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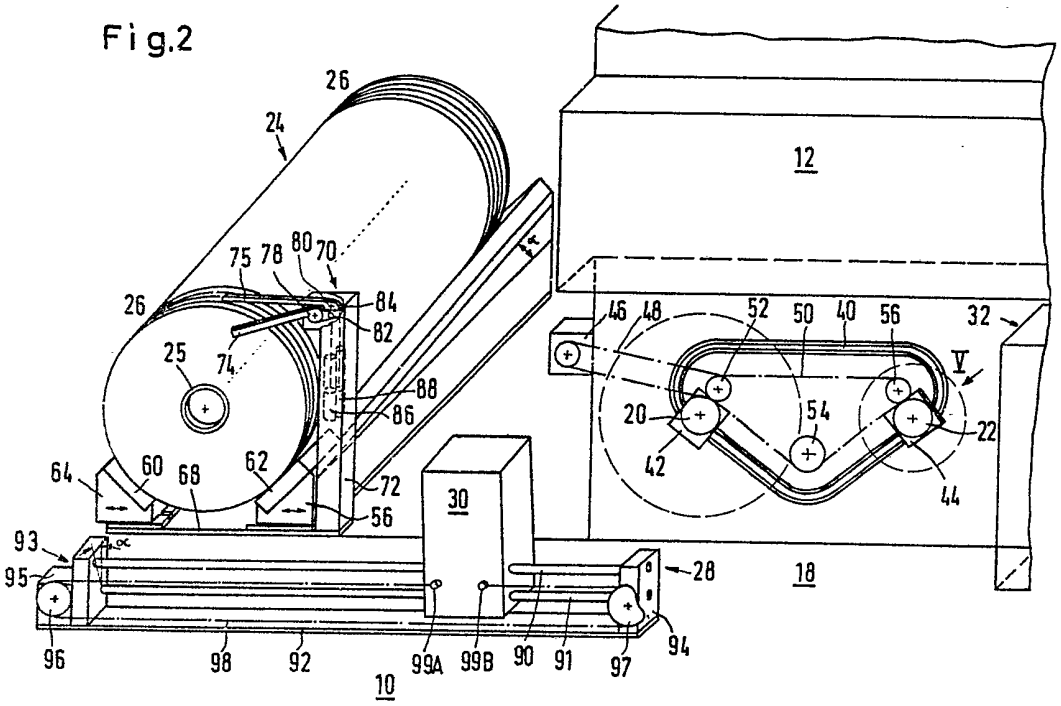
(54) **Method and device for web roll storing and changing in cigarette making machines**

(57) Method and device for the automatic feeding of a cigarette making machine with a paper tape from a number of bobbins via a bobbin-change mechanism comprising two bobbin spindles (20, 22) mounted on support elements for free running and displaceable to predetermined working positions interchanged during each bobbin change step. The method and device includes a conveyor having a bobbin magazine (24), located externally of a bobbin-change mechanism (18) and extending transversely to the rear from a plane which coincides with the working plane of the bobbin-change mechanism, for a row of full paper bobbins (26). Moreover it includes a gripping and drawing-off device (30) which, for taking empty bobbins from and feeding full bobbins to the bobbin-change mechanism, can be moved along a guide (28) located in front of the working plane of the change mechanism (18) and the bobbin magazine (24).

Fig.2



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The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.

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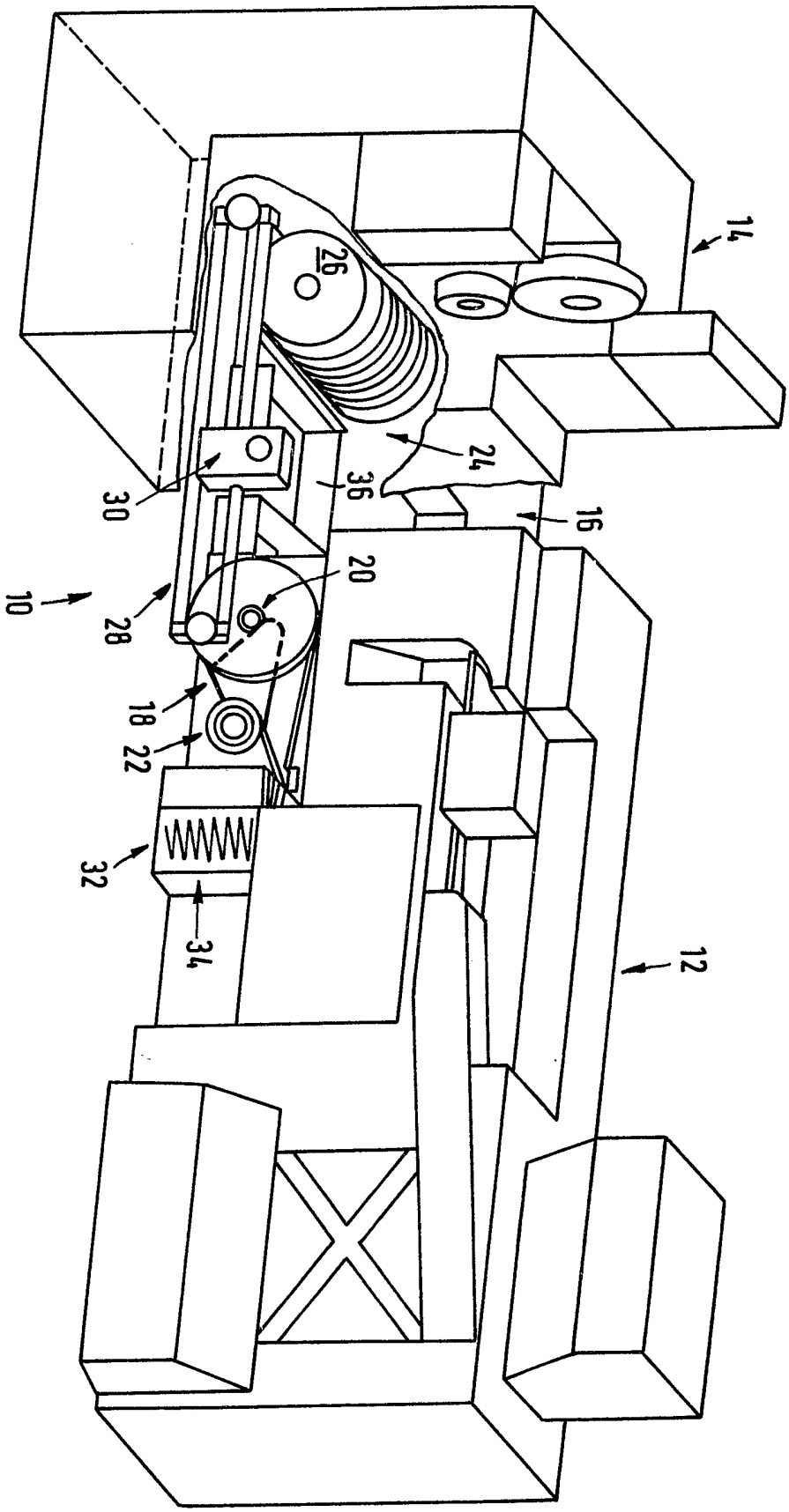

