June 16, 1931. H. BUDDECKE 1,810,754

BOBBIN CHANGING DEVICE

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Fig. 1.

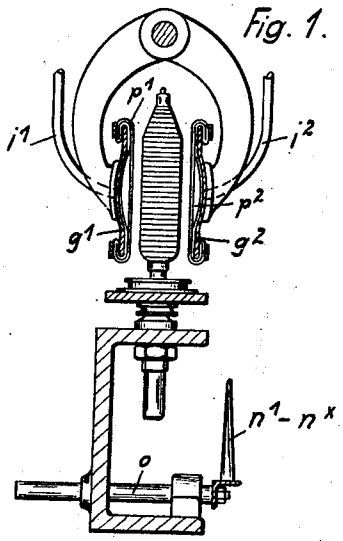


Fig. 2.

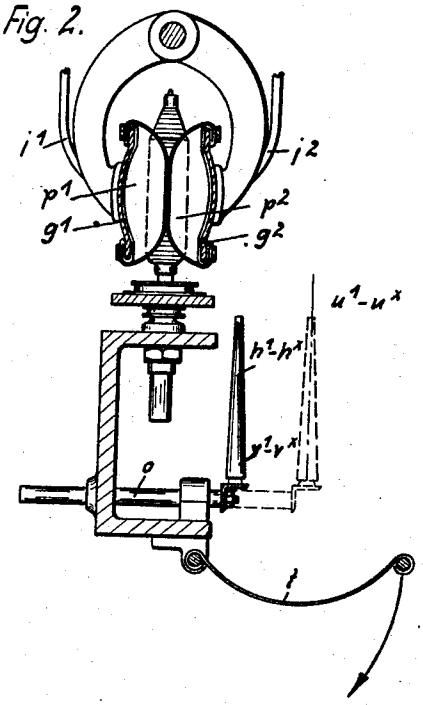


Fig. 3.

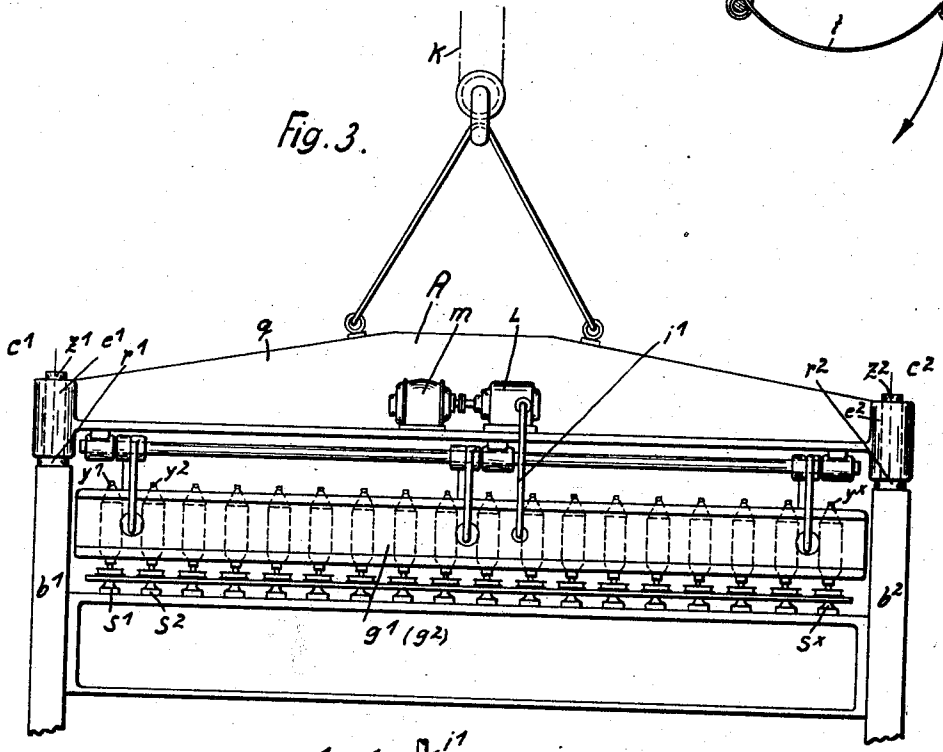
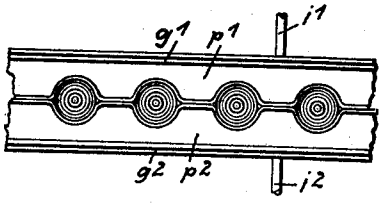


Fig. 4.



