Sept. 5, 1944. E. VOSSEN ET AL 2,357,714

STOP MOTION HEAD FOR KNITTING MACHINES

Filed Feb. 4, 1944 4 Sheets-Sheet 1

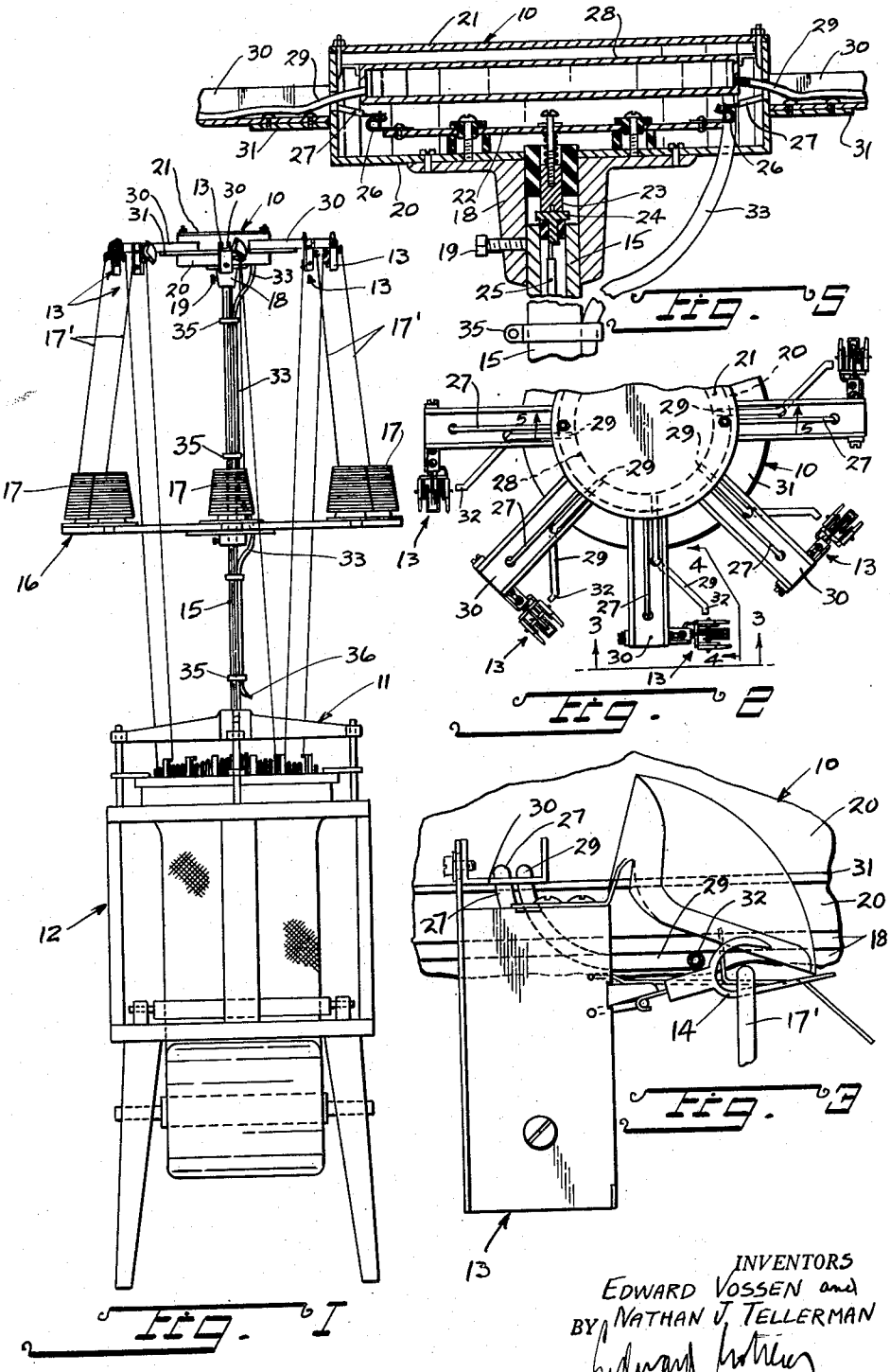


Fig. 1

Fig. 5

Fig. 2

Fig. 3

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STOP MOTION HEAD FOR KNITTING MACHINES

