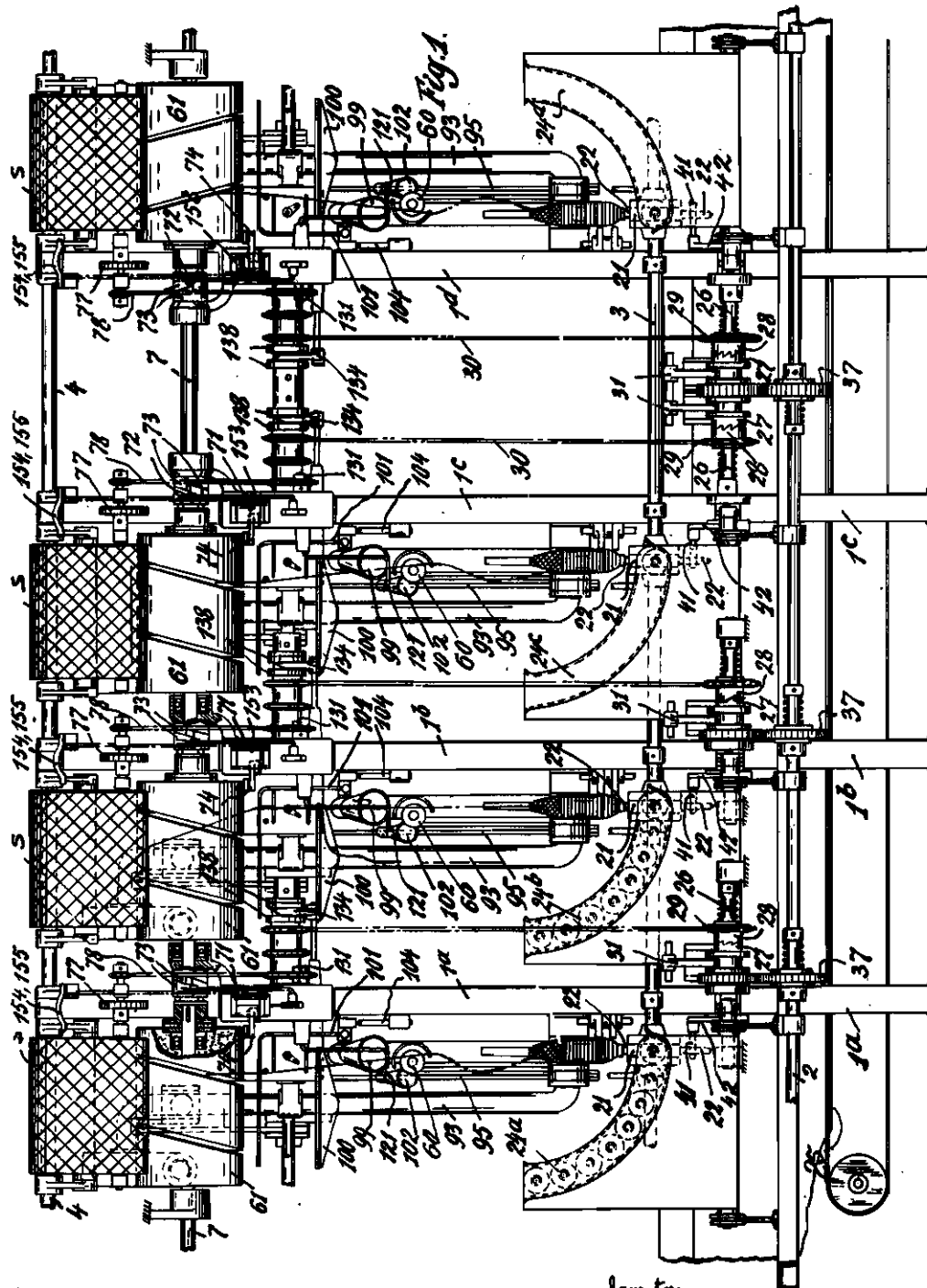


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CROSS WINDING FRAME