Inventor:
Heinrich Buddecke
By Lueo Pomeltke
Attorney.

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Fig. 5.

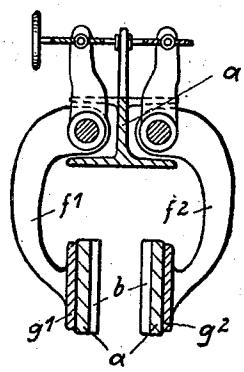


Fig. 8.

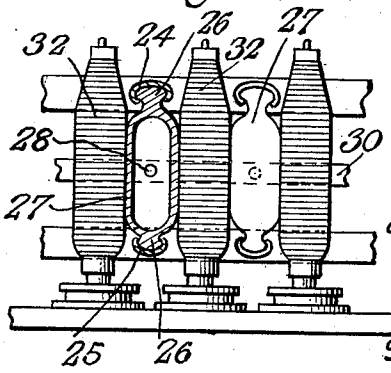


Fig. 6

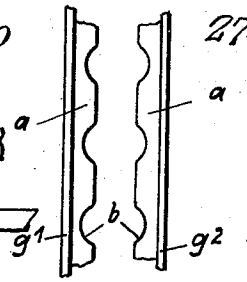


Fig. 9.

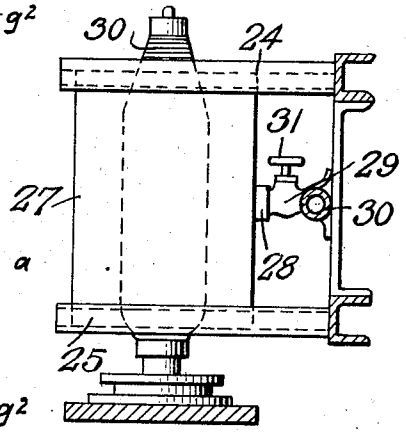
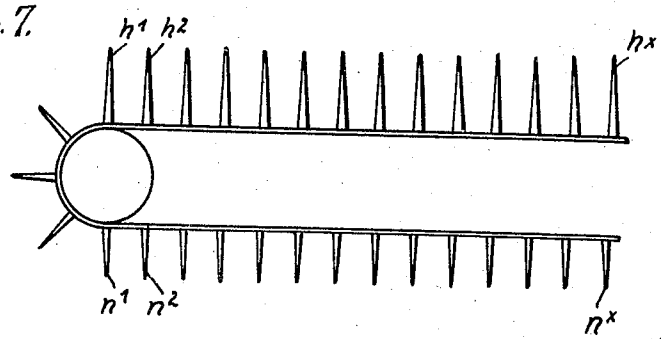


Fig. 7.



Inventor:
Heinrich Buddecke
By Louis Daniels
Attorney.

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UNITED STATES PATENT OFFICE

HEINRICH BUDDECKE, OF CHEMNITZ, GERMANY

BOBBIN CHANGING DEVICE

Application filed April 5, 1929, Serial No. 352,763, and in Germany December 31, 1927.

I have filed applications in Germany on Dec. 31, 1927, and Switzerland on Mar. 31, 1929.

The present invention relates to a bobbin changing device in winding and twisting frames, as well as in spinning machines, and has for its object to facilitate and accelerate the removal of the full bobbins and cops and their replacement by empty ones.

The doffing of full bobbins or cops in winding frames, spinning machines or twisting frames usually takes place by hand and requires therefore much time. Moreover, the machine has to be stopped while this work is going on, which means a considerable reduction in output. On the other hand, to shorten the stopping time of the machine, more labor is required at a correspondingly increased cost.

The present invention aims at the rapid removal of the full bobbins or cops and at their equally rapid replacement by the empty tubes by providing padded grippers for stripping the bobbins in a very careful yet effective manner from the spindles or shanks.