Filed Feb. 4, 1944 4 Sheets-Sheet 2

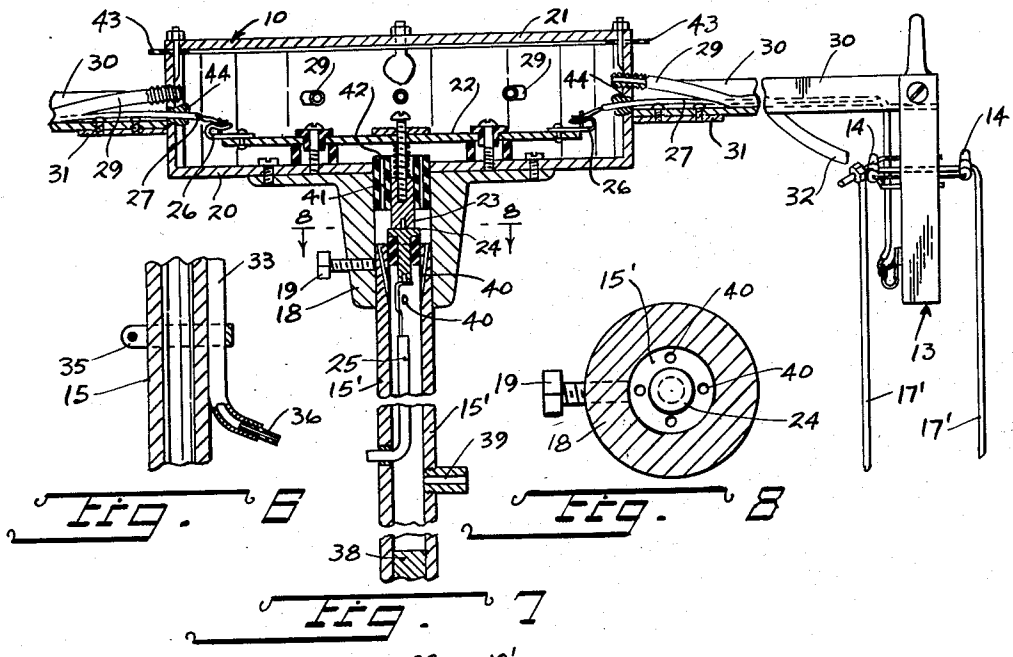


Fig. 6

Fig. 8

Fig. 7

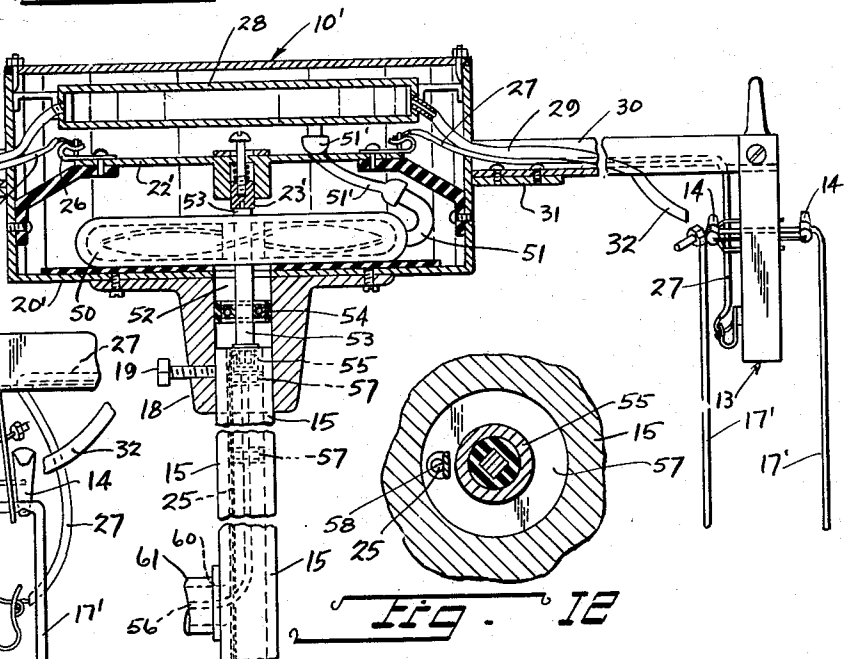


Fig. 12

Fig. 10

Fig. 4

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STOP MOTION HEAD FOR KNITTING MACHINES