Fig.1

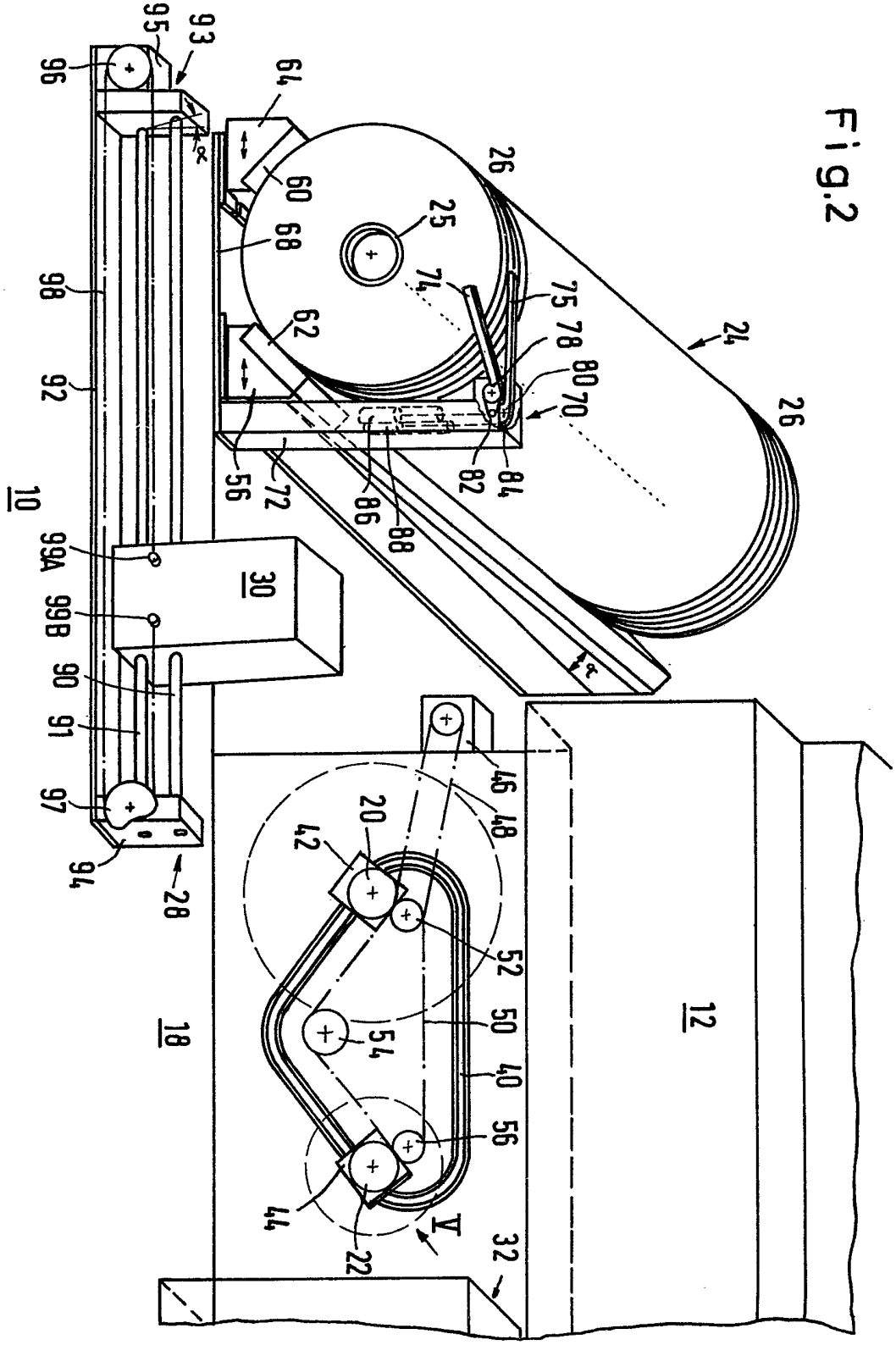
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Fig.2

