PUBLISHED
MAY 25, 1943.
BY A. P. C.

W. REINERS ET AL
WINDING FRAME
Filed March 13, 1941

Serial No.
383,084
6 Sheets-Sheet 1

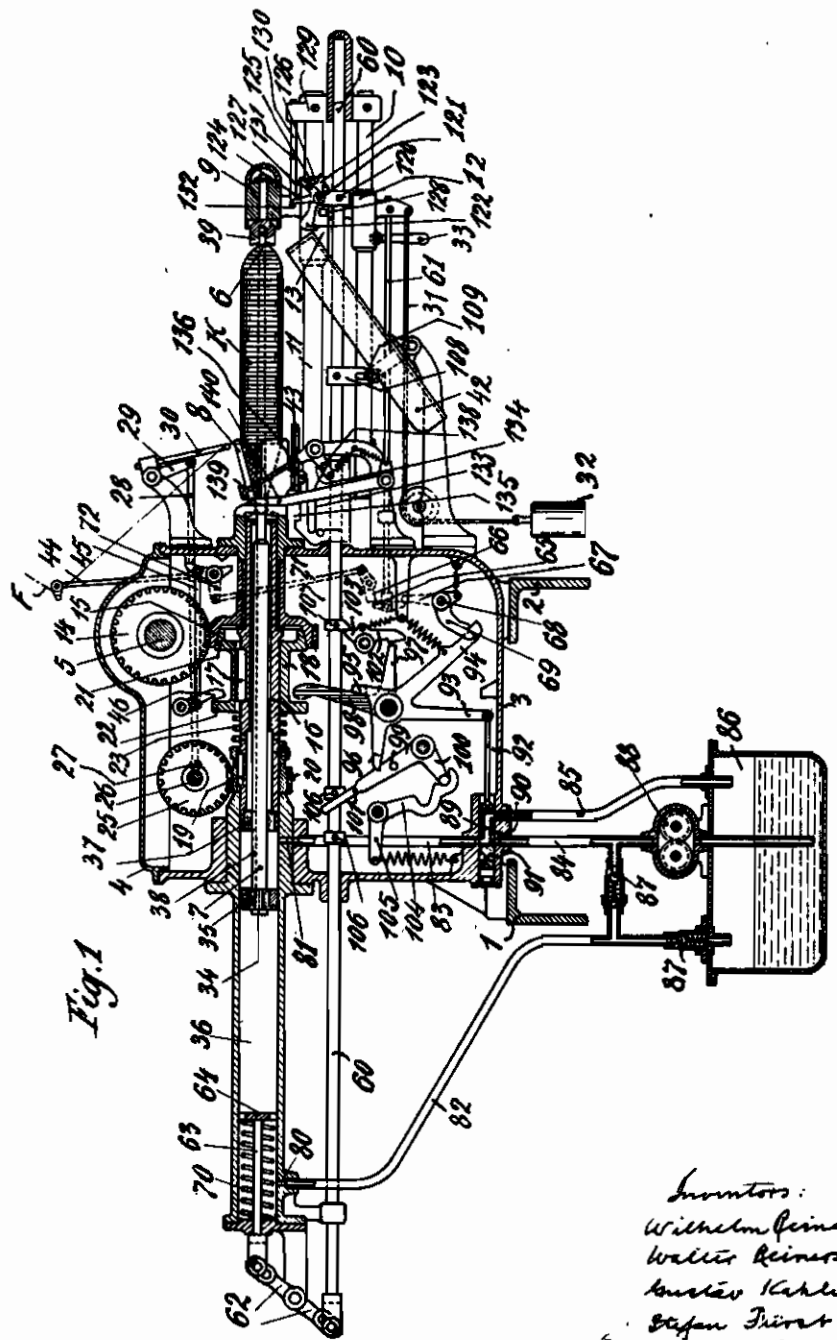

Fig. 1

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Fig. 2.

