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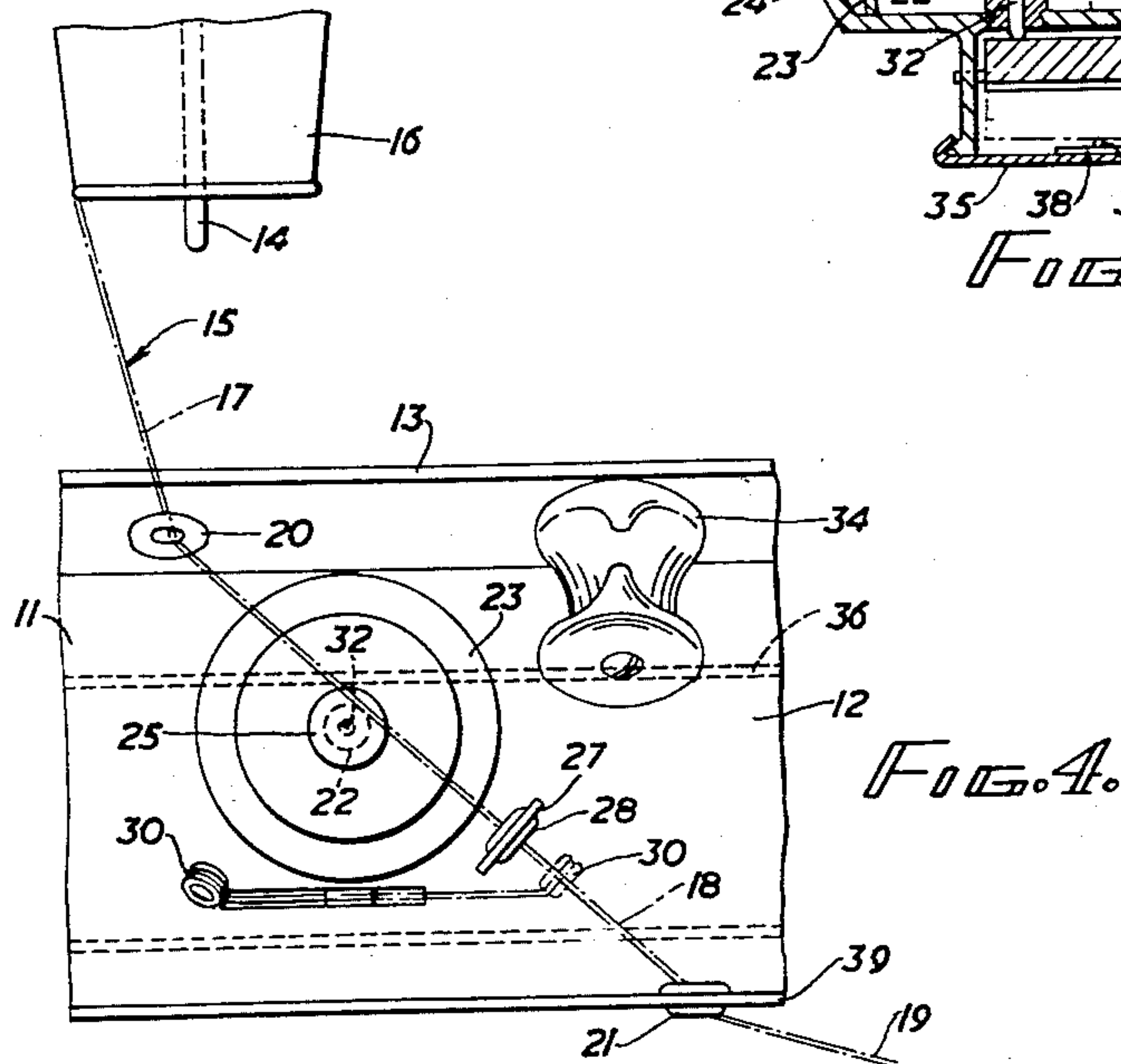