Filed Feb. 4, 1944 4 Sheets-Sheet 3

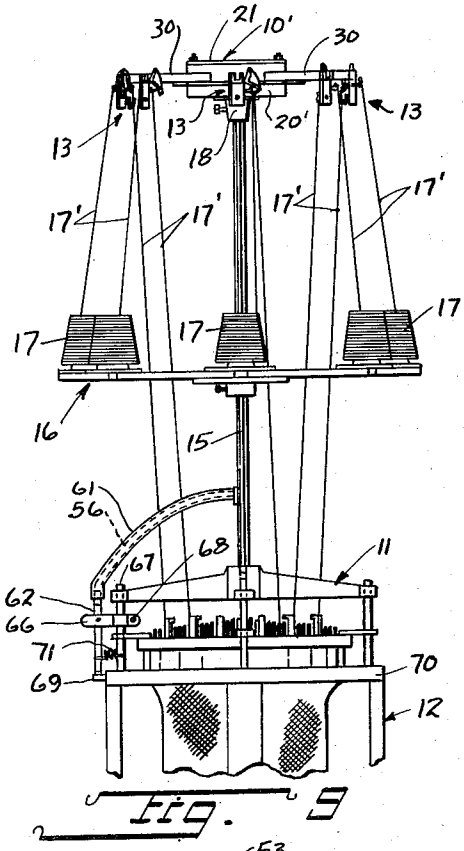


Fig. 9

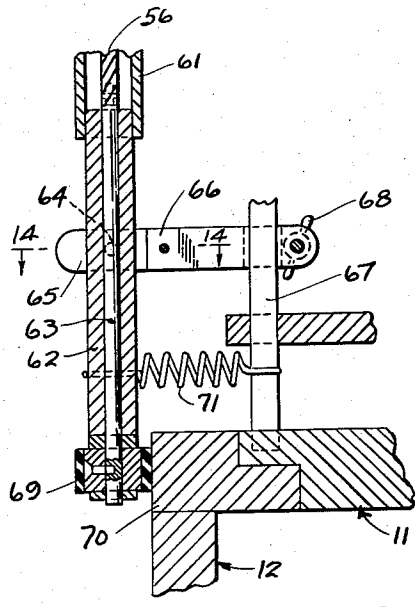


Fig. 13

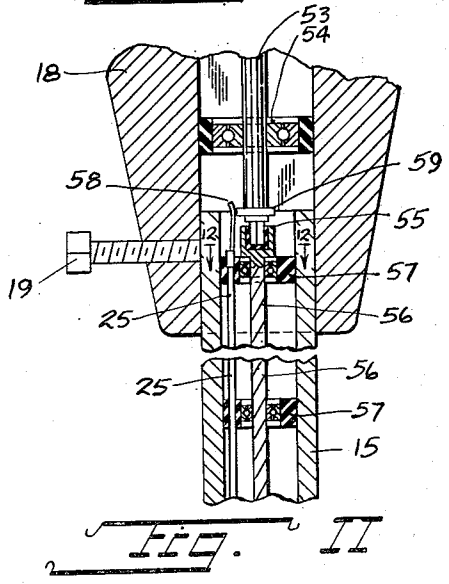


Fig. 11

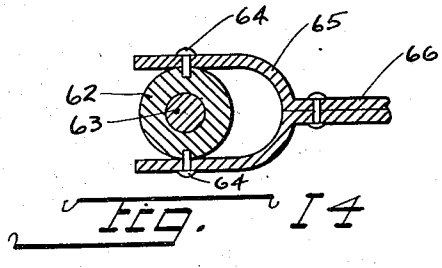


Fig. 14

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Sept. 5, 1944. E. VOSSEN ET AL 2,357,714