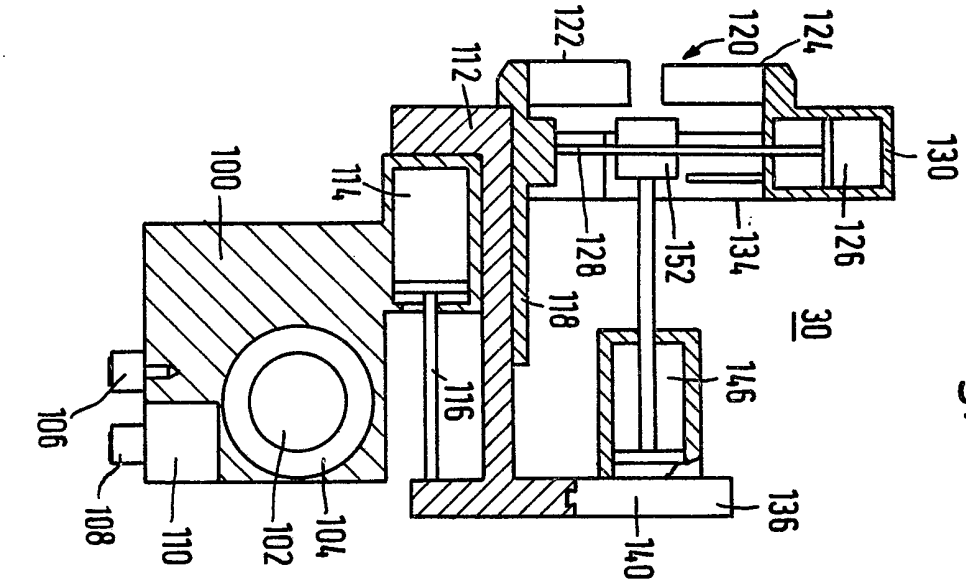

Fig.4

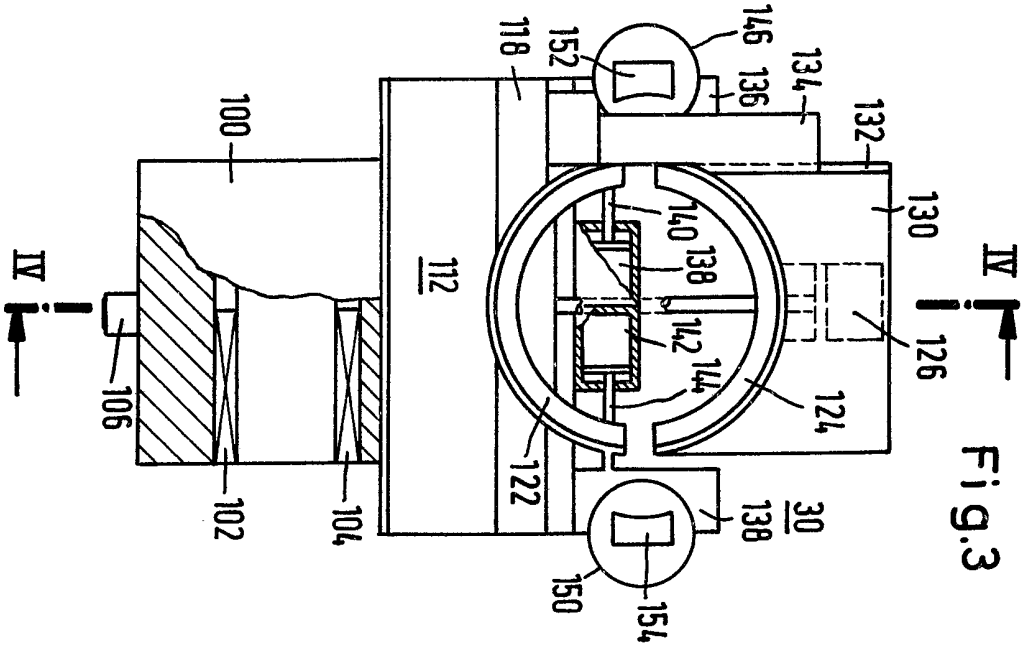

Fig.3

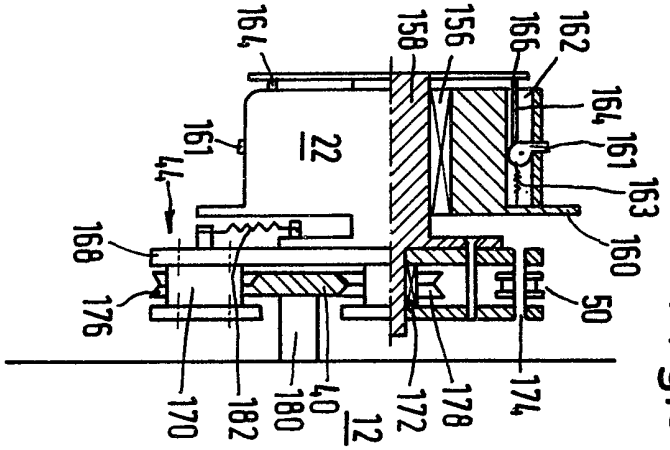

Fig.5

SPECIFICATION

Charging system for a tobacco-processing machine

The invention relates to a charging system for machines in the tobacco-processing industry and it concerns, in particular, a process for continuous feeding of a paper strip or paper tape, wound up on individual bobbins, and automatic equipment for charging a bobbin-change mechanism of the machine which runs largely automatically.

In spite of the very high degree of automation in this very field of cigarette manufacturing, it has been necessary hitherto to exchange the paper bobbins by hand, that is to say to take off an empty bobbin or spool from a bobbin spindle, whilst a second full bobbin is just running down.

This work, which is frequent because of the high production speed, is laborious and time-consuming. Moreover, the run-down bobbin, the tape end of which is previously joined to the tape start of the new paper roll, must then be taken off and the positions of the empty bobbin carrier with a freely running bobbin spindle and of the full bobbin carrier must be interchanged, before a new paper roll is moved up and pushed onto the bobbin spindle.