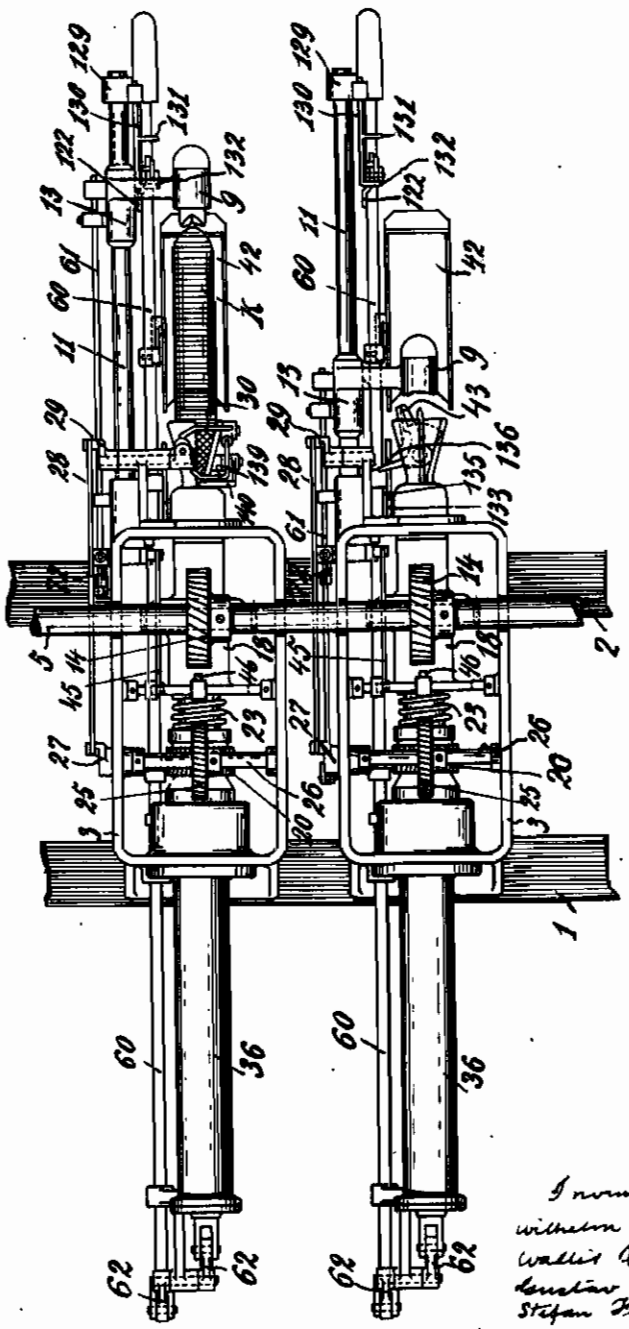

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Fig. 3.

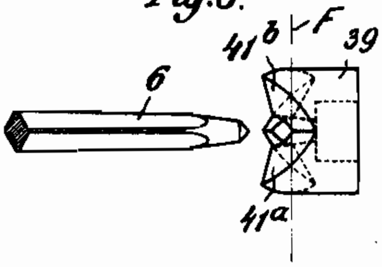


Fig. 4

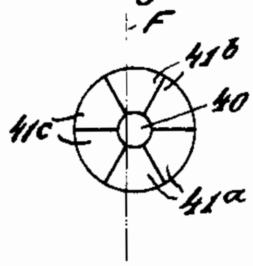
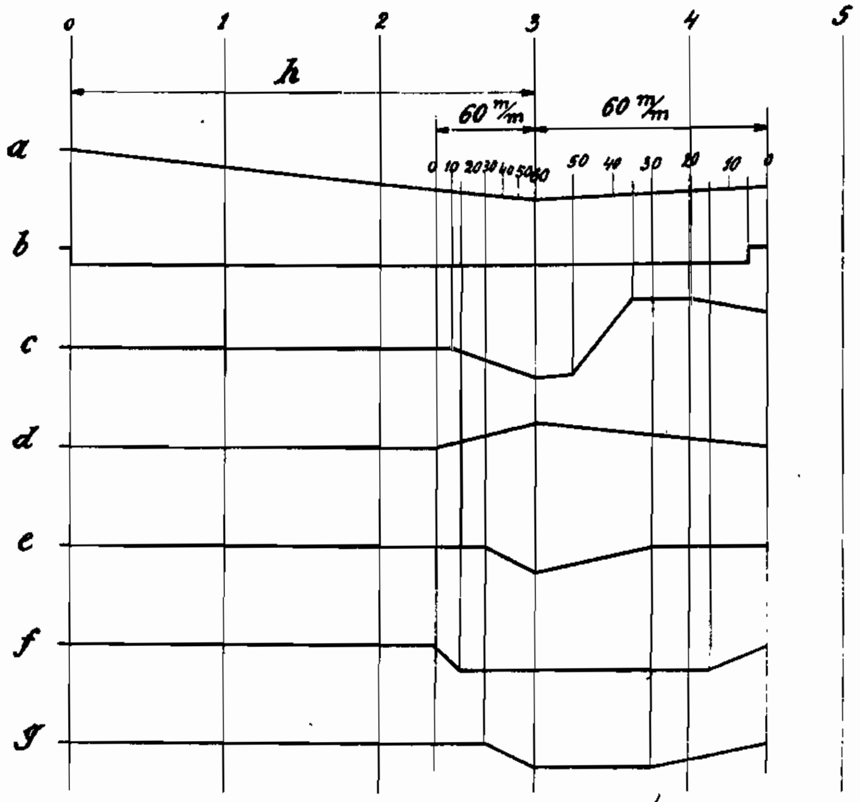


Fig. 5.