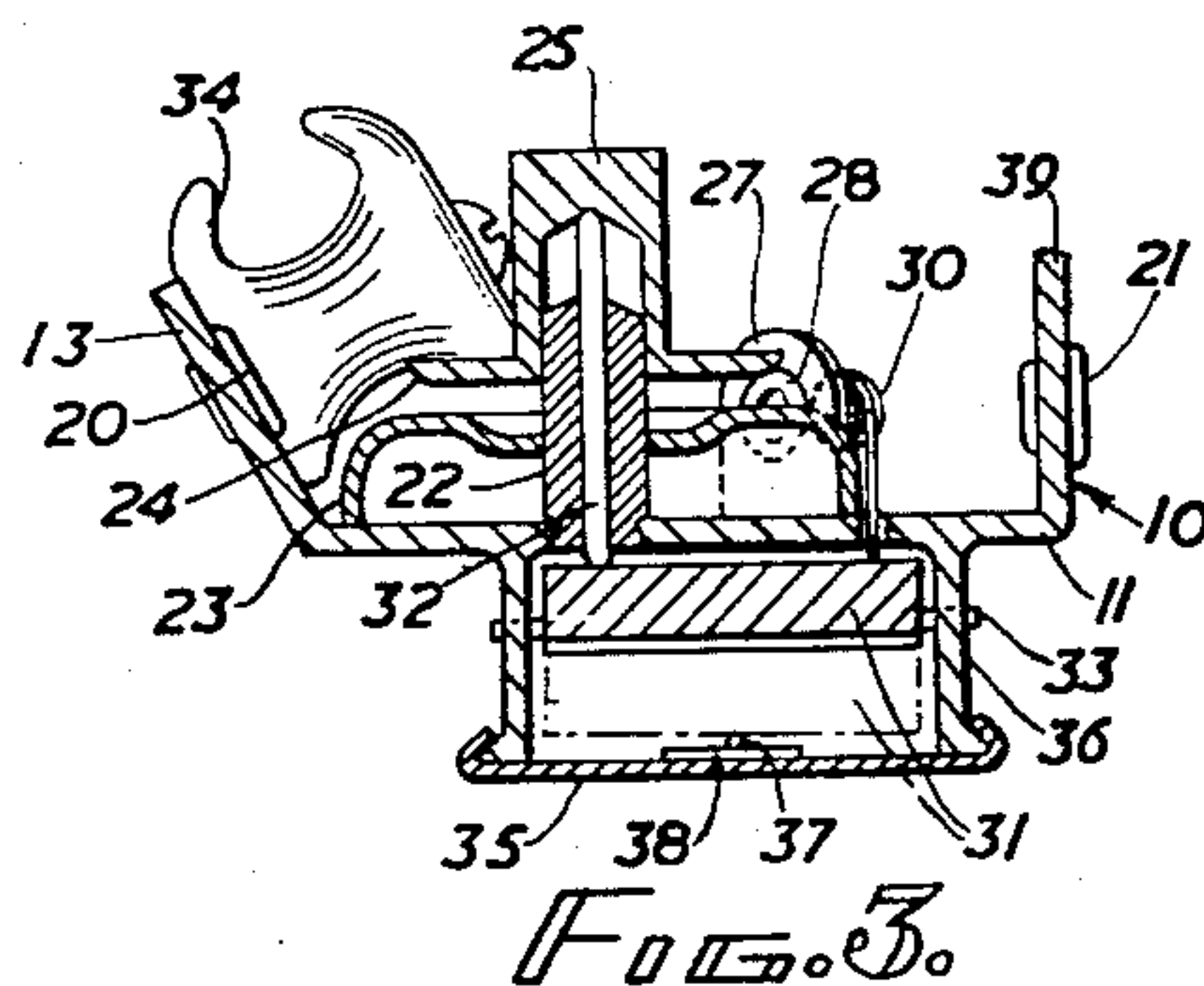
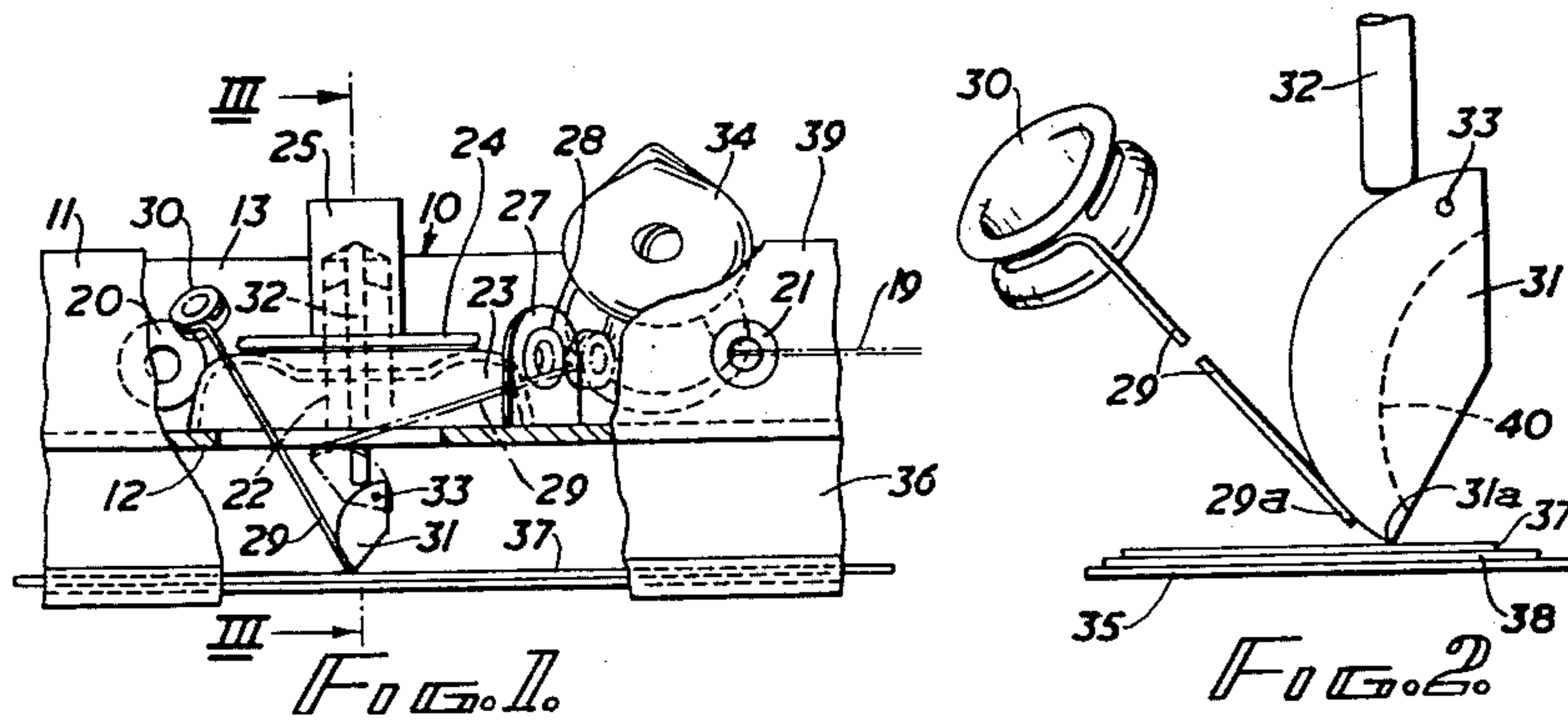
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2,952,890

