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STOCKING AND SOCK CHECKING MACHINE

Filed March 4, 1963

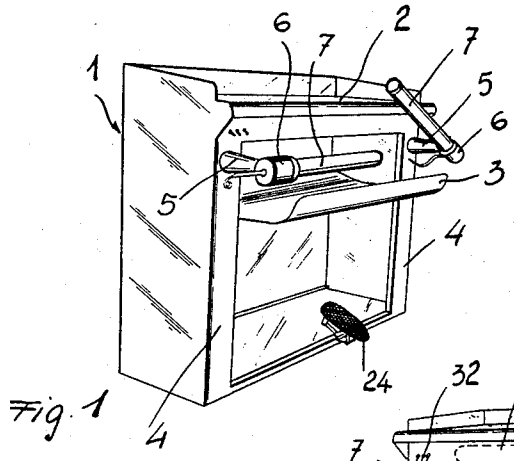


Fig. 1

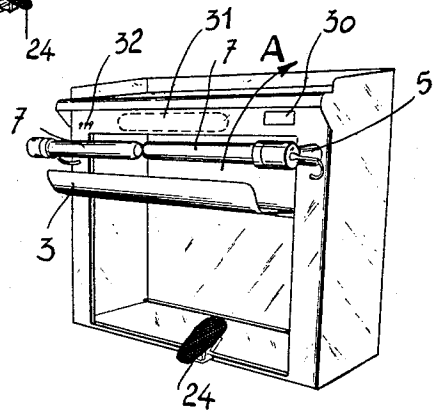


Fig. 2

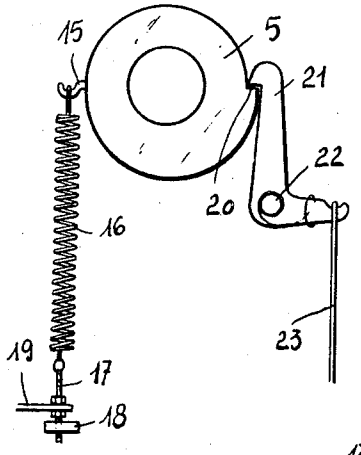


Fig. 4

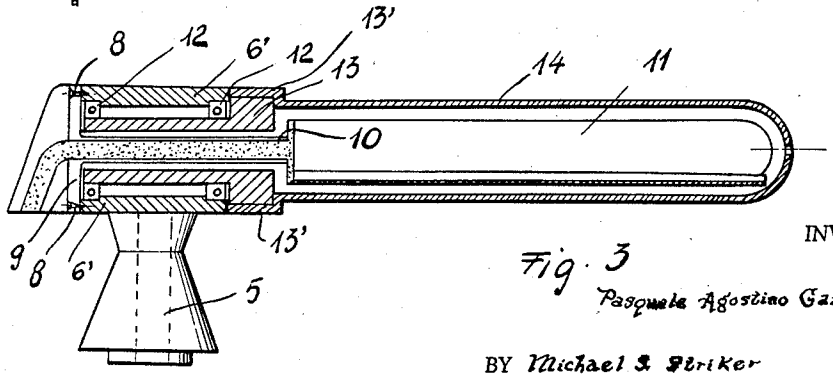


Fig. 3

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STOCKING AND SOCK CHECKING MACHINE

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8 Claims. (Cl. 223—41)

This invention relates to a machine comprising two cantilever revolving cylinders, made of a transparent material and fitted with a light source in their inside, one of said cylinders (which are arranged in opposition to each other) being tiltably mounted and designed to allow a running inspection and check of manufactured articles, and in particular of stockings and socks, by inspecting both the right and the wrong sides i.e. outside and inside thereof in one inspecting operation only.

Such stockings and socks, as are manufactured on automatic, high duty circular knitters, are presently inspected one by one by workwomen which slip them over automatically revolving tubes, that allow the finished socks or stockings to be inspected on one side only at a time, i.e. either on the right side, or on the wrong side.

Inspecting machines comprising one revolving tube only, not fitted with an internal light source, and having an open sucking end, in order to have the sock automatically overturned, are already known.

However, by means of such conventional arrangement it is not possible to inspect the right side of e.g. a finished sock, when the latter is slipped over said tube with the wrong side out, or vice-versa, unless the operation is performed twice so as to locate any possibly existing defect.

Moreover, the already known machines are particularly complex and expensive, without however meeting all requirements from the viewpoint of operational efficiency, and above all they do not allow to attain an operating speed equal to that of the machine according to the invention, wherein even the slightest defect is made manifest at once to the inspector by the inside lighting of the respective tubes, thus speeding-up the inspection and checking operations.

