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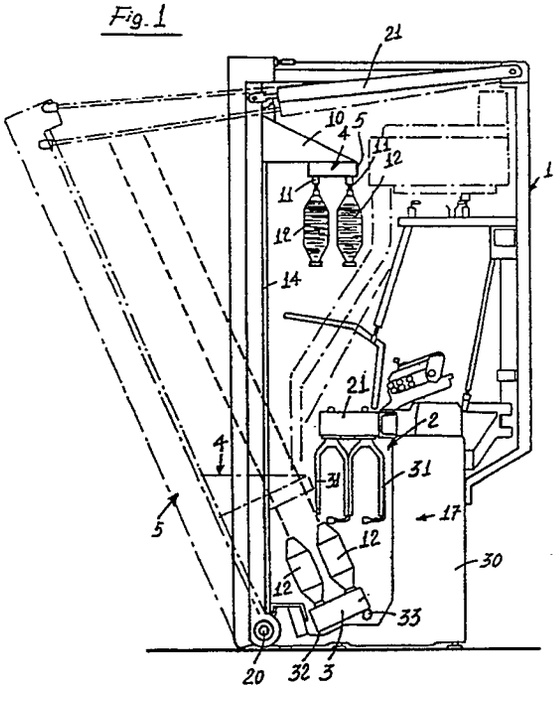
(54) Apparatus for removing bobbins from roving frames and replacing the removed bobbins with empty tubes.

(57) The present invention relates to an apparatus for automatically removing bobbins from roving frames and replacing the removed bobbins with empty tubes, the apparatus including an endless conveyor 4 for removing the bobbins 12 and releasing empty tubes, 12 which is movably supported by a swinging wing member 5 so as to move in a direction substantially perpendicular to the conveyor extension.

The conveyor 4 cooperates with a tilting bobbing bearing carriage 3 arranged under a flyer bearing frame 2.

The bobbin bearing carriage 3 can be driven to a substantially horizontal position, for forming the bobbins, through the flyer bearing frame 2, and a slanted position for removing the formed bobbins 12 and replacing them with empty tubes 12, by means of the endless conveyor 4.

Fig. 1



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APPARATUS FOR REMOVING BOBBINS FROM ROVING FRAMES AND REPLACING THE REMOVED BOBBINS WITH EMPTY TUBES

BACKGROUND OF THE INVENTION

The present invention relates to an automatic apparatus for removing bobbins from roving frames and replacing the removed bobbins with empty tubes to be filled with roving.

For example, in the Italian Patent Application No. 22137 A/87, filed on October 2, 1987, in the name of the same Applicant, and which is herein enclosed by reference, there is disclosed an apparatus substantially comprising and endless conveyor thereon there are arranged, at even spacings, expanding grippers for removing the formed or full bobbins, and other grippers for releasing empty tubes on the bobbin bearing carriage.

In order to perform the replacement operations, the bobbin bearing carriage was adapted to be driven on a substantially horizontal surface, so as to be located, depending on the operating step, under the flyer bearing frame or near the mentioned conveyor to cooperate therewith.

This apparatus is rather complex constructionwise mainly with respect to the driving gears for driving the bobbin bearing carriage which must move laterally of the flyer bearing frame in order to allow the formed bobbins to be removed and replaced with empty tubes.

SUMMARY OF THE INVENTION

Accordingly, the aim of the present invention is to overcome the above mentioned drawback, by providing a new automatic apparatus for removing bobbins from roving frames and replacing removed bobbins with empty tubes in which the bobbin bearing carriage can be disengaged from the flyer bearing frame without the need of subjecting the bobbin bearing carriage to a translation movement.

Within the scope of the above aim, a main object of the present invention is to provide such an apparatus which operates with a very high operating speed, thereby greatly reducing the time necessary for removing the bobbins and replacing them with empty tubes.