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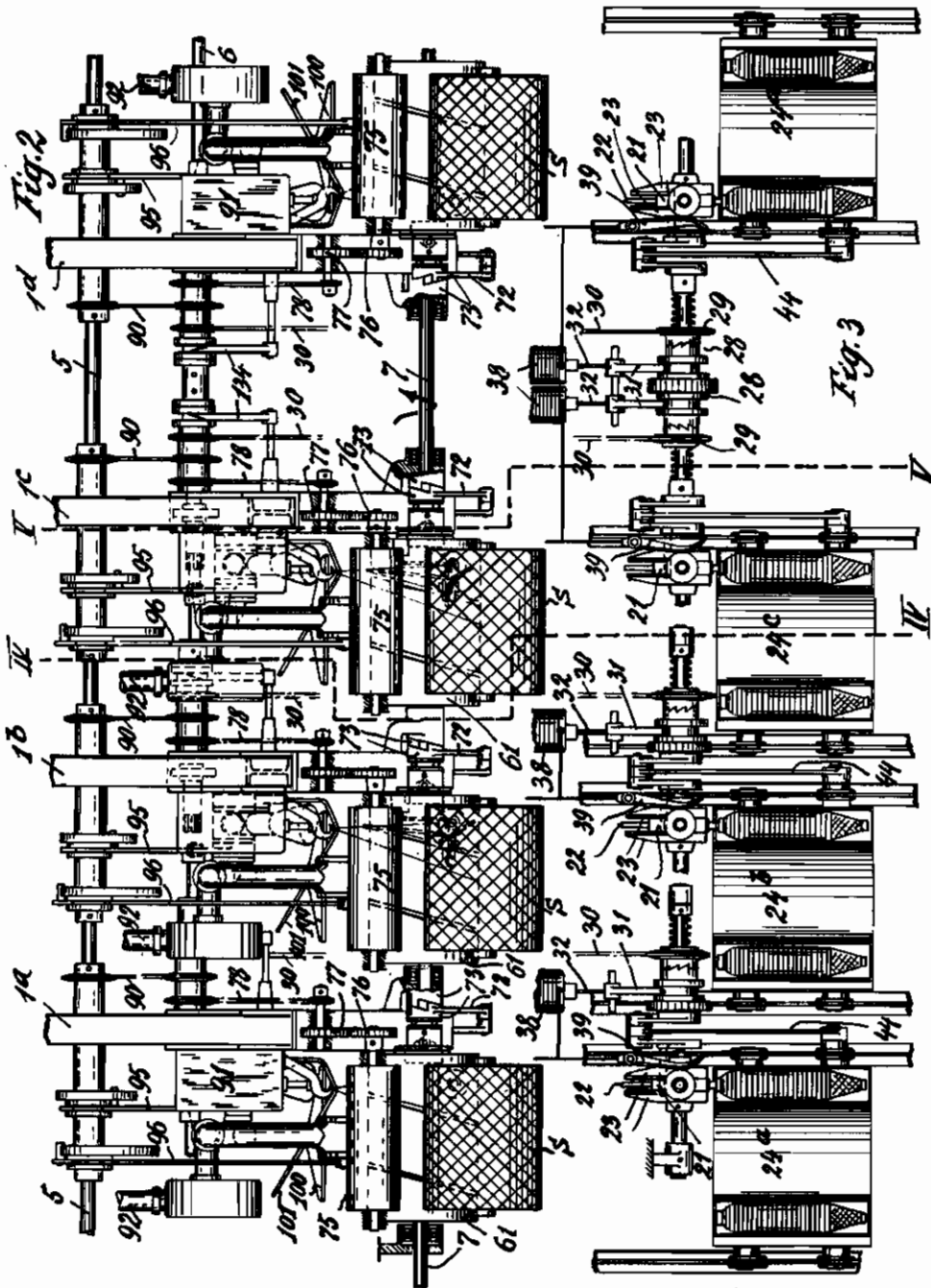