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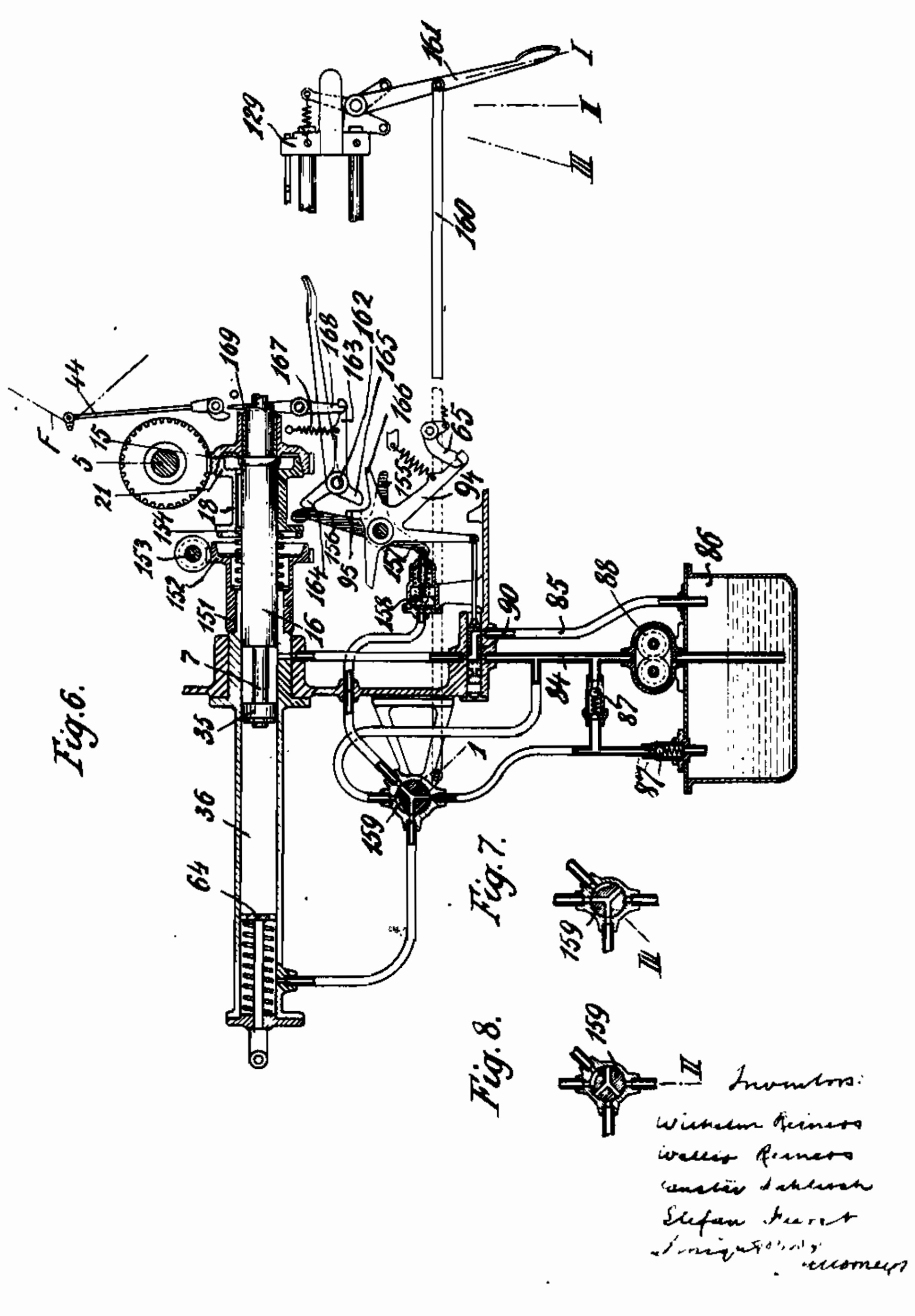

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Fig. 9.

