 28 as it travels toward opening 30. As it continues along, defusion and friction will again cause the stream to tend to slow down and move away from channel 22. However, a new blast of air coming out of opening 30 will again suck the air stream down and along, parallel to the covers 23 of the channel. This process will continue and be repeated at opening 32. After leaving opening 32 and before the air stream has an opportunity to leave the vicinity of the channel bottom, the influence of suction device 34 will work upon the air stream causing it to be sucked into the collection box 35. Thus, unlike prior art devices, the lint and fly which is being dropped from the area of the loom stop motion is urged toward an appropriate suction device and collected thereby before it can leave the confines of the loom structure. With some looms, space limitations may require that the collection box 35 be placed elsewhere with relation to the channel 22 and suction motor 34.

It will of course be apparent to those skilled in the art that if necessary, other shapes of the openings 28, 30, and 32 differing from that depicted in the preferred embodiment of Figures 1 and 2, may be used. It is not intended to limit the invention by what is disclosed in the preferred embodiment but rather by what is claimed in the following claims.

I claim:

1. In combination with a loom having a stop motion mechanism extending thereacross and drop wires suspended thereover from strands of yarn being processed by said loom, an open channel fastened to said loom frame beneath said strands and substantially parallel to said stop motion mechanism, an air blowing device at one end of said channel, an air sucking device at the other end of said channel, air passage means for carrying air from said blowing device and for discharging said air at spaced intervals along said channel in a stream substantially parallel to the bottom of said channel toward said sucking device, and means at said other end for filtering the air reaching said other end.

2. In combination with a loom having a stop motion mechanism extending thereacross and drop wires suspended over said mechanism from strands of yarn being processed by said loom, a channel fastened to the frame of said loom beneath said strands and extending substantially parallel to said mechanism across the width of said loom, an air blowing device at one end of said channel, an air suction device at the other end of said channel, means for discharging air from said blowing device along said channel from the said one end, means for carrying air from said blowing device to points at spaced intervals along said channel and for discharging said air along said channel from said points, and means at said other end for filtering the air reaching said other end.

3. In combination with a loom having a stop motion

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mechanism extending there across and drop wires suspended thereover from strands of yarn being processed by said loom an open channel facing upwardly fastened to said loom frame beneath said strands and substantially parallel to said mechanism, an air blowing device at one end of said channel, an air sucking device at the other end of said channel, a plurality of cover plates covering said channel, said cover plates being in overlapping relationship substantially parallel to the bottom of said channel and spaced from each other toward the bottom of the channel from the said one end to the said other end thereby forming spaced openings for air to be discharged in a stream substantially parallel to the bottom of said channel toward said sucking device, and means at said other end of said channel for filtering the air reaching said other end.

4. In combination with a loom having a stop motion mechanism extending thereacross and drop wires suspended thereover from strands of yarn being processed by said loom an open channel facing upwardly fastened to said loom frame beneath said strands and substantially parallel to said mechanism, a centrifugal blower having its discharge opening connected to one end of said channel, a plurality of cover plates covering said channel, said cover plates being in overlapping relationship substantially parallel to the bottom of said channel and spaced from each other toward the bottom of the channel from the said one end to the other end thereby forming spaced openings for air to be discharged in a stream substantially parallel to the bottom of said channel, a centrifugal blower having its intake opening connected to said other end of said channel, and means interposed between said last mentioned blower and said other end for filtering air entering said last mentioned blower.

5. The method of removing lint and fly falling from the stop motion mechanism and adjacent areas of a loom, said method comprising producing at one side of the loom a first continuous substantially horizontal airstream and directing it toward the other side of the loom substantially parallel to and beneath said stop motion mechanism at a sufficiently high velocity to provide an eductive force on the lint and fly on and near said stop motion mechanism, carrying said airstream the entire width of said loom beneath said stop motion mechanism so as to convey the lint and fly received by said stream producing at an intermediate point of said first stream an additional continuous substantially horizontal air stream of a greater velocity than said first stream at said intermediate point, directing said additional stream toward the said other side of the loom, whereby air from said first stream conveying the falling lint and fly is drawn into said additional stream and continues along therewith and intercepting said airstream with its contained lint and fly at said other side of the loom and collecting said lint and fly.

6. The method of removing lint and fly falling from the stop motion mechanism and adjacent areas of a loom, said method comprising producing at one side of the loom, a first continuous substantially horizontal airstream and directing it toward the other side of the loom substantially parallel to and beneath said stop motion mechanism at a sufficiently high velocity to provide an eductive force on the lint and fly and near said stop motion mechanism, carrying said airstream the entire width of said loom beneath said stop motion mechanism so as to convey the lint and fly received by said stream, producing at spaced intermediate points along said first airstream additional continuous substantially horizontal airstreams each having a greater velocity than said first stream at each of said spaced intermediate points, directing said additional stream toward the said other side of the loom whereby air from said first stream conveying the falling lint and fly combines with each intermediate additional airstream to form one continuous substantially horizontal airstream, intercepting said airstream with its con-

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tained lint and fly at said other side of the loom and collecting said lint and fly.

7. The method of removing lint and fly falling from selected portions of a loom having a stop motion mechanism, said method comprising producing at one side of the loom a first continuous substantially horizontal airstream and directing it beneath said portions toward the other side of said loom substantially parallel to said mechanism at a sufficiently high velocity to provide an eductive force on the lint and fly on and near said portions, carrying said airstream the entire width of said loom beneath said portions so as to convey the lint and fly received by said stream, producing at an intermediate point of said first stream an additional continuous substantially horizontal airstream of a greater velocity than

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said first stream at said intermediate point, directing said additional stream toward the said other side of the loom, whereby air from said first stream conveying the falling lint and fly is drawn into said additional stream and continues along therewith, and intercepting said airstream with its contained lint and fly at said other side of the loom and collecting said lint and fly.

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