Nov. 5, 1968 R. B. JONES ETAL 3,409,332

APPARATUS FOR COLLECTING HOSIERY

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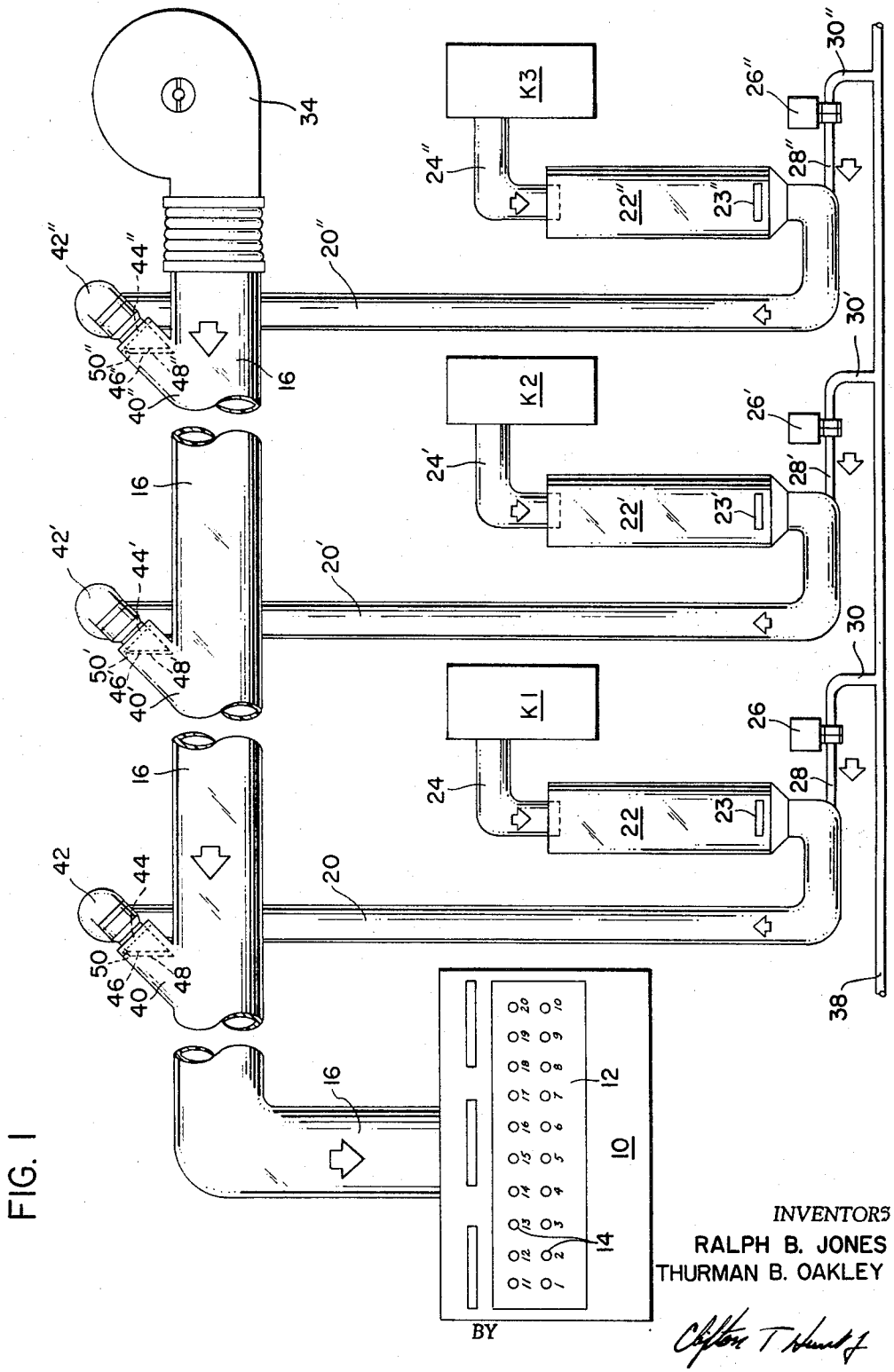