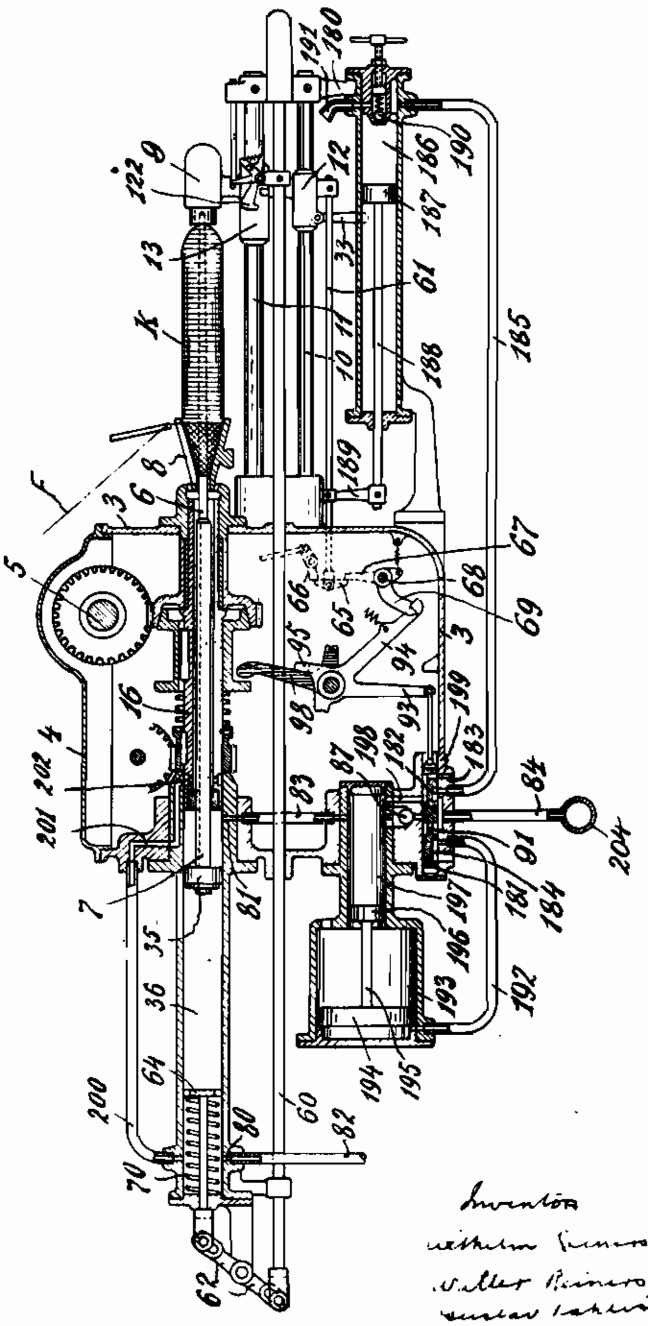

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Fig. 10

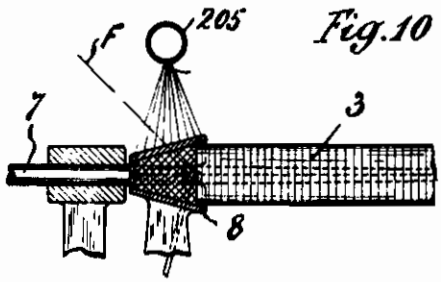


Fig. 11

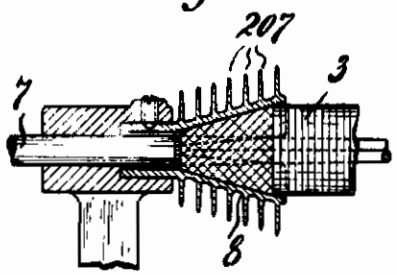


Fig. 12

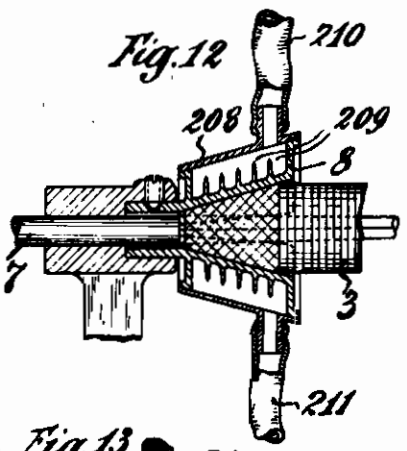


Fig. 14

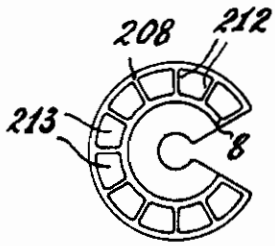
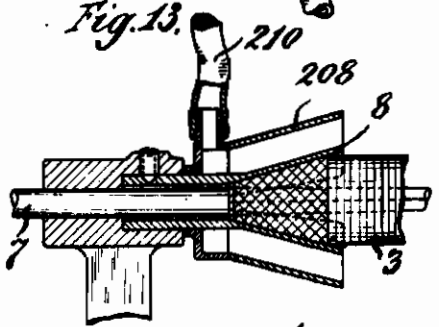


Fig. 13.



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ALIEN PROPERTY CUSTODIAN

WINDING FRAME

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Application filed March 13, 1941

The play of forces at the bobbin exchanging consists in the releasing and carrying out of a greater number of building up proceedings, for which additional accumulators of force in the form of springs, ropes, levers, cam discs and the like are kept ready in the single winding points or for groups of winding points. These individual forces are generally not especially great, so that their renewed keeping ready by re-tensioning, counter-pull and the like, even in quick running and sensitive winding frames with automatic change of bobbins, does not encounter any difficulties. The force required for the pulling out of winding spindles, the attendance of arrangements for replacing bobbins or the like is, however, considerable. It is further not only required instantaneously but must also overcome appreciable resistances up to the starting of the desired movements.

The invention starts therefore from the idea, to automatically accumulate and keep ready this force on the one side but so that its effect can be cut out directly at any time, and to derive on the other side the remaining building up proceedings substantially from this force. According to the invention this is attained thereby, that the force required for the bobbin-changing is taken from a flowing medium, and a control element at first influenced by this medium controls in turn the other building-up proceedings. The resistance opposed at the beginning to the bobbin changing is accounted for according to the invention, in that the flowing medium, before it becomes effective, is placed under increased pressure. As flowing media all known liquid or gaseous media are considered.

In special employment of the idea of the invention in winding frames, in which the winding spindle extends through the cop to be built up, or through the tube of the same, the winding spindle is equipped at one end with a piston which moves to and fro in a cylinder controlled by the flowing medium. In the path of movement of this piston a control plate shiftable in the axis of the cylinder is arranged and hingedly connected with a control rod which controls the different building-up proceedings. This special form offers the further advantage, that the control play, which may be held in its initial position for instance by spring force, presses in turn, after the control pressure of the flowing medium has decreased, upon the spindle piston and thereby pushes the spindle again into the counter-holding head of the winding point.

By this special construction a considerable simplification and acceleration of the bobbin-changing is attained also at the production of tubular cops. In order to facilitate the re-knotting of broken thread ends according to this acceleration, and in order to save time, the invention provides further details which assist the pulling of the tubular cop from the winding funnel and the finding of the broken thread ends at the cop point and further ensure against a premature becoming effective of the change of bobbins, which as such can easily occur at the bobbin movements necessary for the locking up of the thread and the like. According to the invention the slow turning back of the bobbin, known from cross-winding frames, is utilized amongst others.

Also the holding of the starting end of the thread at the beginning of the building-up of a fresh tubular cop is improved according to the invention, in that the counter-cone is equipped with notches extending obliquely to its axis and the winding funnel with an auxiliary thread-guide which oscillates the thread to in front of the funnel and thereby brings it into the range of the notches.

At the solution of the problem a separate reserve or delivery point of the flowing medium was provided for each winding point. In the further development of the idea of the invention considerable simplification in the construction of the whole machine is possible, if a common reserve- and delivery point for the flowing medium is coordinated to the winding points or groups of winding points and each winding point is equipped with a piston compressor, which at the beginning of the bobbin-changing begins to operate and causes a pressure increasing of the flowing medium becoming effective against the spindle piston. The flowing medium can then also be rendered useful through corresponding branch-conduits at the permanent pressing of the cop into the point funnel at the production of tubular cops or for instance of cops on short tubes.