Another object of the present invention is to provide such an apparatus which can be easily constructed starting from easily available elements and materials and which, moreover, is very competitive from a mere economic standpoint.

According to one aspect of the present invention, the above mentioned aim and objects, as well as yet other objects, which will become more apparent hereinafter, are achieved by an automatic apparatus for removing bobbins from roving frames and replacing the removed bobbins with empty tubes, characterized in that said apparatus comprises an endless conveyor for removing said bobbins and feeding empty tubes, said conveyor being movably supported, so as to be displaced in a direction perpendicular to the extension thereof, by a swinging supporting structure, said conveyor cooperating with a tilting bobbin bearing carriage arranged under a flyer bearing frame, said bobbin bearing carriage being adapted to be driven to a substantially horizontal position, for forming said bobbins, through said flyer bearing frame, and a slanted position, for removing formed bobbins and replacing said formed bobbins with empty tubes, through said endless conveyor.

BRIEF DESCRIPTION OF THE DRAWINGS

Further characteristics and advantages of the present invention will become more apparent from the following detailed disclosure of a preferred, though not exclusive, embodiment of an automatic apparatus for removing bobbins from roving frames and replacing removed bobbins with empty tubes, according to the invention, which is illustrated, by way of an indicative but not limitative example, in the figure of the accompanying drawings which schematically shows a preferred embodiment of the automatic apparatus according to the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to the figure of the drawing, the automatic apparatus for removing bobbins from roving frames and replacing the removed bobbins with empty tubes according to the invention, comprises a framework 1 supporting a flyer bearing frame, of a substantially known type, and which has been overally indicated at the reference number 2.

Under the flyer bearing frame 2 there is arranged a bobbin bearing carriage 3 which cooperates with an endless conveyor, overally indicated at the reference number 4, and which can be displaced on a swinging wing 5.

More specifically, the endless conveyor 4, which is substantially of the type disclosed in the above mentioned Italian Patent Application, is supported by supporting plates 10 which are slidably mounted, through sliding guides, on the wing 5 so as to allow the endless conveyor 4 to move along a direction which is substantially perpendicularly to the laying plane of said endless conveyor 4.

The endless conveyor 4 is provided, at even spacings, with bobbin gripping devices, such as, for

example, expanding grippers, indicated at 11, the axis of which is downward facing, and which operate to engage from inside the bobbins, indicated at the reference number 12, or possible empty tubes.

A main feature of the present invention is that the wing 5 bearing the endless conveyor can swing about a substantially horizontal axis and perpendicular to the driving direction of the endless conveyor 4.

The wing 5 bearing said endless conveyor is pivoted at 20, at the bottom portion of the framework 1.

On the top there are provided pneumatic or hydraulic pistons 21 for causing said wing 5 to swing according to a preset sequence.

Advantageously, the bearing wing 5 can be tilted through an angle from 0° (vertical position) to 45° in order to remove, as it will become more apparent hereinafter, the bobbins 12 formed on the bobbin bearing carriage 3 and to replace the removed bobbins with empty tubes.

The bobbin bearing carriage is coupled to a supporting frame 30 of the flyer bearing frame 2, so as to slide in order to bring the tubes to cooperate with the flyers, indicated at 31, for forming the roving.

Said bobbin bearing carriage is pivoted at one end thereof 32, and on the fixed framework of the apparatus there is provided a fixed abutment 33 which, as the bobbin bearing carriage is displaced to a lower position, causes said carriage to be outward tilted.

More specifically, the bobbin bearing carriage is tilted through an angle which corresponds to the opening angle of the wing 5 bearing the endlees conveyor, so that this conveyor 4 can be displaced downward, without interfering against the flyer bearing frame, to remove formed bobbins, in an automatic way, and replace removed bobbins with empty tubes.

In operation, as fully bobbins have been formed, at the flyer bearing frame, the bobbin bearing carriage will be caused to lower so as to disengage the bobbins from the flyers and, during its downward stroke, said carriage will outward rotate because of its engagement against the fixed abutment arrangement.