STOP MOTION HEAD FOR KNITTING MACHINES

Filed Feb. 4, 1944 4 Sheets-Sheet 4

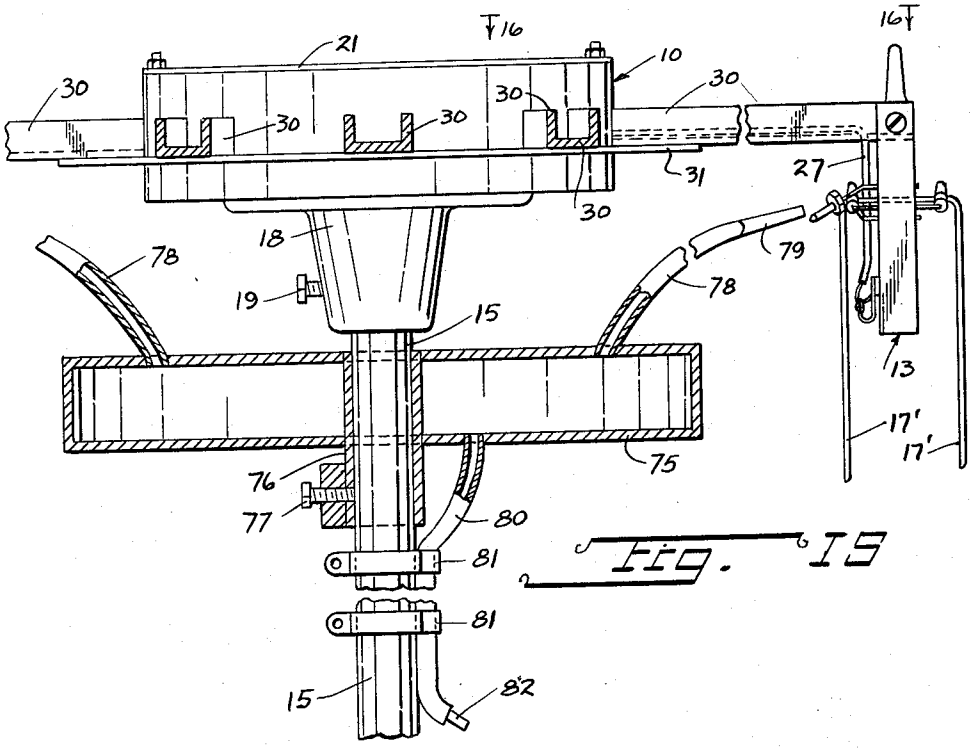


Fig. 15

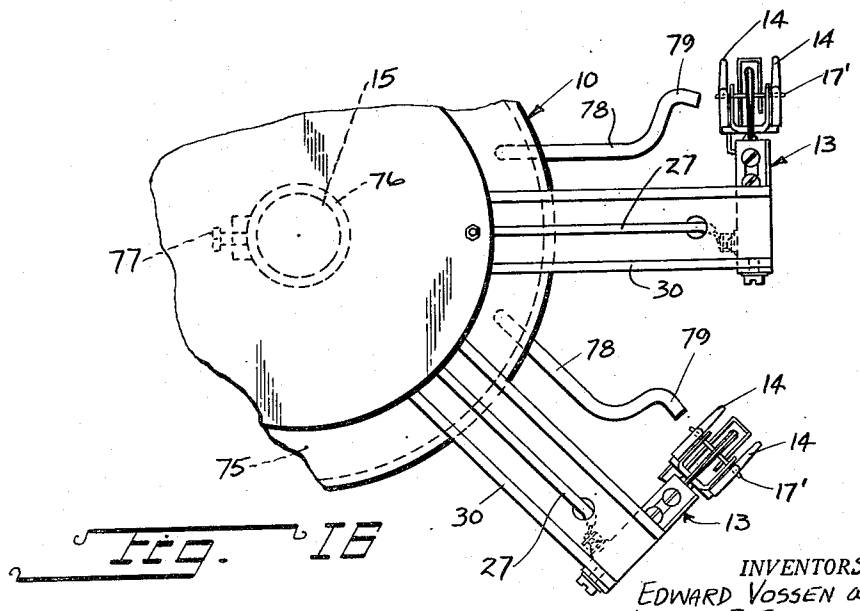


Fig. 16

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Patented Sept. 5, 1944 2,357,714

UNITED STATES PATENT OFFICE

2,357,714

STOP MOTION HEAD FOR KNITTING MACHINES

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Application February 4, 1944, Serial No. 521,020

12 Claims. (Cl. 66—168)

This invention relates to new and useful improvements in stop motion heads for knitting machines.

It is customary to equip knitting machines with stop motion heads which include indicator units with yarn guiding members over which the yarn passes. These detecting units are electrically connected with controllers for the knitting machines to stop them under certain contingencies. For example, if the one or more yarns are drawn tight due to an obstruction on the yarn, or yarns, or other parts, the detector unit or units would detect this deficiency and stop the machines before any damage is done. Similarly, the detector units are constructed to detect other undesirable developments and stop the knitting machines.

The yarns generally used on knitting machines contain quite a bit of lint and fuzzy material. Because the yarns are continuously passing over the yarn guiding members the lint and fuzzy material will be forced off the yarns and will settle on the stop motion heads and parts and objects in the vicinity. Moreover, the atmosphere in a knitting room is always laden with the lint and fuzz coming off the yarns during the operation of the knitting machines. This lint and fuzz is thrown around by the moving parts of the machine, such as the belts, shafts, etc. It settles upon the knitting machines, the floor, the surrounding area, and also upon the stop motion heads of the machines. Soon the heads become loaded with the lint and fuzz which grows in size until it gives the appearance of stalactites and other grotesque formations. While this development is objectionable in so far as appearance and sanitation are concerned, it is also detrimental to the operation of the knitting machines and the material knitted. As the formations keep growing in size, they increase in weight and sooner or later a condition is reached in which a large piece or pieces break off and fall down on the moving yarns. It adheres to the yarns and is carried down to the knitting machines. This causes heavy lumps in the finished fabric, if it succeeds in passing the needles of the machine, or if it plugs up the guide holes to the front of the needles it causes the yarn to tear, which in turn causes a press-off. By "press-off" we mean that the knitted material starts coming off the needles, and unless the machine is immediately stopped the entire knitted fabric falls off of the needles.

Practically, every knitting mill has an air blower and an air hose which the operator uses to blow the lint and fuzz away from certain parts of the knitting machines, such as the knitting needles, the guides and other parts. However, the operators do not dare point the air hose up at the stop motion heads to blow off the accumulating lint and fuzz because the air will blow the yarns off the yarn guiding members of the detector units and will cause the yarns to twist and tangle with each other. Furthermore, if an air hose is directed up at the stop motion heads it will blow the accumulated lint and fuzz across to an adjacent knitting machine and settle on the stop motion units of these machines. For these reasons the operators seldom, if ever, dare blow the air up at the stop motion heads, except when the knitting machines are out of operation and the yarns are unthreaded.