The use of flowing media in the winding frames did lead further to the proposition, to provide blowing arrangements at each winding point, said arrangements preventing the collecting of flying dust very disagreeable just in rapidly running full-automatic winding frames, and inadmissible heating of certain machine elements.

When using gaseous flowing media these media may be used according to the invention as well as source of power as also for the blowing arrangements. The invention provides further that the blowing pressure at the initiation of the building-up proceedings is temporarily in-

creased, so that the gas, for instance the air taken from a general service-conduit for air under pressure, blows jerk-wise the corresponding points.

In order to further improve the cooling of certain machine elements and to make it possible to employ also in funnel-winding frames higher winding speeds, the jacket of the winding funnel has, according to the invention, a specially heat deflecting shape or it is made of heat well conducting material. With the same object in view the winding funnels may be equipped, according to the invention, with longitudinal, transverse or spiral-shaped cooling ribs or the like, whereby a better cooling is attained. The winding funnel may further be surrounded, according to the invention, by a double wall and in the hollow space thus produced no or only very short cooling ribs can be provided. Finally, closed passages may be formed, according to the invention, in double wall winding funnels by the ribs, whereby also a cooling with cooling liquid is rendered possible.

Several embodiments of the invention are illustrated by way of example in the accompanying drawing, in which

Fig. 1 shows a winding point in side elevation, partly in section,

Fig. 2, two neighbouring winding points in top plan view, the cover of the casing being removed,

Figs. 3 and 4 a counter-cone in side elevation and in front view,

Fig. 5 a diagram of the building up times,

Fig. 6 another construction of a winding point as shown in Figs. 1 and 2, all parts not necessary for the explanation being omitted,

Figs. 7 and 8 different positions of the main valve shown in Fig. 6,

Fig. 9 an other form of construction of a winding point corresponding to Fig. 1 partly in section,

Fig. 10 a simple winding funnel in axial section,

Fig. 11 a winding funnel with cooling ribs also in section,

Fig. 12 an axial section through a winding funnel with cooling ribs on the wall in side elevation with admission- and discharge conduits for the cooling medium,

Fig. 13 a corresponding section through a winding funnel with wall and closed passages with admission,

Fig. 14 the winding funnel as shown in Fig. 4 in end view.

Similar parts are designated by similar reference numerals in the different embodiments of the invention.

On the transverse girders 1, 2 of the winding frame the individual winding points are fixed the one directly at the side of the other by means of their casings 3 and in any desired number. The casing walls serve as bearing carriers, oil containers or oil catch and so forth, as usual in such constructions, and they are closed at the top by covers 4. A shaft 5 serves as source of power for all winding points. The tubular cop K which has to be built up is wound directly on the front end 6 of the winding spindle 7 between the top cone 8, the foot of which may be screwed into the casing 3, and the shiftable counter-holding head 9. Rods 10, 11 serve for guiding the counter-holding head 9 and different feeding elements, said head sliding on the rods by means of bushes 12 and 13. The winding spindle 7 is driven from shaft 5 through the intermediary of a gear wheel 14 meshing with a gear wheel 15 equipped with an inner cone, the hub of gear wheel 15 being mounted on a long bush 16 serving at the same time as journal for the spindle 7. A clutch sleeve 18 revolves together with the bush 16 on a slidable wedge 17 and revolves, on a stationary wedge 19, a gear wheel 20. One end of sleeve 18 forms a clutch cone 21 and its other end a flange 22. The clutch cone 21 engages under the action of a spring 23 with the inner end of gear wheel 15.

A thread guide 30 is moved from the gear wheel 20 by a gear wheel 25, shaft 26, crank 27, rod 28 and oscillatable arm 29. The thread guide 30 moves to and fro in front of a lateral slit or the top cone 8. During the laying of the actually foremost thread layer, the forming cop K is pressed, by a pull rope 31 on the slidable bush 12 and by means of a weight 32 or the like, into the top cone 8 and can be pulled out of the same, for instance when a thread breaks, by a handle 33 adapted to be secured in position. The winding spindle 6 together with the cop K can follow this movement without difficulty, as its correspondingly shaped end 34, i. e. a piston 35, slides in a cylinder 36 or in an inner ring 37 of the driving bush 16. A guide groove 38 maintains the driving connection between main shaft 5 and winding spindle 6, 7, when the clutch 15, 21 is engaged.

The front end of winding spindle 6 or the rear end of the cop K bear against the counter-holding head 8 in a specially constructed counter-cone 38, as shown in Figs. 3 and 4. This counter-cone 39 has three notches 41*a*, 41*b* and 41*c* cut obliquely to the axis of the spindle, the thread F being adapted to be caught in the points of intersection of these notches and clamped in the bore 40 of the cone when the spindle 6 is pushed in. This form of construction presents further the advantage, that the thread is centered also when the counter-cone does not revolve. For taking up a finished cop and for severing the thread the usual tipping tray 43 and scissors 43 are provided. The stop motion 44 is connected by a rod 45 with a short oscillatable arm 46 so that the clutch 15, 21 is opened at thread breaking.

Control rods 60, 61 serve for the transmission of the building up proceedings. The control rod 60 is connected by a double lever 62 with a sliding rod 63 in the cylinder 36, the control head 64 of said rod adapted to be shifted against the action of a spring 70 in a manner which will be hereinafter described. The control rod 61 is fixed at one end on the slidable bush 12 and carries at the other end a small tipping lever 65, which is held in the position shown in Fig. 1 by two levers 66, 67. The lever 67 controls by a shaft 68 a control lever 89, whereas the lever 68 can be influenced by the stop motion 44 through rods 71, 72.