The above drawbacks are obviated by this invention by providing a particularly simple and efficient inspecting machine, having two cantilever tubes normally horizontally aligned with one another, at least one being tiltably supported at one of its ends, so that the latter can be caused to swing to a displaced positon by means of a foot lever control. Such tubes can be rotated about their own axes, e.g. by hand, and are lighted from the inside, or from the outside, to make clearly manifest all possibly existing defects.

The operation of such machine is substantially as follows: after the titltably supported cantilever tube has been swung upwardly, a stocking is slipped over it with the wrong side out; then said tube, after having been brought back to its horizontal position is turned by hand, to inspect the stocking from its wrong side, whereupon said stocking is overturned by hand by slipping it over onto the other tube, so as to expose now the right side of it.

This invention will be better understood from a consideration of the following detailed description, taken with the accompanying drawing, both description and drawing being given only as a not restrictive example. In the drawing:

FIG. 1 is a perspective view of an inspecting machine according to the invention, with one of the cantilever tubes swung upwardly.

FIG. 2 is a perspective view of the same machine with both cantilever tubes aligned with each other.

FIG. 3 is a partly sectioned view of the details of rotary tube structure.

FIG. 4 shows a possible arrangement of a device, consisting of biasing means, arresting means and a foot lever controlled release, for the swinging of the one cantilever tube from the position of FIG. 2 to that of FIG. 1.

The machine according to the invention and as shown by FIGS. 1 and 2, comprises an upright frame, generally indicated at **1**, having an upper table platform **2**, and a collecting tray **3**, fitted between the side pillars **4** which are separated by a wide space. Two studs **5** are mounted near the top ends of said pillars, at least one of said studs being rotatable with respect to said frame and operable by a mechanism which will be described in more detail later.

Two separate tubes **7**, closed at one end and facing each other at said closed ends; are cantilever supported by sleeves **6**, respectively, that are secured to the end of the studs **5**, respectively.

More precisely, as shown by FIG. 3, a fixed plate or flange **9** is secured, e.g. by means of the screws **8**, to a sleeve **6'**, that is secured to the end of stud **5**. An elongated lamp **11**, e.g. a neon tube, is fitted on a lamp holder **10**, which is supported by said stationary flange **9**. A rotary tube or casing **14**, which might be e.g. of glass or of a translucent synthetic material, surrounds the neon tube **11** and is supported at one end thereof, by a sleeve **13** that, in turn, is fitted, e.g. by means of ball bearings **12**, into the inside of sleeve **6'**. It should be noted that the end of sleeve **13** is shaped in such a manner as to be able to accommodate, e.g. by a bayonet coupling, the ends **13'** of casings or tubes **14** of different diameters, so that the latter are interchangeable, according to the size of socks or stockings to be inspected.

One of the cantilever tubes **7**, e.g. the right one, is tiltably mounted on the pillar **4** by a rotatable support pin **5** (FIG. 3), that is equipped with a hook **15** (FIG. 4). The prestressing of a spring **16**, that is hooked at its upper end onto said hook **15**, can be adjusted by means of nuts abutting against a stationary frame member **19** and screwed on a threaded tension rod **17** which is secured to the lower end of said spring **16**. The supporting stud **5** is moreover formed with a projecting tooth **20**, that is designed to be engaged by the end **21** of a lever pivoted at **22**, and that can be operated, e.g. through a tension rod **23**, by a foot lever **24** (FIGS. 1 and 2), which is connected in any suitable manner with said tension rod **23**.

Thus, by depressing the foot lever **24**, whereby the tooth **20** is released from lever **21**, the cantilever tube is permitted to tilt upwardly in the direction of arrow A due to the action of spring **16**, whose pre-stressing is to be suitably adjusted in order that no abrupt shocks may be suffered by the neon tube.

The operation of this inspecting machine may be briefly described as follows: by depressing the footlever **24**, the right cantilever tube **7** is swung upwards, and a stocking is slipped thereon with the wrong side out by the inspector. Then said tube is brought back by hand to its horizontal position, against the action of spring **16**, and locked in this position by means of the tooth **20**, whereupon this tube **7**, lighted from the inside by the neon tube **11**, is turned by hand, and the stocking is inspected for possible defects by the inspector. This same stocking is then overturned by slipping it onto the adjacent other tube **7**. Such operation can be carried out easily by the inspector, owing to the spherical shape of the tube ends, and to the small space between the opposing closed ends of the tubes. Thus, the right side of the stocking can also be inspected while the latter is on the second tube **7** whereafter, by depressing again the footlever **24**, the right tube is swung once more upwards, and the fully inspected stocking is withdrawn from the second tube **7** by taking it by the foot,

thus making the machine ready for a further checking operation.