The work is made easier to a certain extent by semi-automatic bobbin-change mechanisms in which the bobbin spindles are mounted diametrically opposite on radial rotary arms or on a turntable and which make it possible automatically to change the two working positions of a full bobbin and a run-down bobbin in each case. Even in the case of these semi-automatic bobbin changers, however, which are well known, for example, for the feeding of cigarette paper to the stage of wrapping the tobacco strand in a cigarette machine, feeding the cover paper for providing the cigarettes with filters in a filter-fitting machine or feeding the outer paper in a filter-production machine, the interchange of a run-down bobbin and a full bobbin must still be carried out by hand.

Furthermore, the rotary movement during the change step requires a relatively large space, even if the change is carried out only after a previously inserted bobbin has already partially run down.

This is a problem, above all, in the case of machines in which the space available for the paper bobbins is restricted, for example by projecting machine parts, to such an extent that the known semi-automatic changers cannot be used here. For this reason, a cigarette machine is also known in which the semi-automatic changer is fitted on one side of the machine. The disadvantage of this is above all the long paper path which leads to the front of the machine and on which the paper can easily be damaged.

It is thus the object of the invention to improve a process and equipment for continuous feeding of a paper strip or tape, wound up on individual bobbins, to a machine having a bobbin-change mechanism in such a way that, with extensive automation of the course of the process, that work can be done as simply, rapidly and reliably as possible.

To achieve this object a process for continuous feeding of a paper tape of paper strip, wound on bobbins, to a bobbing-change mechanism of a machine in the tobacco-processing industry is carried out, according to the invention, in such a way that a number of full bobbins are set up, to the side of the bobbin-change mechanism, essentially parallel to the working plane of the change mechanism and aligned in a coaxial row one behind the other, are moved forward stepwise and are picked up individually one after the other, are brought into a plane which is located in front of the working plane of the change machanism and are moved in the former plane, transversely to the stock row, to a position in front of the particular empty bobbin spindle of the change mechanism and are pushed onto this spindle, before in a subsequent change step the working positions of the full bobbin and of the bobbin which has run down in the meantime are interchanged, the run-down bobbin is then drawn off its spindle and, during its movement in the movement plane located in front of the working plane, is ejected on the way to the bobbin stock row into a collection container between the change mechanism and the stock row, before the next bobbin is moved up from the stock row.

The process according to the invention is distinguished by an advantageous sequence of movements, wherein the bobbins taken, in a position which is essentially parallel to their final upright working position, from a magazine containing a row of full bobbins standing one behind the other, are in each case moved to the change mechanism on the same path on which the subsequently run-down and taken-off bobbin is then moved back and ejected, before the next bobbin is picked up. As a result, the invention makes possible a more rapid process sequence, as compared with the state of the art, in which the full bobbins are usually stacked on a holding table in the vicinity of the machine, from where they are taken after the position of the bobbin spindle has been changed and the empty bobbin has been taken off.

The invention also comprises advantageous equipment which makes possible extensive automation of the work sequence so that the work load in the operation or supervision of the machine can be further reduced.

In a preferred embodiment of the invention, particular advantages result from the fact that the change of position of the bobbins does not take place in a circular movement, as in the known semi-automatic bobbin changes, but takes place along a closed guide curve on which the current bobbin, which has then partially run down, is lfted a little and moved in the direction of the paper feed, whilst the run-down bobbin, lowered to a position underneath the current bobbin, is passed through against the direction of paper feed, before it is taken off and a new bobbin is inserted. This change movement makes possible a particularly

space-saving and flat type of construction with a small installation depth on a relatively small machine area which would not be sufficient for the installation of hitherto known change mechanisms.

Further advantages and features of the invention can be seen from the following description and the drawing in which the invention is explained and represented in more detail by reference to a preferred illustrative embodiment. In the drawings, diagrammatically and in part extensively simplified:

Figure 1 shows a perspective view of a machine combination conventional for the manufacture of filter cigarettes, with a cigarette machine fitted out according to the invention and a filter-fitting machine which follows in the functional sequence,

Figure 2 shows an enlarged view substantially corresponding to Figure 1, in order to illustrate further details of the equipment according to the invention,

Figure 3 shows a front view of a gripping and stripping device, according to the invention, of the automatic charging device,

Figure 4 shows a view, cut along the line IV—IV in Figure 3, of the gripping and stripping device according to the invention and

Figure 5 shows a partially cut view, seen in the direction of the arrow V in Figure 2, of a carrier, which can be moved on a guide curve, of a freely running bobbin take-up roll of the change mechanism according to the invention.

Figure 1 shows equipment 10 according to the invention in conjunction with a conventional combination of a cigarette machine 12 and a filter-fitting machine 14. The equipment 10 here serves for automatically charging the cigarette machine 12 with cigarette paper for wrapping the tobacco strand formed in this machine.

Underneath a connection channel 16 and between the adjacent front edges of the machines 12 and 14, which are set up at right angles to one another, there is sufficient space for the charging equipment 10 according to the invention, which is constructed to be particularly space-saving. It is thus advantageously possible to re-equip known machine combinations of this type with the invention.

The automatically operating charging equipment 10, see also the cavalier projection shown in Figure 2, essentially comprises a bobbin-change mechanism 18, automated in accordance with the invention, with two bobbin spindles 20 and 22, a bobbin magazine 24 for a number of paper bobbins 26 which are set up one behind the other essentially parallel to the axis of the bobbin spindles 20 and 22 and can be moved forward, and an automatic gripping and stripping device 30 which can be moved to and fro in a guide 28 transversely to the direction of the bobbin axis between the bobbin changer 18 and the bobbin magazine 24. The narrow paper rolls wound up on bobbin cores or spools 25, which in most cases consist of plastic, are here generally called paper bobbins 26.