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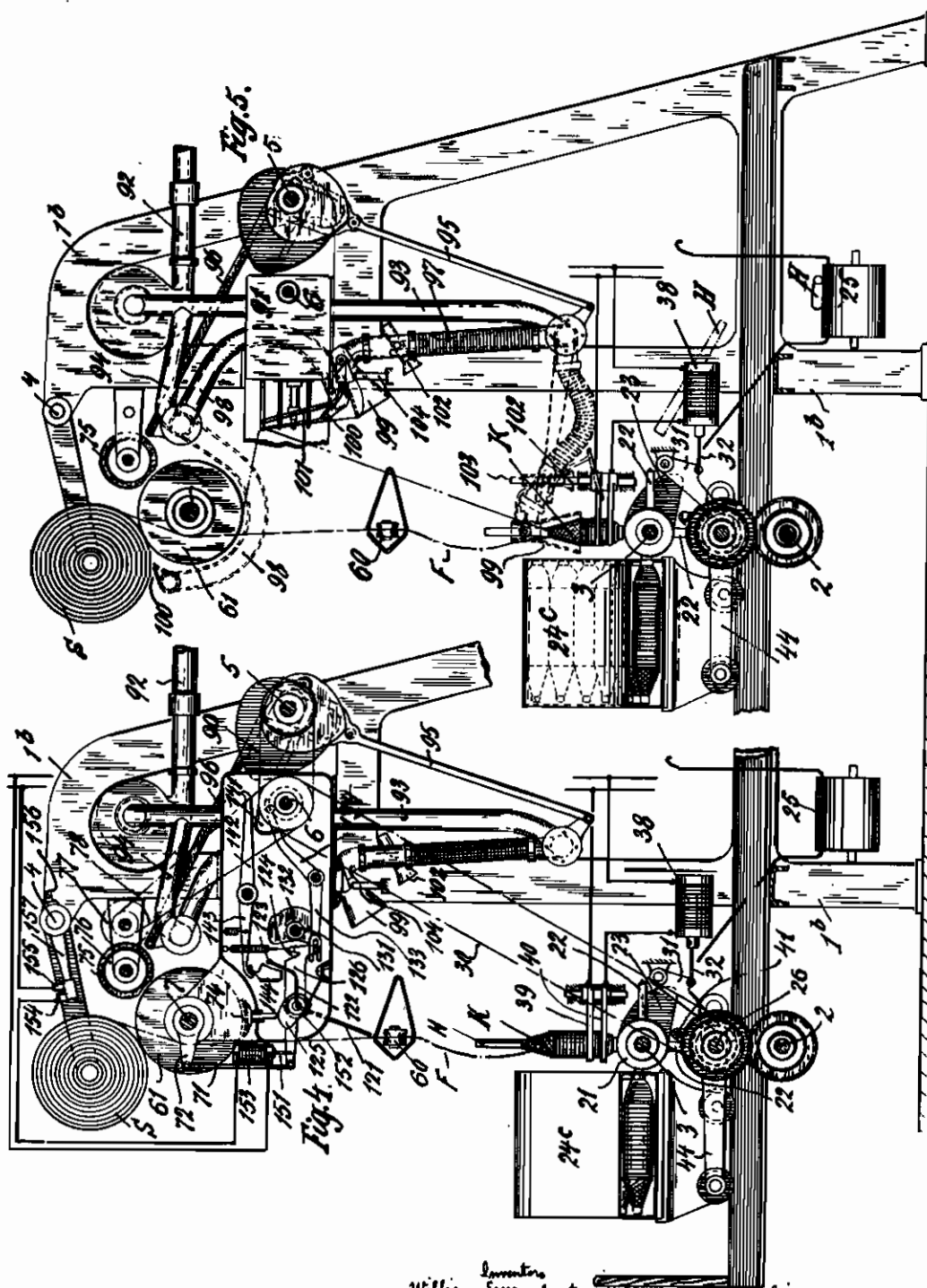