FIG. 1

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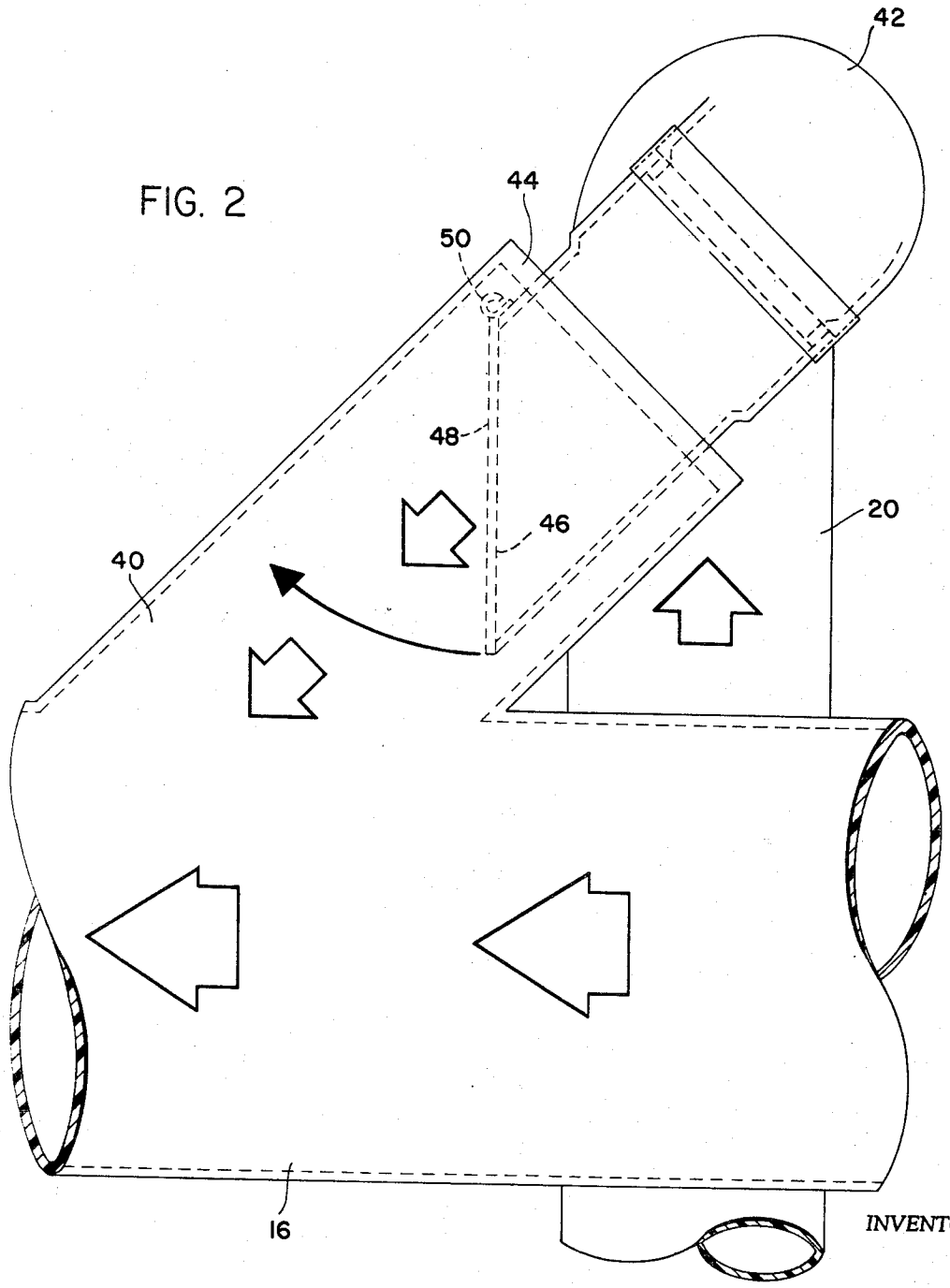
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FIG. 2



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APPARATUS FOR COLLECTING HOSIERY

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ABSTRACT OF THE DISCLOSURE

This application relates to an apparatus for collecting and sorting hosiery or socks, and more particularly to a collection system whereby an operator at an inspection station or a seaming station may selectively collect finished hose or socks from knitting machines scattered throughout a mill.

Background of the invention

In early mill operations, hose were dropped into a storage container adjacent each machine by the machine operator when knitting was completed. The hose were manually collected from the individual knitting machines and transported to a seaming station or an inspection station, where the hose were sorted according to size or style before the next operation.

With the advent of forced air conveying systems, it becams possible to eliminate the manual collection of hose from individual knitting stations by conveying them as knitting was completed to a central inspection or seaming location through a forced air conveyor tube.