That part 32 of the machine 12 which follows in the forward direction of the paper is already known and contains, in addition to a control device and a printer for marking the cigarettes with the brand name, also a driven roller combination for drawing the paper tape off the bobbin driven by the roller combination, and means for joining the successive tape ends of bobbins 26 used one after the other, and also including a buffer box 34 for the temporary reception of a tape stock. This paper tape stock, collected before successive end sections of individual bobbins 26 are joined, makes it possible to stop the tape drive when the tape ends are joined and to start the new bobbin without a thrust.

In the prior change mechanism of the known machine 12, however, the actual change step must be carried out by hand, and specifically with the aid of a straight rail into which new bobbins are inserted at the rear and are pushed forward after the bobbin which has previously run empty has been taken off. This is a result of the low arrangement of the bobbin-change mechanism underneath a projecting machine part which restricts the space for the change of position of the bobbins to such an extent that an automatic change step hitherto appeared impossible.

In the bobbin-change mechanism 18 according to the invention, this problem is solved essentially by a closed control curve 40 which preferably has approximately the shape of an isosceles triangle, turned upside down, with rounded corners and is constructed as a guide rail, see also Figure 5, for carriages 42, 44 of the bobbin spindles 20 and 22 which are mounted thereon to be freely rotatable.

In the example shown, the drive during the change step is effected by means of a motor 46 connected to the control system provided, and a drive chain 48 for a further chain 50 which is guided, at equal spacing on all sides from the guide rail 40, around a toothed roller 52, which can be driven by the drive 46, 48, and two toothed rollers 54, 56 mounted to be freely running, the carriages 42 and 44 of the bobbin spindles 20 and 22 being fixed to the chain with equal spacing on both sides. The drive chain 48 here runs behind or underneath the guide rail 40 to a toothed drive wheel which is rotatable in common with and behind the toothed wheel 52.

The bobbin magazine 24, according to the invention, of the charging equipment 10 preferably consists of a continuous conveyor, which can be actuated stepwise, with a V support of preferably 90°, which is formed, for example, by two belt conveyors or slat conveyors 60, 62.

The carrier devices 64, 66 of the conveyors 60, 62 forming the bobbin support can, as indicated by double arrows, be adjusted tranversely to the conveying direction on a common carrier plate 68 in opposite directions, for example by means of a common threaded drive. A simple adaptation to different bobbin diameters and easy setting of the tolerance range of the mean value of the diameter of the bobbin are thus possible. The preferred mirror-symmetrical 45° inclination of the support

surfaces of the conveyors 62, 64 has the further advantage that the lateral position and height position of the bobbin axis is retained independently of the bobbin diameter during the symmetrical adjustment of the conveyors in opposite directions.

In the embodiment shown, the V support 62, 64 of the conveyor 24 is inclined forwards at an angle α. This angle can preferably be between 3° and 8° and, in conjunction with a stop and holding device 70 at the front, makes is possible to set up the bobbin 26 securely in the magazine 24 without an additional adjustable bobbin support at the rear end of the magazine. This arrangement has the particular advantage that the magazine 24 can be refilled with new bobbins from the free rear at any time and without impediment due to stops or the like.

The stop and holding device 70 comprises a column-type casing 72 which is fixed, for example, on the baseplate 68 of the magazine 24. In the upper part of the casing, two arms 74 and 76 which are located one behind the other in the conveying direction and are pivotable essentially parallel to the plane of winding, are mounted on a common shaft at 78 and 80 respectively. The arms 74 and 76 have lever-type extensions 82 and 84 which reach beyond the bearing points 78 and 80 and on which actuating members for the pivoting movement of the arms 74 and 76 engage via equalising joints. These actuating members consist, for example, of double-acting pneumatic cylinders 86, 88 which can be actuated via electrically controlled valves of a machine-control system.

The guide 28 for the gripping and stripping device 30 runs parallel at a short distance in front of the machine 12 and the magazine. According to Figure 2, it consists of two guide rods 90 and 91 which extend one above the other between two lateral stop and bearing blocks 93 and 94 which are seated on a support plate 92. The support plate 92 can be joined to the support plate 68 of the magazine 24.

A rope drive or chain drive, for example, is provided for the controlled movement of the device 30 along the guide 28. This drive essentially consists of an electric servo motor 95 mounted at the left-hand fitting block 93, of a deflection roller 96 which can be driven by the motor and by a further deflection roller 97, which is mounted on the right-hand fitting block 94 to be freely rotatable, for a rope or a chain 98, of which the free ends engage on fixing points 99A and 99B, for example on the rear, on opposite sides of the device.

Since, according to Figure 2, the bobbins are supplied in a forward-leaning position according to the inclination of the V support 60, 62 of the bobbin magazine 24, the device 30 should be tilted by a corresponding angle when it is moved into the position in front of the take-off end of the magazine 24 in order to align the gripper coaxially when it takes up a full bobbin and, during the movement to the bobbin changer, the device 30 should be righted in such a way that, in the other end position of the device 30, the gripping and stripping elements are coaxially aligned with the bobbin mandrel 20 revolving about a horizontal axis.

A simple possibility of realising such a superposed tilting and displacement movement of the device 30 consists, for example, of an arrangement in which the guide rods 90 and 91, although extending horizontally in parallel planes at different levels, diverge in planes perpendicular thereto in the direction of displacement of the device 30, Corresponding to the angle of inclination of the magazine support 62, 64. According to Figure 2, for example, the upper guide rod 90 extends parallel to the working plane of the bobbin changer 18. The fixing points of the two guide rods 90 and 91 in the right-hand fitting block 94 are located vertically one above the other, whilst the fixing point of the lower guide rod 91 on the left-hand fitting block 93 is located nearer to the take-off end of the bobbin magazine 24 than the fixing point of the upper guide rod 90. Thus, an angle α, corresponding to the angle of inclination of the conveyor, results between the fixing points of the guide rods 90 and 91 at the left-hand end of the guide 28.