This invention proposes an improved stop motion head which will prevent the lint and fuzz from settling on said stop motion head and building up in an objectionable manner as mentioned. It is proposed that the improved head should blow away the lint and fuzz continuously or periodically as it reaches the vicinity of said stop motion head. Moreover, the improved stop motion head should prevent the accumulation of lint and fuzz upon itself without any danger whatsoever of the yarns becoming twisted or being blown off the yarn guiding members of the detector units.

More specifically, the invention proposes the construction of a stop motion head which is characterized by a stop motion head proper adapted to be mounted above the head of a knitting machine and having detector units with yarn guiding means. The improved stop motion head should include or be associated with nozzles for directing streams of air upon said detector units for blowing away the fuzz, lint, etc., which tends to collect on them. The nozzles should be supplied from an air supply system.

The principles of the improved stop motion head may be applied to all types of knitting machines, for example, both to the revolving head machines, as well as the stationary head machines. For purposes of illustration, the improved stop motion head will be illustrated and described in this specification in conjunction with a rotary head knitting machine, but this is not intended as a limitation.

The invention contemplates numerous modifications embodying the broad principles thereof. In one form of the invention, an air chamber is proposed within the stop motion head proper with which small tubes connect and which terminate in the nozzles mentioned. An air supply tube or system is connected with this air chamber. In another form of the invention the air chamber

is mounted near the stop motion head proper, and tubes connect said air chamber with said nozzles.

In another form of the invention the stop motion head proper is constructed air tight and used as a chamber from which small tubes are led to the discharge nozzles mentioned. This chamber may be supplied with air from a tube or through the hollow shaft of the head of the knitting machine.

In another form of the invention the air supply system includes a small fan or blower located within the stop motion head proper for supplying the required air to the nozzles. This fan may be driven in any fashion. However, one drive is shown for illustrative purposes, and is in the nature of a flexible shaft associated with a drive wheel engaging a relatively rotative part of the knitting machine to obtain its rotating power.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure—

Fig. 1 is an elevational view of a revolving head knitting machine provided with an improved stop motion head constructed in accordance with this invention.

Fig. 2 is a fragmentary enlarged plan view of the stop motion head of the knitting machine illustrated in Fig. 1.

Fig. 3 is a fragmentary enlarged elevational view looking in the direction of the line 3—3 of Fig. 2 to which the yarn was added.

Fig. 4 is a frgamentary enlarged elevational view looking in the direction of the line 4—4 of Fig. 2 to which the yarn was added.

Fig. 5 is a fragmentary enlarged vertical sectional view of Fig. 2.

Fig. 6 is a fragmentary enlarged view of a portion of Fig. 1 showing particularly the bottom end of the air supply tube, certain of the parts in this view being broken away to disclose the interior construction.

Fig. 7 is a fragmentary sectional view similar to Fig. 5 but disclosing a stop motion head constructed in accordance with another form of this invention.

Fig. 8 is a horizontal sectional view taken on the line 8—8 of Fig. 7.

Fig. 9 is a fragmentary elevational view of a revolving head knitting machine provided with a stop motion head constructed in accordance with another form of this invention.

Fig. 10 is a fragmentary enlarged sectional view of the stop motion head of the knitting machine shown in Fig. 9.

Fig. 11 is a fragmentary enlarged detailed view of the lower portion of the stop motion head shown in Fig. 10 with additional parts shown in section.

Fig. 12 is a fragmentary enlarged horizontal sectional view taken on the line 12—12 of Fig. 11.

Fig. 13 is a fragmentary enlarged vertical sectional view of a portion of Fig. 9 illustrating particularly some of the details of the flexible shaft drive thereof.

Fig. 14 is a fragmentary enlarged horizontal sectional view taken on the line 14—14 of Fig. 13.

Fig. 15 is a fragmentary sectional view similar to Fig. 5 but illustrating still another modified form of the invention.

Fig. 16 is a fragmentary plan view looking in the direction of the line 16—16 of Fig. 15.

The stop motion head for knitting machines, in accordance with that form of the invention illustrated in Figs. 1–6 inclusive, includes a stop motion head proper 10 adapted to and mounted above the head 11 of a knitting machine 12. Said stop motion head proper 10 has a plurality of detector units 13 with yarn guiding members or fingers 14. The details of these detector units will not be given in this specification as they form no part of the invention and their existence and use are generally known in the trade.

The stop motion head proper 10 is illustrated mounted upon a vertical shaft 15 of the head 11 of the knitting machine. This shaft 15 supports the spool support 16 provided with the spools of yarn 17. The webs 17′ of said yarn from the spools 17 are guided upwards across said members or fingers 14 of said detector units 13 and then down through the various guides not shown, to the needles of said knitting machine 12.