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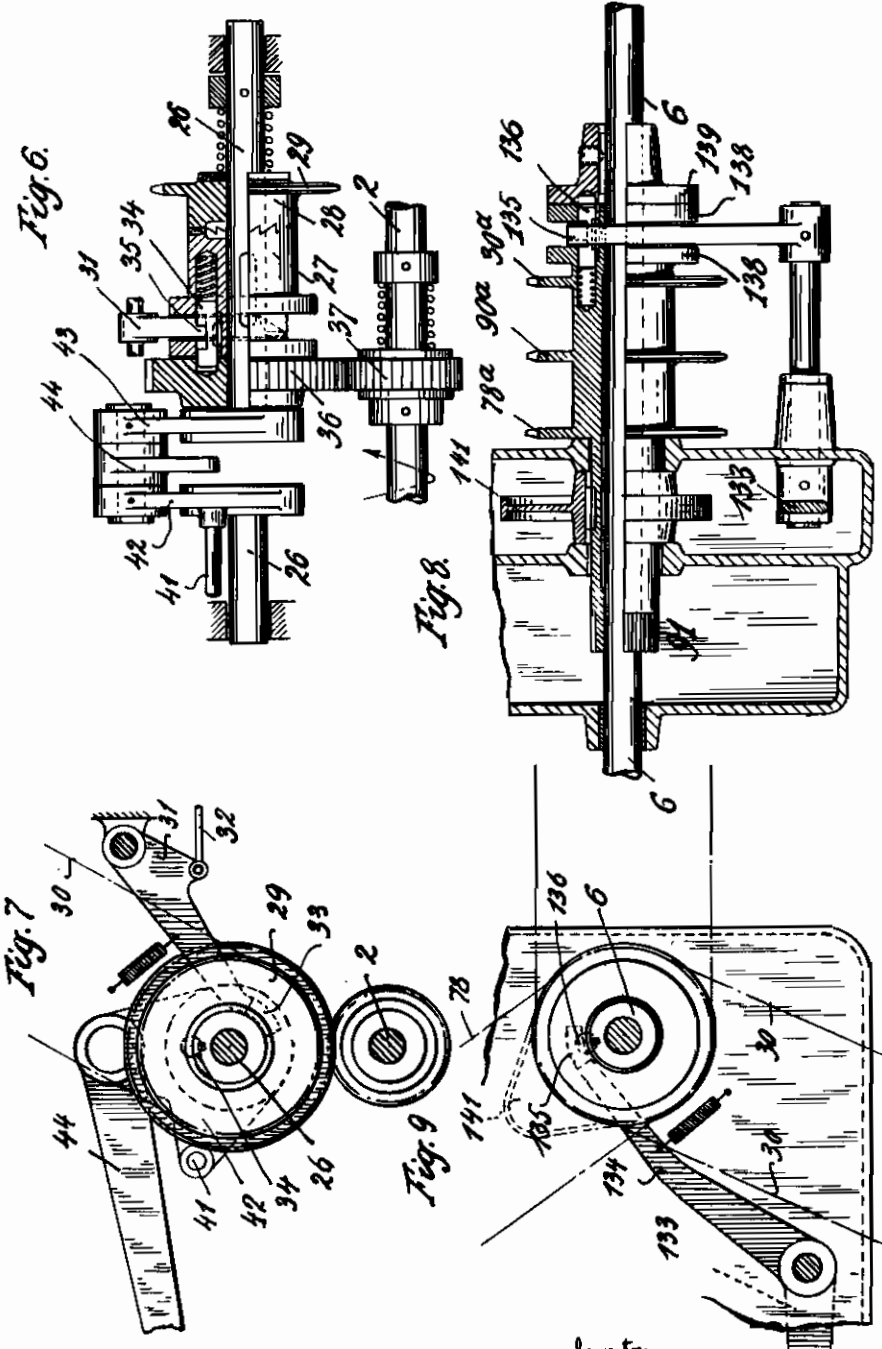
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ALIEN PROPERTY CUSTODIAN