Figures 3 and 4 show the principle of construction of an advantageously simple embodiment of the gripping and stripping device 30 according to the invention.

A carriage 100 displaceable on a rod guide according to Figure 2 here has a guide bore 102 which can be fitted out, for example, with ball bearings 104 which ensure perfect and easy running of the device 30 on the guide rod 90, see Figure 2.

Further guide elements provided are two rollers 106 and 108 which are located on the underside of the carriage and interact with the guide rod 91, see Figure 2. The lateral guide which is formed by the rollers and is open underneath here makes it possible to stiffen or support the lower guide rod 91 which can be formed, for example, by the upper edge of a web projecting vertically upwards from the support plate 92. In place of a rope or chain drive, already explained, for the device 30, it is also possible to provide, according to Figure 4, a controllable electric motor 110 in the lower part of the carriage, as a direct drive for the roller 108 which interacts with the guide rod 91. A toothed engagement between the roller 108 and the guide rod 91 here ensures extremely high precision of the drive.

A support plate 112 can be moved forward and back on the carriage 110 by means of an adjusting device 114, 116 which engages between the carriage and the support plate. The support plate 112 carries a gripping device 120 which is fixed thereto by a supporting base part 118 and which, when the support plate is adjusted, is moved forward and back in common with the latter.

An advantageously simple embodiment of the gripping device 120 consists of a two-part mounting mandrel, the lower part 122 of which is

joined to the supporting part 118. The upper part 124 of the internal gripper 120 is joined via a double-acting adjusting device 126, 128 to the support part 118 of the lower part 122 and can be moved up and down relative to the latter. A section 130, which can be moved together with the upper part of the internal gripper 120, allows guiding in a guide element 134, joined to the lower part 118, 122, with the aid of a vertical guide rail 132.

Furthermore, carrier elements 136 and 138 are arranged on the support plate 112, which carrier elements are displaceable transversely to the direction of movement of the support plate and can be actuated in opposite directions by control devices 138, 140 and 142, 144 respectively Control devices 146 and 150, seated on the carrier elements 136 and 138 respectively, carry gripping and stripping elements 152 and 154 which are located symmetrically on both sides of the mounting device 120 and the mode of operation of which will be explained below.

Finally, Figure 5 shows the principle of construction of a possible embodiment of one of the bobbin carriers of identical design for the changing mechanism 18 according to the invention. The illustrated bobbin spindle 22 is mounted, rotating freely, with the aid of a bearing 156 on an axis 158 projecting from the carriage 44. The roller 22 has a rim flange 160, projecting from the rear edge, as a stop for a bobbin which has been pushed on, and a locking device for holding the bobbin which has been pushed on, which locking device is temporarily released while a bobbin is pushed on and taken off by the internal gripper 120 when the latter has moved into position.

The locking device consists, for example, of three or four locking elements 161 which are arranged in even distribution on the periphery of the roller and which are pivotable in recesses 162, parallel to the axis, of the roller about axes arranged transversely to the roller axis 158 and have a nose-like locking projection which, in the locking position, protrudes through an orifice in the peripheral surface of the roller 22. Each locking element 161 is normally held by a pre-tensioning spring 163 in the locking position shown, from which it can be pivoted away into a release position by actuating a control mechanism 164, 166 which is freely accessible from the front in the edge zone in front of the end face of the roller.

The pre-tensioning spring 163 can, for example, be a compression spring which is located between the inner end of the recess 162, close to the periphery, and an eccentric engagement point on that side of the locking element 161 which is remote from the pivot axis of the locking element.

The actuating mechanism is, for example, a rod 164 projecting from the open-front end of the recess. An annular disc 166 joins the projecting free ends of the actuating rods 164 of the various locking element 161. The common actuating ring 166 allows uniform actuating of all the locking elements 161 and also prevents hazards to the operation and to the personnel supervising the operation by projecting parts of the rotating bobbin spindles or rollers 20, 22. When the internal gripper 120, moved up to the mandrel or spindle 22, presses with its annular end face on the ring 166, the locking noses 161 are pivoted into their pivoted-back position against the force of the return spring 163. When the ring 166 is released, the locking noses pivot under the action of the return spring automatically into their illustrated position in which the rim of the peripheral orifice forms a stop which restricts the pivoting movements.

On the underside of the main support plate 168, the carriage 44 has bearing and fixing elements 170 to 174 for the drive chain 50 fixed to the carriage, see Figure 2, and for track wheels 176 and 178 by means of which the carriage is guided on the guide rail 40 which is fixed to the front of the machine via supporting spacer elements 180. Particularly reliable guiding of the carriage is obtained when two track wheels are provided on at least one side of the rail, so that secure three-point contact with the running rail 40 results. The opposite track wheels 176 and 178 can be arranged to be movable relative to one another on the support plate 168 of the carriage 44 and can be held in secure contact with the guide rail by means of tension springs 182.

In the following text, the automatically controlled mode of operation of the charging device according to the invention will be explained.

The gripping and stripping device 30 is moved along the guide 28, see Figure 2, to the left into a position in front of the take-off end of the bobbin magazine 24. The two-part internal gripper 120 in its contracted position is moved by the control device 114, 116, together with the support plate 112, into the central bore of the foremost bobbin 26 and is forced open by means of a control device 126, 128. At the same time, the stop arm 74 of the device 70 is pivoted upwards so that the first bobbin is taken off the magazine when the gripper 120 moves back.