Correspondingly, the endless conveyor 4, which is coupled to the mentioned wing 5, which latter is tilted through an angle corresponding to the tilting angle of the bobbin bearing carriage, will be lowered so as to engage the empty bobbin gripping devices with the bobbin, to restrain said bobbins to said grippers and thereby removing said bobbins at the top position of the panel or plate 10.

In a next operation step, the conveyor belt, after having been displaced for a distance corresponding to the distance between two gripping devices or grippers, will be downward displaced again to the bobbin bearing carriage, in order to arrange the empty tubes engaged on the grippers 11 of the conveyor 4 on said carriage.

Then, by raising again, the carriage will be arranged again at a horizontal position thereby allowing new empty tubes to be engaged under the flyers, for forming new bobbins.

Then, the conveyor will be again displaced to the top position thereof, for discharging formed bobbins and engaging empty tubes.

During the operation step in which the bobbins are discharged from the endless conveyor, the mentioned wing will be advantageously returned to a closure position.

From the above disclosure, it should be apparent that the invention fully achieves the intended aim and objects.

In particular the fact is to be pointed out that, by exploiting the swinging movements of the swinging wing and bobbin bearing carriages, it is possible to remove formed bobbins and replace them with empty tubes in a very reduced time and simple way.

While the invention has been disclosed and illustrated with reference to a preferred embodiment thereof, it should be apparent that the disclosed embodiment is susceptible to several modifications and variations all of which will come within the spirit and scope of the appended claims.

Claims

1. An automatic apparatus for removing bobbins from roving frames and replacing the removed bobbins with empty tubes, characterized in that said apparatus comprises an endless conveyor, for removing bobbins and feeding empty tubes, said endless conveyor being movably supported by a swinging wing, so as to be displaced in a direction substantially perpendicular to the laying plane of said endless conveyor, said endless conveyor cooperating with a tilting bobbin bearing carriage arranged under a flyer bearing frame, said bobbin bearing carriage being adapted to be driven to a substantially horizontal position, for forming bobbins through said flyer bearing frame, and a slanted position, for removing formed bobbins and replacing removed formed bobbins with empty tubes, through said endless conveyor.

2. An apparatus according to claim 1, characterized in that said wing bearing said conveyor or is pivoted at a bottom end portion thereof about an axis which is substantially horizontal and substantially perpendicular to the displacement direction of said endless conveyor.