Moreover, the machine might be equipped with auxiliary attachments, e.g. with a pick counter 30, operated in known manner by the swinging tube 7, so as to indicate the number of inspected stockings to the operator or to warn her when e.g. twenty four stockings (i.e. a dozen of pairs) have been inspected.

In addition, the machine might be fitted with a lamp 31 shown by dotted lines in FIG. 2, and located under the upper table platform 2, in order to light the stocking that is being inspected, e.g. through a translucent portion of the frame, from the outside. Such lamp is particularly useful for the inspection of the right side of stocking. Obviously, the lamps 31 and 11 might be switched-on and off by independent switches 32, located e.g. on the front panel, within easy reach of the inspector.

Obviously, many modifications and variations of the present invention, as may be readily conceived by a person skilled in the art, are possible in the light of the above teachings. Therefore, it is to be understood that the invention is not limited in its application to the details specifically described or illustrated, and that within the scope of the appended claims, it may be practised otherwise than as specifically described or illustrated.

What I claim is:

1. A device for inspecting both the inside and the outside of stockings, comprising, in combination,

a frame;

a first tubular member of predetermined length and diameter and made mainly of light-permeable material and having one rounded closed end;

first support means mounted in fixed position on said frame for rotarily supporting said first tubular member so as to permit rotation of the latter substantially about its longitudinal axis;

first light source means arranged inside said first tubular member for transilluminating the latter;

a second tubular member of predetermined length and diameter and made mainly of light-permeable material and having one rounded closed end;

second support means tiltably mounted on said frame for rotarily supporting said second tubular member so as to permit rotation of the latter substantially about its longitudinal axis, said second support means being itself tiltable between a first position in which said second tubular member is substantially aligned axially with said first tubular member, with said rounded end of said first tubular member facing at close distance said rounded end of said second tubular member, and a second position in which said axis of said second tubular member is angularly displaced relative to said axis of said first tubular member;

biasing means continuously urging said second support means into said second position thereof;

arresting means for holding said second support member in said first position thereof against the action of said biasing means; and

release means for temporarily eliminating the action of said arresting means so as to permit said second support means automatically to assume said second position thereof.

2. A device for inspecting both the inside and the outside of stockings, comprising, in combination,

a frame;

a first tubular member of predetermined length and diameter and made mainly of light-permeable material and having one rounded closed end;

first support means mounted in fixed position on said frame for rotarily supporting said first tubular member so as to permit rotation of the latter substantially about its longitudinal axis;

first light source means arranged inside said first tubular member for transilluminating the latter;

a second tubular member of predetermined length and diameter and made mainly of light-permeable material and having one rounded closed end;

second support means tiltably mounted on said frame for rotarily supporting said second tubular member so as to permit rotation of the latter substantially about its longitudinal axis, said second support means being itself tiltable between a first position in which said second tubular member is substantially aligned axially with said first tubular member, with said rounded end of said first tubular member facing at close distance said rounded end of said second tubular member, and a second position in which said axis of said second tubular member is angularly displaced relative to said axis of said first tubular member;

biasing means continuously urging said second support means into said second position thereof;

arresting means for holding said second support member in said first position thereof against the action of said biasing means; and

release means operable by foot action for temporarily eliminating the action of said arresting means so as to permit said second support means automatically to assume said second position thereof.

3. A device according to claim 1 wherein a counting device is operatively coupled with said second support means for indicating the number of consecutive movements of said second support means from said second position to said first position and back to said second position.

4. A device according to claim 3 wherein said tubular members are each removably mounted on said support means, respectively, so as to be interchangeable against other tubular members of differing dimensions.

5. A device according to claim 2, wherein a counting device is operatively coupled with said second support means for indicating the number of consecutive movements of said second support means from said second position to said first position and back to said second position.

6. A device according to claim 5 wherein said tubular members are each removably mounted on said support means, respectively, so as to be interchangeable against other tubular members of differing dimensions.

7. A device according to claim 1 wherein said tubular members are each removably mounted on said support means, respectively, so as to be interchangeable against other tubular members of differing dimensions.

8. A device according to claim 2 wherein said tubular members are each removably mounted on said support means, respectively, so as to be interchangeable against other tubular members of differing dimensions.

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