The stop motion head proper 10 is provided with a support bracket 18 which is engaged over the top end of the shaft 15 and securely held in position with a set screw 19. Said stop motion head proper 10 includes a round container 20 mounted on said bracket 18. This container 20 has a removable cover 21. Within the container 20 there is a metal disc 22 electrically insulated from the container 20 and bracket 18, and electrically connected with a resiliently mounted contact 23 cooperative with a stationary contact 24 mounted on and electrically insulated from the shaft 15. Said shaft 15 is tubular and houses an electric lead or cable 25. This lead 25 is connected with and is for the purpose of supplying electric current to the contact 24. Clips 26 are mounted upon the disc 22 and connect with electric wires or cables 27 which extend to the various detector units 13. The several parts just described are used for defining the electric circuit to the detector units 13. Further details of this will not be given in this specification since they form no part of the invention and their construction is generally known.

Up to this point the details of the stop motion head were old. The improved head now departs from prior constructions in the provision of an air chamber 28 fixedly mounted within the round container 20. A plurality of pliable tubes or pipes 29 connect with the air chamber 28 and extend along arms 30 of the stop motion head proper 10 and terminate in discharge nozzles 32 directed towards and against the detector units 13. The arms 30 are mounted upon a support flange 31 mounted around the round container 20 of the stop motion head proper 10. An air supply tube 33 connects with the air chamber 28 and extends down along the shaft 15 and is releasably attached to said shaft 15 with clamps 35. The tube 33 terminates at the bottom end in a nozzle 36 upon which an air hose having the usual valve may be engaged for supplying air to the air chamber 28.

The tubes 29 are of pliable material so that they may be bent to direct the nozzles 32 at a suitable angle and to suitable points against the detector units 13. It is important to direct the streams of air against the detector units so that the air will not blow the yarn off the yarn guiding members 14, which in the particular design of detector units shown on the drawings, are in

the nature of fingers. Furthermore, the air nozzles 32 are so directed as to blow the lint off the fingers 14 and other parts of the detector units 13 to prevent the lint and fuzz from packing the moving parts of the units 13 and stalling this operation.

The operation of the device is as follows:

Whenever the operator uses the air hose to blow the lint and fuzzy material off the needles and other parts of the knitting machine, or at other times if conditions warrant, the operator may engage the air hose against the inlet 36 to blow air into the air chamber 28 and from this chamber 28 through the tubes 29 to the nozzles 32 so that air streams are directed against the detector units 13 to keep them clean. The air streams will prevent the lint and fuzz from accumulating and hardening and causing damage, as already pointed out.

In Figs. 7 and 8 a modified form of the invention has been disclosed in which the stop motion head 10 is very similar to the one previously described, but distinguishes essentially in the fact that the round container 20 is used as an air chamber for supplying said tubes 29 with air. Furthermore, the hollow shaft 15' has its bottom end closed with a plug 38. A nipple 39 is mounted upon a convenient point of the shaft 15' for an air supply hose. Passages 40 are formed in the top of the shaft 15' for the air to enter the bracket 18. Additional passages 41 are formed in an insulation bushing 42 which slidably support contact 23. These passages 42 are for the air to enter the round chamber 20. The round chamber 20 is sealed so as to be air tight. An air seal washer 43 is mounted beneath the cover 21. The openings through which the electric leads 27 pass are closed with plug material 44. In other respects this form of the invention is identical to the previous form and like parts are indicated by like reference numerals.

The operation of this form of the invention may be understood by noting that when an air hose is engaged on the inlet 39, the air will pass up through the shaft 15' and through the passages 40 and 41 and enter the round chamber 20. From this chamber 20, it will pass through the tubes 29 to reach the nozzles 32 as previously explained for blowing the lint and fuzz off the detector units 13 of the stop motion head.

In Figs. 9–14 inclusive, still another form of the invention is disclosed which distinguishes from the prior forms in the construction of the air supply system. In this form of the invention the stop motion head is provided with a stop motion head proper 10' mounted above the head 11 of the knitting machine 12. The stop motion head proper 10' has a round container 20' housing and supporting an air chamber 28. A plurality of tubes 29 connect with this air chamber 28. These tubes 29 are for connection with the nozzles which blow air against the detector units of the stop motion head proper.