YARN CONTROL DEVICE

Filed Oct. 21, 1955

2 Sheets-Sheet 1



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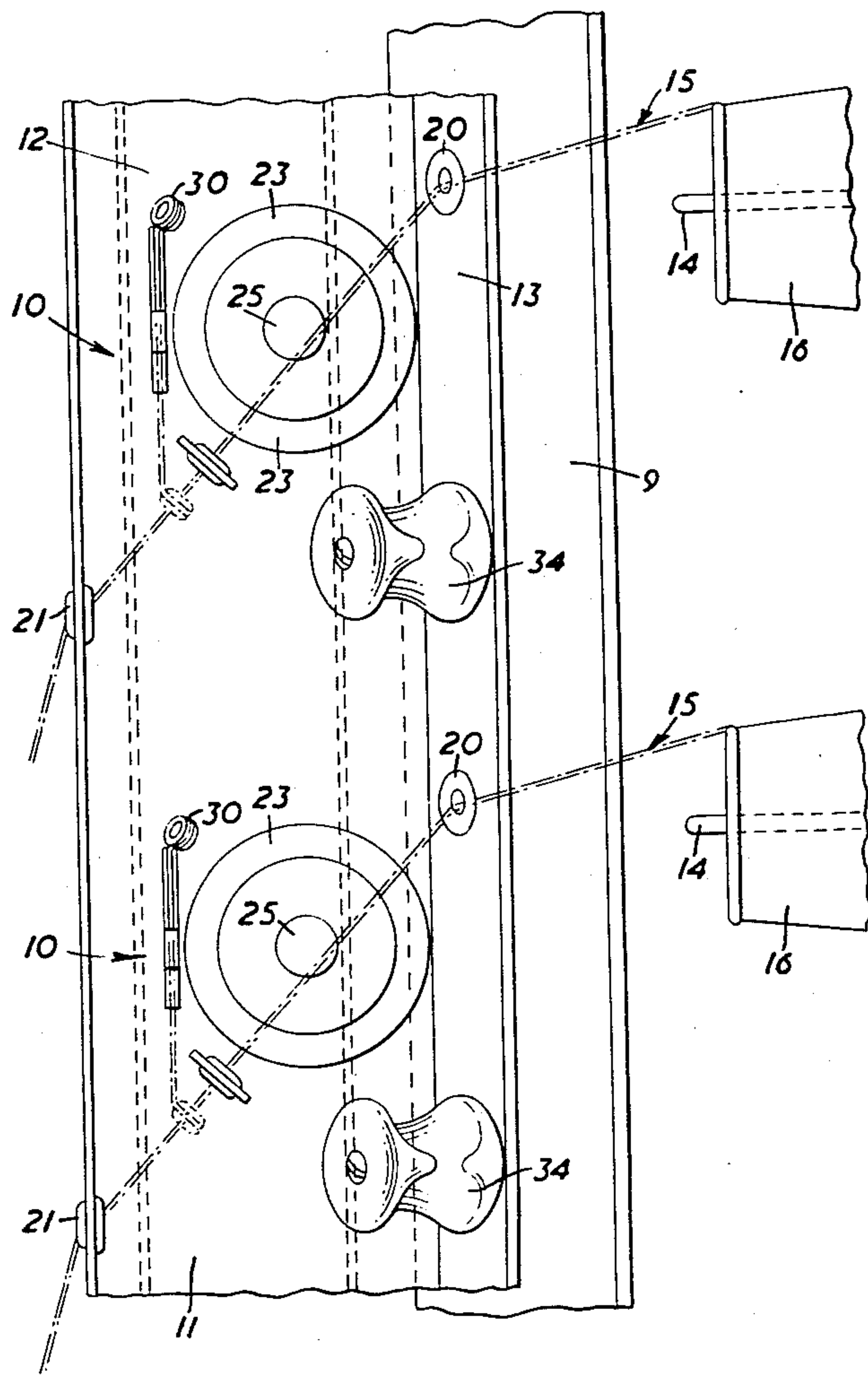


FIG. 5.

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1

2,952,890

YARN CONTROL DEVICE

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Filed Oct. 21, 1955, Ser. No. 542,007

Claims priority, application Great Britain Oct. 25, 1954

10 Claims. (Cl. 28—51)

This invention relates to yarn control devices and is concerned with such a device which, although applicable generally, is more particularly intended for controlling yarn while being drawn off over end from bobbins or other packages.

The invention seeks to provide improvements in the yarn control device described in the specification of Patent No. 2,771,254. In that specification a yarn control device is disclosed which comprises a yarn guide or eyelet movable, under the varying instantaneous tension in the yarn, about a centre and against the loading of a weight from a position in which, with the yarn passing through the guide or eyelet, it determines a longer path for the yarn through the device to a position in which it determines a shorter path, and back again.

An important object of the present invention is to modify the yarn control device described in the specification of the aforesaid patent so that it acts also as a simple and instantaneously operating electrical stop motion for the machine, such as a warp-beaming machine, by which the yarn is being drawn off from the packages mounted, for example, on a creel. Further objects are to simplify and improve the device in order to enable reduced tension to be imposed on the yarn by its passage through the device and to increase the sensitivity of the latter.

A still further object is to provide a yarn control device in which relief of yarn tension from the yarn guide or eyelet causes the latter to move to a position in which it determines the longest path for the yarn through the device and in so doing makes or breaks an electric contact to stop the machine or device utilising the yarn.

Preferably a counterweight is employed, as in the aforesaid patent, as a means of automatically increasing the loading on said yarn guide or eyelet as it moves towards a position in which it determines the shortest path for the yarn through the device, and this counterweight may be arranged to contact an element carried by the device in order to effect the aforesaid making or breaking of the electric contact.

As a result of the improvements effected by the present invention a stop motion is provided which requires no threading of the yarn through drop wires or the like, as is customary with many of the known forms of electric stop motions used in warping from a creel. In fact the yarn does not even come into contact with the movable contact-making and -breaking member of the electric stop motion whereby further damage to the yarn is avoided, in addition to the advantage that the tedious threading of the yarn through the drop wires is completely obviated.