The building-up proceedings themselves, after they have been started and the length of the cop has been reached, are propagated hydraulically by oil pressure. With this object in view, two passages 80, 81 are provided near the ends of cylinder 36 and connected with an oil reservoir 86 by tubes 82, 83, 84 and 85. A wheel pump 88 or the like serves for producing pressure, and check valves 87 serve for conducting the flow or for pressure equalization. Tube 83 may be connected by a control slide 90 either with tube 85, in the position shown in Fig. 1, or with tube 84. The slide 90 has, besides an angular bore, an annular groove 91 and is hinged-

ly connected by a rod 92 with a star lever 93, 94, 95 and 96, the arm 95 of this star lever engaging behind an elbow lever 97, 98 mounted on the same shaft as this star lever. A pin 99 of an elbow lever 100, 101 is adapted to act on arm 96 of the star lever, and with an arm 97 of this star lever a short two-armed lever 102, 103, or pawl, cooperates. The star lever and the two-armed lever 102, 103 are directly connected by springs, and the elbow lever 100, 101 is spring-controlled through the intermediary of a notch-lever 104, 105. The lever arm 101 can be influenced from the control rod 60 by abutments 105 and 106, the lever arm 103 by an abutment 107 and the tipping tray 42 by a hinge 108, 109.

A small bracket 120 is fixed on the front end of control rod 60 and carries a pin 121, on which a double lever 122, 123 and an elbow lever 124, 125 are pivotally mounted. The lever arms 123 and 125 are connected by a spring 126, the mutual oscillation of these arms being limited by a pin 127. The slidable bush 13 has an abutment 128 behind which the lever arm 122 may engage, and a connecting piece 129 of the rods 10, 11 has a short rod 130, between abutments 131, 132 of which rod the lever arm 124 moves, in order to temporarily couple the counter-holding head 9 with the control rod 60.

A notch bar 133 is fixed on control rod 60 and equipped with an oblique control face 134, control abutments 135, 136 and a control pin 137. The inclined control face 134 acts upon the guide pin 138 of an auxiliary thread guide 139, whereas the abutments 135, 136, the scissors 43 and the control pin 137 influence an oscillatable arm 140 serving as ejector.

The operation of the arrangement illustrated in Figs. 1 to 4 is as follows:

After the thread F hanging from the thread guide 30 has been clamped between the front end of spindle 6 and the counter-cone 39, the usual building up of the cop begins. The counter-holding head 9 gradually moves forward under the pressure of the thread layers in the right hand direction as shown in the drawing. If a thread breaks during the building up of the cop, the stop motion 44 oscillates towards the left and thereby separates the clutch 15, 21. The cop K in the course of building up and the spindle 6, 7 are then pulled forward from the funnel 8 and in this position fixed on rod 10. Even when the cop K, at the pulling forward for re-knotting the thread, has already attained a length at which the tipping lever 65 contacts with lever 67, this lever 67 cannot enter into operation, for the reason that, when the stop motion is oscillated off, the second counter-bearing, formed by the lever 65, is lacking for the tipping lever 66. The spindle 6, 7 follows the pulled-off cop as a certain oil pressure exists in bush 36. This oil pressure, as shown in Fig. 1, is produced thereby that, especially when the tube 64 is closed by slide 90, the pump 88 in the tube 82 produces a certain pressure limited by the check valves 87. After the re-knotting of the thread the bush 12 is released by means of the handle 33 and the cop pulled again into the funnel under the influence of the weight 32. The pulling force of weight 32 is greater than the oil pressure in the cylinder 36 or on the piston. If the point of cop K is again in the winding funnel 8, the stop motion 44 is moved forward in the usual manner, the clutch 15, 21 closed and the winding proceeding continues.

If the cop K has reached the predetermined length, the tipping lever 65 strikes on the levers 66, 67. As the lever 66 is for the time being held in its position by the stop motion 44, the lever 67 is oscillated in clockwise direction in the form of construction shown, whereby the locking lever 69 liberates the rotary star, so that this star under the action of its pull spring can cause the following control proceedings.