An air fan or blower 50 is mounted within the round container 20' and has its air discharge end 51 connected by a rubber tube 51' with the air chamber 28. The inlet to the fan or blower 50 is connected with the opening 52 of the bracket 18. The blower 50 is provided with a drive shaft 53 which is rotatively supported in a bearing 54 mounted within the bracket 18. The drive shaft 53 connects with a coupling 55 connected with the end of a flexible shaft 56 rotatively supported in bearings 57 mounted within the shaft 15. The flexible shaft 56 passes through the major portion of the shaft 15. The electric cable 25 which also passes through the shaft 15 for supplying electric power to the detector units, is properly insulated and is provided with a contact spring 58 engaging a collector ring 59 mounted upon the shaft 53. The shaft 53 extends from the top of the blower 50 and connects with a contact 23' which is resiliently mounted on the disc 22' within the round container 20'. This disc 22' and the blower 50 are insulated from said round container 20'. The disc 22' is provided with clips 26 which connect with the electric leads 27 for connection with the detector units of the stop motion head. The bearing 54 and coupling 55 are electrically insulated. Insulation is added wherever needed so that the current supplied by the electric cable 25 is not short-circuited and properly reaches the cables 27 for the detector units.

The flexible shaft 56 comes out through a side opening 60 in the side of the tubular shaft 15. It passes through a suitable flexible housing 61 which connects with an arm 62. This arm 62 rotatively supports a rod 63. The arm 62 is pivotally mounted by a pair of pins 64 mounted upon the yoke 65 of a bracket 66 mounted upon a support rod or post 67 on the rotating head 11 of the knitting machine 12. A clamp screw and nut 68 holds the bracket 66 in position so that it may be loosened and shifted when desired. A rubber covered roller 69 is mounted upon the bottom end of the rod 63 and engages a stationary ring 70 of the knitting machine 12. Attention is called to Fig. 13 in which it is clear that the stationary ring 70 supports the rotative head 11 so that the latter may rotate. A spring 71 acts between the tubular arm 62 and the rod 67 for normally urging the roller 69 against the ring 70. In other respects this form of the invention is identical to the first form and like parts have been given like reference numerals.

The operation of this form of the invention is as follows:

When the head 11 of the knitting machine revolves, the roller 69 will be rolled along the stationary ring 70 so that it rotates. These rotations will be transmitted by the rod 63 and the flexible shaft 56 to indirectly drive the blower 50. The air from said blower 50 will be supplied to the air chamber 28 and from here through the pipes 29 to the nozzles 32 which direct streams of air against the detector units 13 of the stop motion head 10'. With this construction the air will always operate to blow the lint and fuzzy material off the detector units 13 whenever the knitting machine is in operation. If for some reason it is desired to discontinue blowing air, the wing screw and nut 68 may be loosened and the bracket 66 moved upwards on the post 67 and clamped in a new position in which the roller 69 is free from the ring 70.

In the modified form of the invention disclosed in Figs. 15 and 16, the stop motion head for knitting machines includes a stop motion head proper 10 adapted to be mounted above the head of a knitting machine and having a plurality of detector units 13 with yarn guiding members or fingers 14. The stop motion head proper 10 is illustrated mounted upon a vertical shaft 15. A round air container 75 is mounted upon the shaft 15 directly beneath the stop motion head proper 10. This container has a hub portion 76 engaging upon the shaft 15.

A set screw 77 engages through the hub por-

tion and abuts the shaft 15 for holding the container 75 in position. A plurality of pliable tubes 78 connect with the air chamber 75 and terminate in discharge nozzles 79 directed towards and against the detector units 13. An air supply tube 80 connects with said air chamber 75 and extends down along the shaft 15 and is releasibly attached to said shaft with clamps 81. The bottom end of the tube 80 terminates in a nozzle 82 with which an air hose may be engaged for supplying air to the air chamber 75.

In other respects this form of the invention is similar to the first form, and like parts have been identified by like reference numerals.

The operation of this form of the invention is similar to the first form. The air discharging through the nozzle 79 will blow away the lint and fuzz from the detector units 13, preventing accumulation and objectionable conditions, as already pointed out.

While we have illustrated and described the preferred embodiments of our invention, it is to be understood that we do not limit ourselves to the precise constructions herein disclosed and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claims.

Having thus described our invention, what we claim as new and desire to secure by United States Letters Patent is:

1. A stop motion head for knitting machines, comprising a stop motion head proper adapted to be mounted above the head of a knitting machine and having detector units with yarn guiding members, nozzles for directing streams of air upon said detector units for blowing away fuzz, lint, etc., which tends to collect thereon, and an air supply system to said nozzles, and including pliable air tubes connected with said nozzles and which may be bent to direct the nozzles as desired.

2. A stop motion for knitting machines, comprising a stop motion head proper adapted to be mounted above the head of a knitting machine and having detector units with yarn guiding members, nozzles for directing streams of air upon said detector units for blowing away fuzz, lint, etc., which tends to collect thereon, and an air supply system to said nozzles, and including pliable air tubes connected with said nozzles and which may be bent to direct the nozzles as desired.