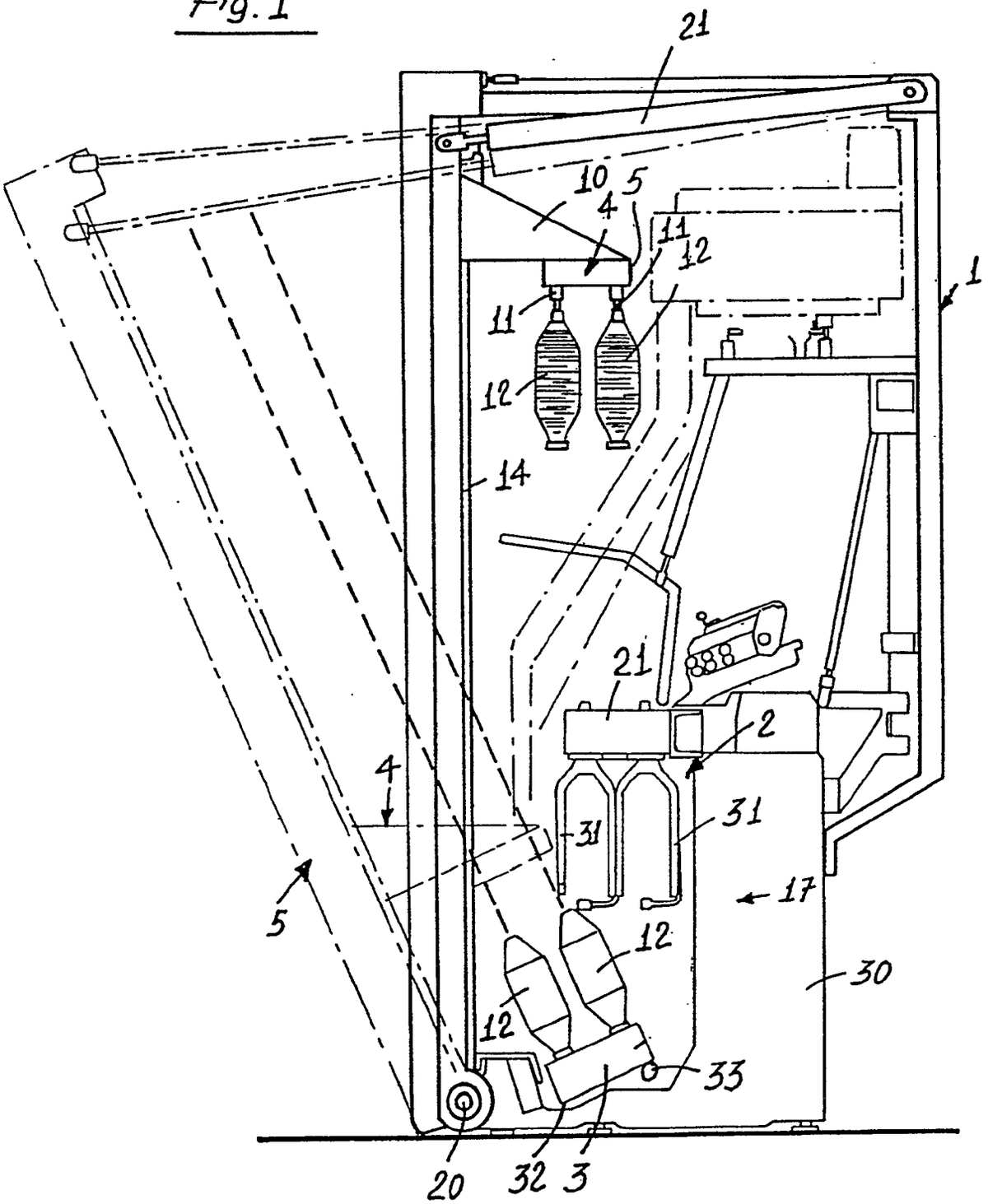
3. An apparatus according to one or more of the preceding claims, characterized in that said endless conveyor is supported by supporting plate members which are slidably guided on the wing sup-

porting said conveyor.

4. An apparatus according to one or more of the preceding claims, characterized in that said endless conveyor supporting wing is swingably driven by a piston arranged between the top portion of the apparatus framework and the top end portion of said conveyor bearing wing.

5. An apparatus according to one or more of the preceding claims, characterized in that said bobbin bearing carriage is pivoted, at one end thereof, onto raising means adapted to displace said carriage to and from said flyer bearing frame, said apparatus fixed framework including a fixed abutment arranged at a higher level than the level which can be reached by the pivot zone of said bobbin bearing carriage.

Fig. 1



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EUROPEAN SEARCH REPORT

Application Number

EP 90 83 0447

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Y,D	EP-A-0310568 (FRATELLI MARZOLI) * the whole document *	1	D01H9/04
A		3	
Y	DE-A-3702265 (FRATELLI MARZOLI) * column 7, lines 38 - 53; figures 1-8 *	1	
A		2, 4	
A	FR-A-2434878 (ZINSER) * figures 1-4 *	1	
A	DE-A-2521057 (FRATELLI MARZOLI) * the whole document *	1	
A	WO-A-8100264 (RIETER)		

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

D01H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	27 FEBRUARY 1991	RAYBOULD B.D.J.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
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E : earlier patent document, but published on, or after the filing date
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