The arm 95 of the rotary star presses the arm 98 of the elbow lever 97, 98, rotating together with the rotary star on the same shaft, against the flange 22 of bush 18 and thereby releases the clutch 15, 21. At the same time the arm 93 of the rotary star pulls forward the rod 92 and thereby connects by the annular groove 91 the pump 86 with the aperture 61 in the cylinder 36. Under the pressure of the pump 88 the piston 35 is consequently shifted to the left in the example shown, wherefrom results that on the one hand the spindle 6 is pulled out of the finished cop K and on the other hand the plate 64 is pressed against the end of cylinder 38. The control rod 60 is hereby moved towards the right. The front end of the lever arm 102 of the pawl 102, 103 engages then under the arm 97 of the elbow lever 97, 98 whereby the clutch is held in the inoperative position. At the same time the arm 101 of the elbow lever 100, 101 is turned in clockwise direction, so that the pin 99 oscillates the arm 96 of the star lever into the position shown in Fig. 1 and therewith pushes the slide 90 back into its original position, so that, when the piston 35 of the spindle 6, 7 moves forward, the oil in front of this piston can flow back through the tubes 63, 85 to the oil reservoir 68. The notch lever 104, 105 assists the elbow lever 100, 101 to oscillate beyond its dead point position. Owing to the movement of the rod 60 towards the right the arm 124 at the front end of this rod is moved away from the abutment 132, so that the locking nose of arm 122 engages behind the abutment 128 and thereby, when the rod 60 continues to move, moves towards the right the bush 13 and by the same the counter-holding head 9. The cop K loses thereby its rear support. As further, owing to the movement of the notched bar 133 towards the right, the pin 137 pushes to the right the ejector 140 moving in the slit of the winding funnel 8, the front end of cop K is also removed from the funnel 8 which supports the same, and the cop drops into the tray 42 oscillated by the hinges 108, 109 in clockwise direction, said tray assuming in this instance a position, which corresponds to the oblique position assumed by the cop when sliding out of the funnel. As the pin 138 of the auxiliary thread guide 139 strikes against the inclined surface 134 of the forward moving notched bar, the cop is oscillated towards the funnel foot and the thread F is also moved forward against the funnel foot independently on the position of the thread guide 30, so that the thread end can hang through the open scissors and be severed by the same. In this position the hanging thread thrum is clamped between the winding spindle 6 and the counter-cone 39 when this spindle engages again into this cone, so that the thread thrum need be neither clamped by the scissors nor be wound first onto the spindle, as the head 9 liberated by the cop suddenly moves towards the left under the action of the weight 32 before the scissors begin to cut. The liberation of the counter-holding head 9 necessary herefor has been effected in the meantime, in that the plate 64, owing to the move-

ment of the slide 90 towards the right, is pushed again in the cylinder 36 under the action of spring 70. At this movement arm 124, which has been moved towards the right together with rod 60 as shown in Fig. 1 and elastically yielding relative to the abutment 131 has engaged behind the same, strikes then against the abutment so that the locking nose 122 is pulled upwards and detached from the bush 13. The thread thrum hanging from the auxiliary thread guide 139 down to the scissors is therefore caught in the notches of the counter-cone 38 and clamped by the spindle 6, which engages in the bore of this counter-cone. The necessary forward movement of the front end of spindle 7, 6 is imparted to the spindle also by plate 64 when this plate moves forward, as the plate 64 pushes the piston 35 in front of it. After the scissors have cut and the rod 60 has been pulled back, the tipping tray 42 assumes again the position shown in Fig. 1, whereby the cop which is in the tray can slip off for instance onto a conveying band.

The whole building up proceedings are again shown in the diagram Fig. 5 by way of example as regards time and travel. The diagrams of the individual elements are designated as follows: *a* for the spindle 6, 7, *b* for the clutch 15, 21, *c* for the counter-cone 39, *d* for the tipping tray 42, *e* for the ejector 140, *f* for the auxiliary thread guide 139, *g* for the scissors 43. The building up times are indicated in seconds by 0, 1, 2, 3, 4 and 5.

After the correct length of the cop has been attained, the spindle first moves a distance *h* of 260 mm (in Figs. 1, 2 and 6 towards the left, in Fig. 5 towards the right) and in a building up time of three seconds. For the last 60 mm the piston 35 pushes the plate 64 in front of it. During the last travel of 60 mm of the spindle 6, 7 the rod 60 is at the same time moved towards the right. In the diagram shown in Fig. 5 it is indicated by corresponding projections in downward direction which building-up proceedings are released and carried through during this travel of rod 60. These proceedings can also be seen directly from the diagram on hand of the above description.

After these building-up proceedings have been carried out, i. e. after the three seconds given by way of example, the backward movement of rod 60 begins and therewith under the influence of the cylinder spring 70 the forward movement of plate 64 or of piston 35. As the spring 70 must move plate 64 and piston 35 in opposition to the still filled cylinder 36, and as spring 70 possesses further a certain stiffness, a slightly longer time is required for the return movement of the rod 60 into its initial position, i. e. for carrying out the travel of 60 mm, as is also indicated in the diagram. Also in this instance the corresponding building-up proceedings are shown according to time and travel by projections in downward direction.

In order to facilitate the finding of the broken thrum when a thread breaking has occurred, a bush 151 with inner cone 152 is rotatably mounted on the cylinder 38, as shown in Fig. 6, which may be driven by a shaft 153. The flange 154 of bush 18 is constructed as clutch cone, so that the driving bush 10 of spindle 6, 7 can be brought under the action of shaft 153 instead of under the action of shaft 5. The shaft 153 revolves considerably slower than the shaft 5 and in opposite direction, so that at the backward movement of spindle 6, 7 or of cop K the thread thrum can be easily found. The engaging of clutch 152, 154 is effected by a three-armed lever 155, 156, 157 behind the arm 156 of which the arm 95 of the star lever engages as in the first form of construction. The arm 157 itself is under the action of a pressure piston 158 which is hydraulically driven as soon as the three-way cock 159 is accordingly turned into the position II, for instance by means of a rod 160. This rod 160 can be moved by a handle or a pedal through the intermediary of a lever 161.

Hydraulic force may also be used for pulling the cop K out of the winding funnel 8 for finding the end of the broken thread, in that for instance the cock 159 is turned into the position III shown in Fig. 7, whereby the pump pressure acts upon the piston 35 from the left, at the side of plate 64 and somewhat shifts the spindle 6, 7.

In Fig. 6 another construction of the means is shown, which can prevent the becoming effective of the reversing motor when the cop K is pulled back at breaking of the thread, especially when the length of cop has approximately been attained.