3. A stop motion head for knitting machines comprising a stop motion head proper adapted to be mounted above the head of a knitting machine and having detector units with yarn guiding members, nozzles for directing streams of air upon said detector units for blowing away fuzz, lint, etc., which tends to collect thereon, and an air supply system to said nozzles, and including an air chamber within said stop motion head proper, small tubes extending from said air chamber and connecting with said nozzles, and an air supply tube to said air chamber.

4. A stop motion head for knitting machines comprising a stop motion head proper adapted to be mounted above the head of a knitting machine and having detector units with yarn guiding members, nozzles for directing streams of air upon said detector units for blowing away fuzz, lint, etc., which tends to collect thereon, and an air supply system to said nozzles, and including an air chamber within said stop motion head proper, small tubes extending from said air chamber and connecting with said nozzles, and an air supply tube to said air chamber, said air chamber comprising an annular member mounted within said stop motion head proper.

5. A stop motion head for knitting machines comprising a stop motion head proper adapted to be mounted above the head of a knitting machine and having detector units with yarn guiding members, nozzles for directing streams of air upon said detector units for blowing away fuzz, lint, etc., which tends to collect thereon, and an air supply system to said nozzles, and including an air chamber within said stop motion head proper, small tubes extending from said air chamber and connecting with said nozzles, and an air supply tube to said air chamber, said air supply tubes being pliable so as to be adapted to be extended downwards along portions of said knitting machines to a convenient point for an operator to apply an air hose.

6. A stop motion head for knitting machines, comprising a stop motion head proper adapted to be mounted above the head of a knitting machine and having detector units with yarn guiding members, nozzles for directing streams of air upon said detector units for blowing away fuzz, lint, etc., which tends to collect thereon, and an air supply system to said nozzles, including an air supply to the interior of said stop motion head proper, means for hermetically sealing said stop motion head proper, tubes extending from said stop motion head proper and connecting with said nozzles.

7. A stop motion head for knitting machines, comprising a stop motion head proper adapted to be mounted above the head of a knitting machine and having detector units with yarn guiding members, nozzles for directing streams of air upon said detector units for blowing away fuzz, lint, etc., which tends to collect thereon, and an air supply system to said nozzles, including a driven fan for supplying air, said driven fan being mounted within said stop motion head proper.

8. A stop motion head for knitting machines, comprising a stop motion head proper adapted to be mounted above the head of a knitting machine and having detector units with yarn guiding members, nozzles for directing streams of air upon said detector units for blowing away fuzz, lint, etc., which tends to collect thereon, and an air supply system to said nozzles, and including a blower mounted within said stop motion head proper, and means for driving said blower.

9. A stop motion head for knitting machines, comprising a stop motion head proper adapted to be mounted above the head of a knitting machine and having detector units with yarn guiding members, nozzles for directing streams of air upon said detector units for blowing away fuzz, lint, etc., which tends to collect thereon, and an air supply system to said nozzles, and including a blower mounted within said stop motion head proper, and means for driving said blower, including a flexible drive shaft for extending down to the knitting machine, and a drive wheel connected with said flexible shaft and engageable with a relatively "rotating" part of said knitting machine for driving said blower.

10. A stop motion head for knitting machines, comprising a stop motion head proper adapted to be mounted above the head of a knitting machine and having detector units with yarn guiding members, nozzles for directing streams of air upon said detector units for blowing away fuzz, lint, etc., which tends to collect thereon, and an air supply system to said nozzles, and includ-

ing a blower mounted within said stop motion head proper, and means for driving said blower, including a flexible drive shaft for extending down to the knitting machine, and a drive wheel connected with said flexible shaft and engageable with a relatively "rotating" part of said knitting machine for driving said blower, and means for releasibly holding said roller so that it may be moved out of contact from said relatively "rotating" part.

11. A stop motion head for knitting machines, comprising a stop motion head proper adapted to be mounted above the head of a knitting machine and having detector units with yarn guiding members, nozzles for directing streams of air upon said detector units for blowing away fuzz, lint, etc., which tends to collect thereon, and an air supply system to said nozzles, and including a blower mounted within said stop motion head proper, and means for driving said blower, including a flexible drive shaft for extending down to the knitting machine, and a drive wheel connected with said flexible shaft and engageable with a relatively "rotating" part of said knitting machine for driving said blower, a tubular arm pivotally mounted, a rod rotatively mounted through said tubular arm and connected with said flexible shaft, said roller being mounted on the end of said rod, and resilient means for urging said tubular arm to resiliently urge said roller against said relatively "rotating" part of the knitting machine.

12. A stop motion head for knitting machines, comprising a stop motion head proper adapted to be mounted above the head of a knitting machine and having detector units with yarn guiding members, nozzles for directing streams of air upon said detector units for blowing away fuzz, lint, etc., which tends to collect thereon, an air supply system to said nozzles, a tubular shaft for supporting said stop motion head proper, and said air supply system being connected up with said tubular shaft, whereby air may be supplied to the tubular shaft for supplying said nozzles.

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