Such a device is shown by U.S. Patent No. 3,129,573 issued Apr. 21, 1964, wherein is shown a collection system comprising a conveyor tube running along a bank of knitting machines. As soon as the knitting of each hose is completed the knit hose are directed from each individual knitting machine by an air blast through delivery tubes than open into a main conveyor tube containing a path of forced air and running along the length of the bank of kitting machines. At the collection end of the main conveyor tube the hose are discharged indiscriminately without regard to size or style from the conveyor tube into a collection net or other container from which they are removed periodically by a worker. This system is not entirely satisfactory, because. if the machines in the bank of knitting machines are knitting different styles or sizes of hose, as is the usual case, it is necessary to then sort the hose deposited into the collection net before the next operation. This is an expensive and time consuming operation.

Summary

The present invention, therefore, is directed to a means for eliminating the randomness by which the finished knitted hose are received at the collection station from the knitting machines.

For this purpose, the collection station, whether it be an inspection station or a seaming station, is connected to a plurality of kintting machines by a series of ducts through which a continuous current of air directs the knitted hose deposited in the ducts at the knitting machines toward the collection station. The collection station is provided with a bank of electrical switches, each switch being operatively connected to the collection box of one of the knitting machines. The operator activates the switches connected to the machines which are knitting hose or socks of the particular style or type he desires to inspect or seam, and a solenoid at each such machine opens a gate valve and allows the hosiery knit by that machine and stored in its collection box to be pneumatically conveyed to the central station.

It is therefore an object of this invention to provide an apparatus for simultaneously collecting hosiery or socks of a given designated type at a central collection station from various knitting machines throughout the plant.

It is another object of this invention to provide an apparatus whereby an operator having knowledge of the machines which are knitting a particular type of hose, may collect all of that type of hose at a central collection station.

It is a still further object of this invention to provide an apparatus whereby an operator may selectively activate several switches at a collection station corresponding to a designated group of machines among a number of machines producing a variety of sizes and styles of hose, and collect all of the hose of a given type processed at that time.

It is a still more specific object of this invention to provide an apparatus for simultaneously collecting hosiery or other light weight objects of a given designated type at a central collection station from various machines throughout the plant through a system of forced air conduits, including a branch conduit leading from each machine and a main duct communicatively connected to each branch conduit and extending to a central collection station, and a valve in each branch conduit adjacent its juncture with the main duct normally closing the branch conduit from communication with the main duct but operable to admit hose from respective branch conduits to the main duct.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds, when taken in connection with the accompanying drawings, in which—

FIGURE 1 is a somewhat schematic elevation view, with parts broken away, of a bank of knitting machines associated with the collection ssytem of the present invention.

FIGURE 2 is an anlarged view showing the valve in one of the branch conduits adjacent its connection with the main duct.

Referring more particularly to the drawings, FIGURE 1 shows a series of knitting machines K^1, K^2 and K^3 or sub-stations of any desired construction located at various points throughout a mill. Although only three machines are shown for purposes of illustration, it is to be recognized that the collection system according to the invention is intended for use with any desired number of machines collectively producing a variety of sizes and styles of hose or other light weight articels.

One end of a temporary storage chamber **22** is communicatively connected to the machine K^1 by a delivery tube **24**. When the knitting of a hose or sock is completed upon any of the knitting machines K^1, K^2, or K^3, a standard, well-known, vacuum take-down system draws the hose from the knitting machine through delivery tube **24** and into storage chamber **22** where successive hose knit by the machine are stored until directed to central collection station **10**. This invention may be used with any of a variety of commercially available take-down systems and the particular take-down system utilized is not considered to be a part of this invention.

One wall of storage chamber **22** is provided with a slot **23** through which an operator may withdraw a hose for a spot inspection. The hose may be returned to the collection box **22** through the opening in the top wall.

The lower or other end of storage chamber **22** is connected to main air duct **16** by means of a branch conduit **20**. The branch conduit **20** and main duct **16** are preferably transparent, so that an operator may determine visually whether any of the stockings are clogging the ducts. The radius of all bends and curves in duct **20** should be large enough to prevent the hose from becoming trapped.

Conduits **28** and **30** operatively connect a source of

compressed air from main air line **32** to the lower end of each storage chamber **22**, and solenoid **26** provides a means for controlling a gate valve (not shown) in conduit **28**. Solenoid **26** is electrically connected to a switch **14** at the central collection station **10** corresponding to the machine K^1, with which solenoid **26** is associated. Energization of solenoid **26** opens its associated gate valve to allow a blast of air from main air line **32** into storage chamber **22** to purge it of its knitted hose and direct them through branch conduit **20** and into the main air duct **16**.