Several embodiments of the invention are illustrated in the accompanying drawings, in which:

Figure 1 is a vertical cross-section of a bobbin changing device before the gripping of the bobbin;

Fig. 2 is a view of the same device after the gripping of the bobbin;

Fig. 3 is a front view of a spinning machine provided with the device according to the invention;

Fig. 4 is a ground plan of the bobbin changing device;

Fig. 5 is a side view, partly in section, of a modified bobbin changing device;

Fig. 6 is a plan view of the gripper of Fig. 5;

Fig. 7 is a side view of a transport arrangement for the spools;

Fig. 8 is a side view of a modification of the creel and delivery band; and

Fig. 9 is an end section of the device of Fig. 8.

Referring to the drawings, and particularly to Fig. 3, the bobbin changing device is preferably suspended from a portable crane k and consists of the gripper cheeks g', g^2 extending along the machine and being provided with the hollow rubber bodies p', p^2. The latter can be inflated so as to grip the cops or bobbins laterally and to pull them from the spindles when the crane is raised and to convey them into a collector t where the cops or bobbins are freed from the grip of the hollow bodies owing to their deflation and drop down. According to the invention, instead of cops, the empty tubes may be removed from a creel n'—n^x corresponding to the spindle gauge of the machine in order to be put on the spinning spindles uniformly and simultaneously. The amount of air pressure within the hollow rubber bodies p', p^2, which may be fluted and covered with plush or a similar fabric to facilitate the gripping of the bobbins or tubes to be exchanged, determines whether the bobbins or tubes are pressed considerably or gripped softly and slidingly.

Fig. 3 illustrates a spinning machine A having any number of spindles s'—s^x. The side walls b' and b^2 of the machine are provided with two cylinders z' and z^2 secured, respectively, to the slides r' and r^2. These slides may be arranged in two different positions relative to the machine frame either by arranging the vertical axes c' and c^2 of the cylinders z' and z^2 on the same plane with the vertical axes of the spindles y'—y^x or by pushing them forward until the cylinder axes c' and c^2 are on a plane with the vertical axes u'—u^2 where the empty bobbins v'—v^x ready to be stripped are found.

Two slide bearings e' and e^2 are arranged at both ends of a cross beam q carrying a motor m coupled with an air pump l. The beam q supports further two gripper cheeks g' and g^2 extending alongside the machine and being kept at a predetermined, invariable distance from one another by their carrying levers. The cheeks are provided on their insides with the hollow rubber bodies p' and p^2, one for each cheek, each of these hollow bodies can be separately closed airtight and is connected with the air pump l by the hose i' or i^2.

The device functions as follows:

On top of the spinning machines, winding and twisting frames, the changing device described is suspended from a crane k which can travel over any machine in the known manner. In order to remove the full cops on one side of a machine, the device is moved to the side concerned and the slide bearings e' and e^2 of the cross beam q are caused to drop on the cylinders z' and z^2 which are now on the plane of the spindle axes $y'—y^x$ so that the gripper cheeks g' and g^2 move very closely past the cops and in such a way that the latter are enclosed on both sides by the hollow rubber bodies p' and p^2 (Fig. 1). Then the motor m is started to inflate both hollow bodies p' and p^2 uniformly and the enclosed cop is gripped more firmly (Figs. 2 and 4), the pressure within the hollow bodies being capable of regulation to suit requirements.

When the cops are enclosed by the hollow rubber bodies, the cross beam q is raised again by the crane k and moved forward until it occupies a position above the collector t. The raising of the beam has had the effect of stripping all full cops from their spindles $s'—s^x$, and if the air is permitted to escape from the hollow rubber bodies, the latter will return to their initial position as shown in Fig. 1, and the full cops will drop into the collector t.

The next thing to do is to draw out the rail with the shanks $n'—n^x$ after the empty tubes $h'—h^x$ have been previously put on the shanks which are equal in number to the spindles $y'—y^x$ and arranged at the same distance from one another as the latter. The rail carrying the shanks $n'—n^x$ is supported by the bolt o slidingly arranged on the machine frame.

The beam q is then moved over the cylinders z' and z^2 which are now in adjustment with the axes $u'—u^x$ of the shanks $n'—n^x$, and the same process described with respect to the full cops is repeated with the difference, however, that now the empty tubes $v'—v^x$ are gripped and lifted by the beam q, whereupon the latter with the cylinders z' and z^2 is brought again on a plane with the spindles $y'—y^2$ so that the empty tubes are above the empty spindles. If the beam is lowered, the tubes will be pressed on the spindles, the air is permitted to escape from the hollow rubber bodies, and the machine is ready for operation after the cross beam q is raised again.