CROSS WINDING FRAME

Wilhelm Esser, Munchen-Gladbach, Gustav Kahlisch, Rheydt, and Walter Reiners, Munchen-Gladbach, Germany; vested in the Alien Property Custodian

Application filed March 29, 1940

In order to do away, as much as possible, with manual labour on winding frames, it has already been proposed to arrange in the individual winding points magazines for feeding bobbins and thread knotting devices so that, when the thread supply ceases, the accumulating bobbin is lifted off its driving pulley and braked, so that the not yet wound-on end of the yarn could be knotted together with the beginning of the yarn from a substitute feeding bobbin which in the meantime had been brought into the feeding point. A supposition for all these known devices is therefore, that the broken end of the winding bobbin is still sufficiently long and remains within the range of the knotting device. As further the magazine consists of a plate rotating horizontally in front of the feeding bobbin and carrying at the same time in a bell some of the necessary building elements whereas another part of these building elements together with the knotting arrangement must be arranged at the side of the bell in front of the winding bobbin, in order to render secure as far as possible the intended knotting proceeding, the distance of spindles of the frame must be greater than usual. The winding points are further not easily accessible and to survey.

According to the invention, when the known perpendicularly circulating rotary star for the automatic ejecting of an unwound tube and swinging in of a substitute bobbin into the thread feeding point is provided, a central control device is arranged above the rotary star but below the collecting bobbin, which central control device, influenced by the broken end feeler arranged in front of it, in turn influences the feeding movements on the feeding and winding points of the yarn and those of a thread picking up device, and also those of the knotting device. By this arrangement it is attained that, at normal spacing of the spindles on the spindle frame, the distribution is clearly arranged and easily accessible. It has already become known, in winding frames with perpendicularly circulating rotary star, to employ a so-called travelling knotting device. In such arrangements the replacement of the feeding bobbins is effected, however, from a conveying band movable towards the rotary stars, so that the knotting device can operate only, after the movements of the conveying band in the direction to the frame and in the direction to the spindle of the rotary stars actually have been terminated. The knotting in the individual winding point when the yarn has broken requires further a somewhat wider shape of the spinning frame in the practical construction, in order that

the winding proceedings in the other winding points are not disturbed.

In the known winding frames the knotting device operates whenever the yarn feeding is intercepted, may it take place owing to the fact that the thread breaks or that the bobbin is empty. Compared herewith the mechanism for the bobbin change operates according to the invention independently on the control proceedings disengaged by the thread feeler only when the feeding bobbin is exhausted, in that for instance two feeler levers bear against the end of the feeding bobbin and initiate the bobbin changing when the bobbin is exhausted before the thread picking-up and knotting device begins to operate, so that the picking-up device finds a substitute bobbin in the winding position.

In order to pick-up on the winding bobbin the end of the broken yarn, this bobbin is automatically turned back in the known picking-up arrangements, in order that the picker-up can grip the end of the yarn. This is simplified, according to the invention, in that the friction disc, by means of which the picking-up arrangement turns back the collecting bobbin for uncovering the end of the wound-on and broken yarn after the feeding bobbin has been lifted off and stopped, is locally eccentrically flattened on its surface so that, when being detached from its driving mechanism, it is no longer driven from the thread guiding drum.

According to the invention the suction arm of the pick-up device, which is pushed over the not exhausted feeding bobbin when a yarn breaks, is constructed preferably so that a separate parallel guiding is provided for it which guiding is formed of telescopable elements.

The invention is illustrated in the accompanying drawing diagrammatically by way of example.