Branch conduit **20** at its upper end **42** curves around in such a manner as to enter fitting **40** in a direction along the path of flow of air in the main air duct **16**. The fit between the upper extremity of branch conduit **20** and fitting **40** is not a tight fit, however a shoulder **44** extends between conduit **42** and the outer diameter of fitting **40** to provide essentially an air tight fit, so that air will not leak out of main duct **16**.

The end of branch duct **20** within fitting **40** is bevelled and lies in a substantially vertical plane. A valve member **48** is loosely hinged to the upper end of branch duct **20** as at **50** and provides a movable covering for the opening of take-up duct **20**, which opens to permit a stocking to enter the main conduit but closes to prevent air in the main air duct **16** from backing up into branch conduit **20** and possibly reversing the flow of the stockings. A small hole may be drilled in shoulder **44** to allow a small amount of air to escape and prevent the cover **48** from vibrating.

In operation, when blower **34** is activated to produce a draft of forced air through main air duct **16**, the pressure therein forces valve **48** into engagement with opening **46** and prevents leakage of air through main air duct **16** back down into the branch duct **20**. When solenoid **26** activates a jet of compressed air from air line **32** to induce hose to travel up the branch duct and into the main air duct **16**, the air pressure flowing through branch duct **20** is sufficient to open cover member **48** and allow the hose to enter the main air duct **16**. The upper end of branch duct **20** is confined within the fitting **40** and does not extend into the main air duct **16**, which would cause undesirable turbulence in the main duct and possible damage to the hose.

Air duct **16** as shown is one branch of a forced air conveyor system extending throughout the mill and has mounted at the end opposite collection station **10** a centrifugal blower **34**, which operates to circulate a sufficient amount of air throughout the forced air system to induce any hose that are deposited in the air duct **16** toward collection station **10**.

The collection center **10** is preferably either a seaming station or an inspection station and further comprises a control panel **12** which has mounted thereon a series of numbered switches **14**, each switch electrically connected to one of the solenoids **26** connected with each machine throughout the plant. Although FIGURE 1 illustrates 20 switches on a control panel, the number of switches provided is controlled only by the number of knitting machines feeding hosiery into the collection station; there being one switch for each knitting machine.

According to the invention, when an operator desires to inspect or seam a particular type of hose, he merely actuates one or more of the switches **14** corresponding to the machines on the floor of the mill which are at that time manufacturing the particular type of hose he desires to seam or inspect. For example switch #**1** could be connected to and operate knitting machine K. The switches may be any type of appropriate switch, however a push button type switch is preferable.

Obviously, modifications may be made within the spirit of this invention pertaining to the types of duct work and conduits, or the forced air systems which might be

used with this invention. Moreover, although the specification is directed to a system for collecting hosiery, the system of the present invention is not intended to be limited to hosiery, but might be utilized with any goods manufactured which are adaptable to be transported in a forced air duct-work system or other similar conveyor system. Likewise, although the hosiery has been described as coming from a knitting machine, it is within the scope of the invention to direct hosiery from any manufacturing station to a collection point by utilizing the system as described.

In the drawings and specification there have been set forth preferred embodiments of the invention and, although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation, the scope of the invention being defined in the claims.

We claim:

1. An apparatus for selectively collecting light weight articles at a central collection station from a plurality of sub-stations spaced from one another, said apparatus comprising:

(a) a central collection station;

(b) means associated with each sub-station and actuated from said central collection station to direct articles from said sub-station to said central collection station, said means comprising:

(i) a storage chamber associated with each sub-station and having means associated therewith for receiving articles from each sub-station;

(ii) a first conduit means connecting said storage chamber with said central collection station, said conduit means comprising a main duct conduit extending along said sub-stations to said central collection station, a branch conduit connecting each storage chamber with said main duct, a blower operatively positioned at one end of said main duct providing a continuous flow of forced air through said main duct toward said collection station, a fitting on said main duct receiving one end of each of said branch conduits and means associated with said one end of each of said branch conduits to prevent passage of air from said main duct into said branch conduits while permitting passage of air from the branch conduit into the main duct;

(iii) a second conduit operatively connecting said storage chamber to a system of compressed air; and

(iv) a valve positioned in said second conduit and controllable from said central collection station, said valve providing a means for selectively opening and closing the path of air through said second conduit to said storage chamber, so that when said valve is open, the forced air urges the articles in said storage chamber through said conduit to said central collection station.

2. The apparatus according to claim **1** wherein said last-named means comprises a valve member within said fitting and normally closing its respective branch conduit from communication with said main duct but hinged to open to allow articles to enter the main duct from the branch conduit.

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