The superior features of the invention reside in the fact that two persons are able to remove the bobbins of a machine of any length within a very short time and in a highly convenient manner. The rubber prevents the material from being damaged, and it becomes unnecessary to pay particular attention to the gauge, as the rubber will adapt itself to any spindle distance. Moreover, the device according to the invention makes it possible, owing to the softness of the rubber, to place the tubes softly as by hand yet perfectly firmly on the spindles, though it is necessary to employ a crane.

The device described may be modified in many ways, and the invention is, for example, not restricted to the use of rubber hollow bodies. Figs. 5 and 6 show the gripper cheeks equipped with the pads a which may consist of velvet or sponge rubber or of a velvet cover filled with sponge rubber. The pads may be either smooth or possess the depression b corresponding to the gauge of the spindles. If the cheeks g' and g^2 are provided with non-inflatable pads, they must be secured to the carrying levers f' and f^2 swingingly attached to the beam q and adjustable by hand wheel and spindle or the like, as indicated in Fig. 5.

In order to employ hollow rubber pads, two rows of holders 24 and 25 are used, as shown in Figs. 8 and 9, one of them (24) being within reach of the upper ends of the bobbins and the other (25), within reach of the lower ends. The holders 24 and 25 have the form of slotted tubes, whereby the slotted sides of the holders face one another, and receive the broadened attachments 26 of the rubber pads 27, as clearly shown in Fig. 8. To the center of each rubber pad a tubing attachment 28 is connected which can be slipped over a nipple-like connection 29 laterally screwed into the air supply pipe 30, as indicated in Fig. 8. It is advisable to provide each nipple with a shut-off screw 31 for shutting off leaky pads and preventing excessive loss of air. The device just described is used in the manner explained in detail with reference to Figs. 1 and 2. The pads 27 are inserted between the various bobbins in non-inflated condition, i. e., as a thin layer, whereupon they are inflated by opening the air supply for the pipe 30 so that they firmly grip the bobbins or cops 32 between them. By lifting the firmly interconnected rows of grippers 24 and 25 the pads 27 as well as the bobbins or cops 32 caught by them are caused to cooperate in the movement and stripped.

The collector t may have the form of a delivery band or transport arrangement guided over two rollers, only one of which is shown, the rotation of which will guide the doffed bobbins to one side of the machine. Furthermore, the shanks $n'—n^x$ of the creel for the empty tubes can be arranged instead of on a fixed rail on an endless band or chain passing over rolls or sprockets so that the empty tubes may be put on the shanks on one side of the machine, an arrangement of this type being shown in Fig. 8. Such a device could be used further for putting the bobbins removed from the spindles $y'—y^x$ on a row of empty shanks $n'—n^x$ and, by turning the driving pulley for the endless band, replace

the row of shanks carrying the full bobbins by the lower row of shanks on which the empty tubes have been previously put so that the latter could be caught by the gripper cheeks and fed to the spindles.

I claim:—

1. A bobbin changing device for spinning machines, winding and twisting frames, comprising vertically adjustable grippers for seizing the bobbins prior to their removal from the spindles; and rubber pads provided on the said grippers to insure uniform seizing of the bobbins.

2. A bobbin changing device for spinning machines, winding and twisting frames, comprising vertically adjustable grippers for seizing the bobbins prior to their removal from the spindles; and inflatable hollow rubber bodies attached to the grippers to insure uniform seizing of the bobbins.

3. A bobbin changing device for spinning machines, winding and twisting frames, comprising a plurality of gripper cheeks mounted on the machine and adapted to be raised; and an inflatable rubber body on each cheek adapted to grip the bobbins when inflated.

4. A bobbin changing device for spinning machines, winding and twisting frames, comprising a plurality of gripper cheeks mounted on the machine and adapted to be raised; and a hollow rubber body on each cheek adapted to be filled with air and to be regulated as to the pressure of the air, said body being adapted to grip the bobbins.

5. A bobbin changing device for spinning machines, winding and twisting frames, comprising vertically adjustable grippers for seizing the bobbins prior to their removal from the spindles; and sponge rubber pads provided on the said grippers to insure uniform seizing of the bobbins.

In testimony whereof I have affixed my signature.

HEINRICH BUDDECKE.