Fig. 1 shows in front elevation four winding points of a winding frame,

Figs. 2 and 3 show the same winding points in top plan view, the feeding spindles being pushed forward towards the lower edge of the sheet for the sake of better comprehension,

Figs. 4 and 5 are sections on lines IV—IV and V—V of Figs. 2 and 3 respectively,

Figs. 6 and 7 show in front and side elevation respectively the control mechanism for exchanging the feeding bobbins,

Figs. 8 and 9 show in front and side elevation respectively a detail of the control mechanism of the knotting device.

The four winding points serving for illustrating

the invention may be limited for instance by the frame walls *1a* to *1d*, in which the shafts 2, 3, 4, 5, 6 and 7 are journaled, which are common for the winding points, the other individual elements being accordingly supported. The shafts 2 to 7 may be subdivided all or some of them in spindle groups, or an individual motor drive may be provided for each shaft according to the subdivision of the winding frame, which depends, for instance, on the magazine arrangement and the winding of the feeding bobbin heads. This is shown in Fig. 1 by the mutual position of the feeding bobbin magazines *24a* and *24b* or *24c* and *24d* respectively, for simplicity sake however so that the control means for the winding points adjacent the frame walls *1c* and *1d* are placed between these frame walls, whereas in the practical form of construction, the magazines *24c* and *24d* being evidently closer together and the partitions *1c* and *1d* being omitted, the control means are behind the place where the partitions would have been. Such an arrangement reduces the number of frame walls and offers for instance the possibility that only one suction arm is sufficient for catching the fed threads of adjacent winding points.

The chief elements of the machine constructed and controlled according to the invention (head of feeding bobbin, head of winding bobbin, yarn knotting arrangement and main control gear influenced by the yarn feeler) are arranged for instance as follows:

Every head of feeding bobbin is equipped, as shown in Fig. 4, with the usual star-shaped bobbin carrier 21, the four arms 22 of which are turned by 90° on the shaft 3 between tube strippers 23 (Fig. 3) after a fresh bobbin K has been pushed out of the magazine 24 and a tube H has been unwound. The tubes H pushed off the arm 22 by the curved edges of the strippers 23 are conveyed by a conveying band 25 (Fig. 5) in the usual manner to a collecting box. The controlling of the change of bobbin is effected by a bush 27 keyed on a shaft 28, one flange of this bush 27 engaging by means of teeth and under spring pressure in the flange 28 of a sprocket wheel 29, so that this sprocket wheel, or a chain 30, is moved only in one direction when the bush 27 revolves. The bush 27 or the shaft 28 is rotated from shaft 2 as soon as a front nose 33 of a lever 31 under the action of a rod 32 is pulled out of a notch 35 cut into a coupling bolt 34, as shown in Fig. 7, said bolt engaging in an indentation of a toothed wheel 36 which meshes with a toothed wheel 37 resiliently connected with shaft 2. The rod 32 is attracted by a switching relay 38 (Fig. 4), as soon as two contact arms 39, 40, bearing against the foot of bobbin K which is in the feeding position, close a circuit owing to the idle running of the tube H. A pin 41 of an eccentric 42, said pin acting upon the actually lowermost arm 22 of star 21, and a crank 43, which moves the carriage of the magazine 24 through the intermediary of a rod 44, turn with the revolving of shaft 26. By the turning of star 21 the bobbin, actually lowermost in the magazine 24, is swung out and thus makes room for the next following substitute bobbin, which consequently, when the magazine carriage moves back, is pushed onto the arm of the star, which arm was the lowermost arm of the star but extends now in horizontal direction and faces this bobbin.

The formation of the cross wound bobbin in the head for the winding bobbins is effected ac-

ording to the example illustrated by means of so-called diagonal doffing, in that the yarn F winding on the cross wound bobbin S is shifted from the lateral feeding point, determined by the yarn guide 60, through the groove of the yarn guide drum 61 to the other side of the drum and thence, sliding over the drum wall, returns into the initial position. The yarn guiding drums 61 are driven from the shaft 7 and can be detached from the driving gear through the intermediary of a rod 71 and of a lever arm 72 by pushing as under the elements of clutch 73. When the rod 71 is pulled, as will be hereinafter explained, a brake 74 is at the same time actuated for a moment, and a driving disc 75 driven in backward rotation through the intermediary of toothed wheels 76, 77 (Figs. 4 and 2) from a chain 78. Owing to the construction of the elastic cover of the driving disc 75 shown in Fig. 1, this disc rotates also the yarn guiding drum, so that, when the yarn breaks, the yarn end thus produced winds back from the bobbin S and can be caught by the catching arm of a knotting device.