According to a further feature of the invention the yarn guide or eyelet, in the position in which it determines the shortest path for the yarn through the device, is in alignment with the entry and outlet guides which are themselves arranged in staggered relationship so that, with the yarn passing straight from the entry guide through the yarn guide or eyelet and thence to the outlet guide,

2

the path of the yarn through the device is straight and diagonally of the device, so that the yarn may pass through the latter with only two changes in direction.

The arrangement may be such that the total resultant change in direction of the path of the yarn between entering and leaving the device is of the order of 90°, this change in direction being composed of two component changes in direction, one at the entry guide and the other at the outlet guide, of about 45° each.

Due to this improvement or modification the yarn can be run through the device at high speeds and, as a result of the very low friction, without damage to the most delicate filaments. Furthermore as a result of the free and unrestricted path of the yarn the generation of static electricity is greatly reduced, as will be made more clear hereinafter.

One constructional embodiment of the improved yarn control device will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a broken side elevation of the yarn control device and electrical stop motion,

Figure 2 is a detail view on an enlarged scale of the counterweight shown in Figure 1,

Figure 3 is a sectional end view of the device shown in Figure 1 substantially on the line III—III of that figure,

Figure 4 is a broken plan view of the device, the figure also showing one end of a bobbin from which yarn is drawn off through the device, and

Figure 5 is a plan view of two of the devices arranged side by side on a side frame of a creel, only a portion of which is shown, the bodies of the devices being formed from a common channel member.

Referring to the drawings, the improved yarn control device 10 shown therein comprises a body or base plate 11 in the form of a shallow channel 12 of the same cross-section as is described and illustrated in the specification of Patent No. 2,771,254 and, as described therein, a series of the bodies or base plates for a given row of bobbins are preferably formed by a continuous length of extruded channel of the section described. For example such continuous length may extend from end to end of a creel frame 9 or from end to end of any particular section of a creel. The various lengths of channel 12 are mounted, as before, along each side of the bobbin bars of the creel, parallel to such bobbin bars and in laterally spaced relation thereto, with their upwardly and inwardly extending inclined flanges 13 disposed nearer to such bobbin bars. One of the yarn control devices 10 is arranged opposite each bobbin spindle, shown at 14 in Figures 4 and 5, so that the yarn 15 from the respective package or bobbin 16 travels substantially normal to the channel 12, as shown at 17 in Figure 4, through the device 10 and then forwardly, substantially alongside the channel, as shown at 19, to the warp-beaming machine, all as in the aforesaid Patent No. 2,771,254.

Thus, the body or base plate 11 is formed with an entry guide or eyelet 20 disposed in much the same position as in the original arrangement but, instead of being arranged opposite thereto, the outlet guide or eyelet 21 is in staggered relation to the entry eyelet, being disposed at some distance forwardly of the latter, i.e. in the direction from which the yarn 15 is drawn off through the device. The entry and the outlet eyelets 20, 21 thus define a diagonal path 18 for the yarn, Figure 4, across the body or base plate 11 and a cylindrical guide or bollard 22 is arranged only slightly behind such path whereby yarn passing directly between the entry and outlet eyelets passes between a first annular disc-like member 24 of a weight 25 and a second dished disc-like member

3

23 mounted upon a cylindrical guide 22. Between such cylindrical guide and the outlet eyelet 21 a metal support 27 carrying another eyelet 28 is arranged, as in the aforesaid patent, except that such metal support is disposed so as to be normal to the diagonal path 18 to which reference has already been made.