The device 30 is then moved on the guide 28 to the right to a position in front of the empty bobbin spindle 20 located in the rear position shown on the left in Figure 2. The internal gripper 120 with the full bobbin mounted thereon is axially aligned with the bobbin spindle 20 and moved forward up to the latter. At the same time, the locking noses 161 are pivoted into their release positions as a result of the internal gripper stiking the ring 166, as described above. The lateral strippers 152, 154 with the control devices 146 to 150 are moved forward and strip the bobbin off the mounting mandrel 120 and onto the bobbin spindle 20, as soon as the mounting mandrel 120 is contracted again by the downward movement of its upper part 124 and releases the bobbin mounted thereon. The support plate 112 is now retracted with the gripping and stripping elements. The annular disc 166 is released so that the locking noses 161

move into their locking position according to Figure 5 and securely hold the bobbin.

As soon as the bobbin 25, 26 which in this way has been placed fully automatically onto the mandrel 20 of the bobbin-change mechanism, has partially run down the motor 46, for example a brake motor with a worm gear, is switched on in order to initiate the step of changing the two bobbin spindles 20 and 22. In the case of a starting diameter of the bobbin of 500 mm, the change step is initiated, for example, at a diameter of about 400 mm, which is detected either optically or by means of a brake and feeler lever which is present anyway on the cigarette machine, in order to trigger the control signal for the start of the motor 46.

At the end of the change step, an empty bobbin 25 which has run down but for a small residue of paper and which is seated on the bobbin spindle 22, and a bobbin 25, 26 which at this time is running on the spindle 20, have interchanged their working positions shown in Figure 2. The elements 152, 154 which previously, when a full bobbin was put on, pressed as strippers onto the surface of the paper roll, now act as external grippers which, with the aid of the control devices 138, 140 or 142, 144, are moved up from the outside to the empty bobbin core 25 and clamp the latter. At the same time, the locking devices 161—166 are again flattened temporarily in order to release the bobbin core. During the subsequent retraction of the support plate 112, the empty bobbin core 25 clamped between the grippers 152 and 154 is then drawn off the spindle 22. The device is then moved back again on the guide 28 to the magazine. On the way, the empty bobbin 25 is, as a result of the grippers 152, 154 moving apart, ejected or dropped between the machine 12 and the bobbin magazine 24 into a stock container 36 which, as appropriate, has been put in readiness at this point, see Figure 1.

After the first full bobbin has been removed from the take-off end of the bobbin magazine 24, as described above, the row of bobbins 26 set up in the magazine has in the meantime been moved forward by the thickness of one bobbin. For this purpose, the arm 74 which, in dependence on a signal from the sequence control, has been pivoted up in order to release the first bobbin taken off, has been pivoted again into its position, shown in Figure 2, as a stop in the path of the bobbins, before the holding arm resting on the second bobbin and preventing the next bobbin from tilting or sliding down on release of the row of bobbins by the arm 74, was pivoted up and the bobbin conveyor 60, 62 was moved foward by the thickness of one bobbin up to the stop 74. After this conveying step, the holding arm 76 was also pivoted down again onto the periphery of the next bobbin behind the bobbin now in contact with the stop 74, and it thus forms a safety device, relieving the stop arm 74, against further moving-up of the bobbins standing on the inclined bobbin support. In this starting position, the next bobbin is then removed from the front take-off end of the bobbin magazine, as described above, and is then moved to the bobbin mandrel 22, now located in the front working position, and pushed onto the latter before, after a further change step, the bobbin which has run down in the meantime is taken off and the next full bobbin brought up.

The various functions of the charging equipment according to the invention are initiated with the aid of an automatic sequence control, specifically as a function of, for example, mechanical, electrical and/or magnetic control signal transmitters, some of which can already be present on the machines fitted out in accordance with the invention. If this is desired, electrical, electromagnetic or corresponding control elements can also be provided here in place of the pneumatic control elements used in the present illustrative embodiment in the devices 30 and 70. In the illustrative embodiment shown, however, pneumatic control elements have the advantage that a source of compressed air, which is present anyway in the machine fitted out in accordance with the invention, can be used for operating these pneumatic control elements. The compressed-air connections, which are not shown, on the opposite sides of the piston of the pneumatic control elements are actuated via electrically operated control valves, which are in themselves known, of an electro-pneumatically operating sequence control system.

Of course, modifications of the illustrative embodiment shown are also possible, if this is desired. Thus, for example, that part of the carriage 100 of the device 30 which carries the cylinder 114 of the control device for the support plate 112, see Figure 4, can also be lifted upwards and lowered vertically, relative to the remaining part, by means of a further interposed control device, if this is desired, for example, for centering when a bobbin is picked up from the magazine or when a bobbin is put onto and taken off a bobbin spindle 20 or 22 of the bobbin changer 18. In the case of the bobbin changer 18 according to the invention, working with a precise chain drive for the bobbin carriers 20, 42 and 22, 44 of identical construction, and the likewise present possibility of adjusting the conveyor support 62, 64 of the bobbin magazine 24, however, such an additional control movement of the device 30 can be dispensed with. Another contributory factor to the high working precision of the illustrative embodiment described is the fact that the axes of the bobbins set up one behind the other on the magazine and the axis of the bobbin spindle located at the time in the front working position shown on the left in Figure 2 are at the same height so that precise parallel guiding of the device 30 is possible. Moreover, it is also possible to provide a facility for controlled adjustment of the bobbin roller 22 in the direction of the axis 158 in order to ensure precise lateral adjustability of the paper run in the cigarette machine 12.

CLAIMS

1. Process for continuous feeding of a paper

strip or paper tape, wound up on bobbins, to a machine in the tobacco-processing industry, having a bobbin-change mechanism for two bobbin spindles running alternately in one of two predetermined working positions, characterised in that a number of full bobbins are set up, outside the working area of the bobbin-change mechanism, essentially parallel to the working plane of the change mechanism and aligned in a coaxial row one behind the other, are moved forward stepwise, are picked up individually in their foremost position, are moved into a plane which is located a short distance in front of the working plane of the change mechanism and is parallel thereto, and are moved in the former plane to a position in front of an empty bobbin spindle of the bobbin-change mechanism and are pushed onto the spindle, before in a subsequent change step the working positions of the full bobbin and of the bobbin which has run down in the meantime are interchanged, the run-down bobbin is then drawn off its spindle and, on the return path to the bobbin stock row, which path is the same as the forward path of the full bobbin, is ejected between the bobbin-change mechanism and the stock row, before the next bobbin is picked up from the stock row and conveyed to the empty bobbin spindle of the change mechanism.