The knotting device 91 driven by means of a chain 90 is, according to Fig. 5, equipped with the usual air conduits 92, 93 and 94, at the ends of which the yarn-catching arms 97, 99, controlled by rods 95, 98 by means of eccentrics keyed on shaft 5, are hingedly mounted airtightly. The yarn-catching arm 97 has a suction cone 99, and the yarn-catching arm 98 has a silt-shaped suction mouthpiece 100. The end of the yarn F sucked on by the suction cone 99 is swung, in known manner, by means of a finger 101, hingedly mounted on the foot of the suction cone, into the knotting range of the knotting device 91, as soon as a control nose on the lower end of finger 101 slides over a control pin 104. In order that the suction cone 99 can engage over the conical end of the winding cone of the feeding bobbin K also when tube H has been almost unwound, the narrow end of the suction cone has a packing sliding over the tube, and the arm 97 is equipped with a guide sleeve 102, which, when the arm 97 descends, slides over a guide pin 103. For controlling from the yarn feeler 121 the control proceedings in every winding point, this yarn feeler 121 has a control arm 122, the end 123 of which is bent off at an angle, and, when the yarn feeler 121 oscillates, this bent end engages in a recess 124 of a double lever 125, 126. A control cam 132 continually rotates about a shaft 131 and, when this control cam strikes against the bent off end 123 of arm 122, said double lever 125, 126 is oscillated, so that rod 71 releases the drive 73 of the yarn guide drum 61 and the brake 74 becomes operative. At the same time a double lever 133, 134 is actuated, as shown in Figs. 8 and 9. By the oscillating movement of the double lever 133, 134, the wedge-shaped end 135 of the lever arm 134 comes out of engagement with a coupling bolt 136, so that flange 138 of a bush carrying the sprocket wheels 30a, 90a and 78a is coupled with a disc 139 and thereby rotated from shaft 6. After completion of one revolution a control nose 141 engages under one end of a double lever 142, 143, the other end of said lever depressing a locking 144, in which the bent off end 123 of the yarn feeler has been caught, as soon as this end has been liberated from cam 132 owing to the continued rotation of this cam.

If the cross wound bobbin S has attained the desired diameter, also the yarn guide drum is detached from the driving mechanism, in that rod

71 is acted upon by a relay 153 through the intermediary of a rod 151 hingedly connected on the same lever. By a corresponding coupling 152 of lever 125, the remaining control gear does not participate in this movement. Current is fed to the control relay 153 as soon as the arm carrying the cross wound bobbin S engages under two springs 154, 155 which are connected with contacts mounted on an arm 157 adjustable on shaft 4 by means of a set screw 158.

The operation of the machine is therefore such that, after every winding point has been started, the feeding bobbins are successively wound off automatically to a diameter predetermined for a cross wound bobbin, and that, when a yarn breaks, the yarn feeler disengages the control gear so that, through the intermediary

of the chains 78 and 90, the head of winding bobbins and the coordinated knotting arm cooperate. In order that also during the bobbin changing the knotting device can operate in direct continuation of the swinging-in of the substitute bobbin, the bush 27 rotates, as shown in Fig. 6, the spur wheel 29, whereby, through the intermediary of chain 30, not only the toothed wheel 30a but also the toothed wheels 78a and 90a are rotated, whereas the toothed wheel 29 comes out of mesh with the bush 27 owing to the construction of the toothed portion, in case the rotary movement is effected from the control gear.

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