A three-armed lever 163, 164, 165 is mounted on a pin 162 and can be turned from the stop motion 44 or by means of a handle 166. A spring 167 holds this lever in the locking position together with a pawl 168, 169. At the breaking of the thread the lever 163, 164, 165 as can be seen from the drawing, is liberated by the stop motion 44 owing to the oscillating off of the locking pawl 168, 169. The arm 164 then acts against arm 165 and thereby releases the clutch 15, 21 without, however, closing the clutch 152, 154, whereas the arm 165 strikes against an arm 170 additionally mounted on the star lever and thereby locks this star against rotation, that is prevents a premature becoming effective of the building-up arrangement.

In the form of construction shown in Fig. 9 the liquid container 86 and the pump 88 for each winding point are omitted and replaced by a conduit 204 for pressure medium common for all winding points, this conduit being connected with the control cylinder by means of a control slide 181, a check valve 187 and a piston compressor 184, 196. The control of slide 181 is effected in the same manner as that of slide 90 as shown in Figs. 1 and 6 through a lever star 93, 94, 95, 98.

As the pressure medium from conduit 204 is permanently at disposal, the counter-holding head 9 can also be moved towards the cop K in order to press the same into the funnel 8 by means of the same pressure medium, instead of by counter-weight 32 as described with reference to Fig. 1.

With this object in view the main slide 181 has, besides the annular groove 91, longitudinal recesses 182, 183 and 184. A cylinder 186, which may be fixed on the connecting piece 180 of the guide rods 10, 11, can be connected by a conduit 185 with the distribution point 181 for the flowing medium. A piston 187 slides in the cylinder 186, one end of this piston being connected with the control rod 81 and, as the rod is connected with the slidable bush 12, tends to push the cop K into the top funnel 8 through the intermediary of the counter-holding head 9, as soon as an overpressure exists in the cylinder 186. A discharge 191 is further provided on the head of cylinder 186 and is closed by a check valve 190 and acts as blowing funnel towards the winding point, as soon as a gaseous medium is employed and a

corresponding overpressure is produced in the cylinder **186**.

The distribution point or the slide **181** can further be connected through a conduit **192** with a cylinder **193** of a piston compressor, in which a piston **194** slides, which by a rod **195** can press against a smaller piston **196**. This piston **196** slides in the other cylinder **197** of the compressor which at the same time brings into connection the conduits **83** and **84**, when the slide **181** is in corresponding position. The cylinder **197** may besides also be connected by a conduit **198** with a conduit **199** terminating in the atmosphere.

Finally a conduit **200**, **201** is provided, which terminates in an annular groove **202** in the driving bush **18**, said groove having passages leading to the spindle **7** and, in the form of construction shown, branches from the part of cylinder **36** facing the winding point.

About the operation of the just described form of construction the following has to be said:

During the building-up of cop K the slide **181** is in the position, which can be directly seen from the drawing, i. e. the conduit **84** branched for instance from the general conduit **204** for air under pressure communicates with the cylinder **186** by means of the conduit **185** and presses, by means of piston **187**, rod **188**, transverse piece **189** and rod **61**, the counter-holding head **9** towards the left and thereby the cop K into the top funnel **8**. The valve **190** is then adjusted so that part of the air under pressure blows from the funnel onto the winding point. As the counter-holding head **9** is moved, at the bobbin exchanging towards the right in the form of construction shown, by means of the main control rod **60**, after the catch lever **122** has engaged or when the thread breaks, by pulling forward the hand lever **33**, a sudden increase of pressure must occur in the cylinder **186**, especially if, owing to the movement of the slide **181** to the right, especially in the form of construction shown, when the conduit **185** is closed at the distribution point, this sudden increase of pressure strengthening for a moment the blowing flow, so that settling of flying dust just during the switching proceeding is prevented in specially effective manner.

In a similar manner the flow of air under pressure blown through the conduit **200** or blown through the leakages in the spindle guide towards the point of the cop is increased, as soon as the piston **35**, in the form of construction shown, is moved towards the left for pulling out the spindle **6**, **7** from the cop K.

In order that the starting resistance, which the spindle opposes to the pulling out, can be overcome more easily, the slide **181**, at its movement towards the right as shown, does not only connect the conduits **83**, **84** by means of the annular groove **91**, but it establishes simultaneously the connection between the conduit **84** and the conduit **192**. Consequently the flowing medium in the cylinder **197** is pressed together in the ratio of the surfaces of the pistons **194** and **196** and with corresponding increase of pressure acts upon the piston **35** at the first moment.

According to the invention amongst others the elements exposed to heating have to be cooled. As such element the winding funnel is chiefly to be considered. To realize this idea, a feed pipe **205** for cooling air has above the funnel **8**, as shown in Fig. 10, an air outlet **206** for the cooling air, through which outlet the air current can flush along the winding funnel on the whole extension of the same. The tube **205** may also engage concentrically over the winding funnel **8** wholly or partly, have several air outlets **206** and be connected with main conduit **204**.

In Fig. 11 the winding funnel **8** has ribs **207** for increasing the cooling effect.

Fig. 12 shows a winding funnel with double wall **208** and with short cooling ribs **209**, the admission and discharge conduits **210**, **211** for the cooling medium being carried out elastically, so that the winding funnels may be movably arranged, if desired.

Figs. 13 and 14 show finally a winding funnel with double wall **208** and continuous ribs **212**, by which passages are formed.

The winding funnels according to Figs. 12 to 14 are especially suitable owing to the wall besides for air cooling also for the use of liquid cooling media, provided that in this instance, as in the arrangement shown in Figs. 13 and 14, means for discharging the cooling media, similar as in Fig. 12, are provided.

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