2. Process according to Claim 1, characterised in that the full bobbins in the stock row are moved forward in a position which is leaning slightly forward relative to the working plane of the bobbin-change mechanism, are picked up in the leaning position and, during the transverse movement of the change mechanism, are righted into a position parallel to the working plane of the latter and are then pushed onto the empty bobbin spindle.

3. Process according to Claim 1 or 2, characterised in that, during the change step, the bobbins of the change mechanism are moved past each other along a closed guide curve, the partially run-down new bobbin being moved forward in a lifted position in the direction of the paper-run, whilst the bobbin which has just been emptied is first moved gradually downwards and then gradually upwards again, underneath the current bobbin, back into the working position previously assumed by the latter.

4. Equipment for the automatic charging of a machine in the tobacco-processing industry, with a paper tape which is wound up on a number of bobbins and which is fed continuously to the machine via a bobbin change mechanism comprising two bobbin spindles which are mounted on support elements for free running and the predetermined working positions of which are interchanged during each change step, before a run-down bobbin is taken off and a full bobbin is put on, in particular for automatically carrying out a process according to one or more of the preceding claims, characterised by an automatically controllable conveyor device having a bobbin magazine (24), which is located outside the working area of the bobbin-change mechanism (18) and extends transversely to the rear from a plane which substantially coincides with the working plane of the bobbin-change mechanism, for full paper bobbins (26) set up thereon in a coaxial row one behind the other, and having a gripping and drawing-off device (30) which, for taking off empty bobbins from the bobbin-change mechanism and for feeding full bobbins to the bobbin-change mechanism, can be moved along a guide (28), which is located a short distance in front of the working plane of the change mechanism (18) and the front take-off end of the bobbin magazine (24), between the take-off end of the bobbin magazine and a predetermined working position of a bobbin spindle (20, 22) of the change mechanism.

5. Equipment according to Claim 4, characterised in that the gripping and drawing-off device (30) has a carriage (100) which can be moved on a guide (28) extending substantially parallel to the working plane of the change mechanism (18) and on which gripping and stripping elements (120, 122, 124, 152, 154) which are adjustabie tranversely to the direction of displacement, conjointly or separately as desired, are arranged on an adjustment path which bridges the distance from the working plane of the change mechanism, the stripping elements (152, 154) being additionally adjustable for carrying out a gripping movement.

6. Equipment according to Claim 4 or 5, characterised in that the gripping and stripping device (30) comprises, as an internal gripper, a split mounting mandrel (120) which is adjustable on the carriage transversely to the guide movement and the parts (122, 124) of which are radially adjustable relative to one another, and that gripping and stripping elements (150, 152) which are located to the side of the mounting mandrel are adjustable parallel to the axis of the mounting mandrel and radially.

7. Equipment according to Claim 4, characterised in that the bobbin magazine (24) has a support surface (60), 62 for the bobbins, which is freely accessible from the rear and has a forward fall, and that, at the take-off end, a holding and stop device (70) is provided for the controlled release of the foremost bobbin in each case, with simultaneous retaining of the bobbins lined up behind.

8. Equipment according to Claim 4 or 7, characterised by a continuous conveyor (24) with a V support (60, 62), which can be actuated stepwise, as the bobbin magazine.

9. Equipment according to Claim 8, characterised in that the lateral distance of the 90° V support (60, 62) is symmetrically adjustable by displacing the opposite conveyors (60, 64, 62, 66) in opposite directions.

10. Equipment according to Claim 4 or 5, characterised in that the guide (28, 90 to 98) of the gripping and stripping device (30) is arranged and designed in such a way that, during the movement in front of the empty bobbin spindles (20, 22) the device (30) is automatically righted

from a tilted-back position corresponding to the inclination of the bobbin magazine (24) into a position parallel to the working plane of the bobbin change mechanism.

11. Equipment according to Claim 4, characterised in that the bobbin changer (18) has a closed guide rail (40) on which a partially run-down bobbin, slightly lifted from its working position, can be displaced in the direction of running of the tape into a second working position, while simultaneously the bobbin which has run empty is lowered on the guide curve from the second working position and lifted into the first working position.

12. Equipment according to Claim 11, characterised by a chain drive (46 to 50) of the bobbin-change mechanism, with a chain (50) which is guided, at equal spacing on all sides, within the guide curve (40) around toothed wheels (52 to 56), one of which (52) is coupled to a servo motor (46) via a drive wheel fixed on a common axis, the chain connecting the carriages (42, 44), fixed thereto and movable on the guide rail (40), of the bobbin spindles (20, 22), mounted thereon for free running, with equal spacing (40) on both sides.

13. Equipment according to Claim 4 and 12, characterised in that the bobbin spindles (20, 22) of the change mechanism (18) have a locking device (161—166) which can temporarily be released by the gripping device (30, 120), moving against the end face of the change mechanism, from a self-adjusting locking position.

14. Equipment according to Claim 13, characterised in that the locking device (161—166) has locking elements (161) which are automatically held in the locking position by a return spring and which can be pivoted into a release position by a control mechanism (164, 166) which engages eccentrically on the end face of the bobbin spindle (20, 22).

15. Equipment according to Claim 14 or 15, characterised by a locking device (161—166) having locking elements which are evenly distributed in the peripheral direction of the bobbin spindle (20, 22) and which can be released from their resiliently pre-tensioned locking position via a common annular actuating member (166) of the control mechanism (164).

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