A compensating lever or arm 29, loaded by means of a counterweight 31, is arranged as before except that the eyelet 30 which it carries at its free end is turned into parallelism with the eyelet 28 carried by the metal support 27 when the lever or arm 29 is in the position shown in broken lines in Figures 1 and 4 in which it determines a shorter path for the yarn 15 through the device. In this position of the lever or arm 29 there is thus provided a path 18 for yarn through the device 10 diagonally of the body or base plate 11 of the latter and, in following this path, the yarn 15 entering the device undergoes only two changes in direction between the bobbin 16 and the forward end of the creel, the total change in direction being approximately 90° and such change being effected in two approximately equal changes in direction of about 45° each, as shown clearly at 17, 18, 19 in Figure 4. This simple path through the device is chosen, therefore, in the case of very delicate yarn, where only a very light tension is desired, with resulting minimisation of damage to the delicate filament. In fact it has been found in practice that it is possible to draw off through the device 10 in the manner described the most delicate yarns even when the latter have had no twist imparted thereto. With the yarn 15 passing through the device by the simple path 17, 18, 19 described, the lever or arm 29 is in such position, as has already been stated, that the yarn guide or eyelet 30 at its free end is aligned with the other eyelets 20, 28, 21 when the yarn is being run off at normal tension. Thus the counterweight 31 is turned to a position in which it has caused the pin or plunger 32 to raise the weight 25 so that the annular disc-like portion 24 of the latter is clear of the disc-like member 23 to allow the yarn free passage between the disc elements whereby build-up of static electric charges is reduced to a minimum.

It will be appreciated that this same feature also serves for the fool-proof threading of the device 10. Thus, by turning the lever or arm 29 about its pivot 33 to bring its yarn guide or eyelet 30 into alignment with the three stationary eyelets 20, 28, 21, yarn 15 from the bobbin 16 may be drawn through all four eyelets in one operation with the aid of a hooked needle whereas if the lever or arm 29 is not turned to the appropriate position the annular disc-like portion 24 of the weight 25 will be seated upon the disc-like member 23 and so block the passage of the hooked needle.

To enable the tension placed on the yarn 15 passing through the device 10 to be increased, as for example when greater tensions are required as in the case of heavier yarns, the yarn may be passed around the cylindrical guide or bollard 22 instead of following a straight path between the disc elements. Further, a horned guide 34 is mounted as before forwardly of the cylindrical guide or bollard 22, such horned guide being mounted on the inclined flange 13 of the channel 12, as in the previous arrangement. In order to impose considerably greater tension on the yarn, therefore, the yarn may be passed from the entry eyelet 20 forwardly and around the horned guide 34, thereafter rearwardly round the cylindrical guide or bollard 22 and thence through the stationary eyelet 27, the eyelet 30 at the end of the lever or arm 29 and from thence to the outlet eyelet 21. When extremely high tensions are to be imposed on the yarn two turns of the latter may be made round the horned guide 34, the inclination of the latter enabling this to be done without the second turn rubbing and chafing upon the first.

It will be seen from the foregoing that there are two

4

main alternative paths for the yarn 15 through the device 10—one which does not utilise the horned guide 34 and another which does—the particular path being chosen which is best suited to the gauge and character of the yarn. Changing of the yarn path through the device can be achieved without re-threading.

The counterweight 31 of the compensating lever or arm 29 is preferably lighter than in the original form of the device, being no longer cylindrical in shape but having the circular cross-section reduced to that of a sector of approximately 147° subtended angle, as shown clearly in Figure 2. The pivot pins 33 are arranged as before and the lower end 29a of the compensating lever or arm is attached to the arcuate surface of the counterweight at a point approximately 135° from the pivot axis. Accordingly, with the lever or arm 29 in the position in which it determines the longest path for the yarn 15 through the device 10, the lower corner 31a of the counterweight cross-section falls to a point near the cover plate 35 which closes the open lower end of the subsidiary downwardly directed channel 36. Longitudinally of the upper surface of the cover plate 35, and extending from end to end of the latter, an electrical contact rail 37 runs, such rail being electrically insulated from the cover plate by a strip of material 38 disposed between it and the cover plate.

Due to this arrangement it will be seen that, when the lever or arm 29 falls rearwardly to the position shown in full lines in Figures 1 and 4 and in Figure 2—as for example when the respective package runs empty—the counterweight 31 makes electrical contact with the rail 37 to make or break an electrical circuit to stop the warpage machine. The resulting simple and efficient stop motion, being enclosed by the cover plate 35, is fully protected from dust and fly.

To take care of the circumstance in which the full capacity of the creel is not being utilised an element is provided for suspending the stop motion function of each yarn control device 10 temporarily out of use. Such element may take the form of a stiff wire in order to keep the counterweight 31 at the lower end of the latter raised from the contact rail 37, one end of the wire being bent to form a clip enabling the wire to be attached to the vertical wall 39 of the channel 12 to retain the lever or arm in the counterweight-raising position.

When the device is to be used in circumstances where only a very light tension indeed is desired, the counterweight may have the subtended angular portion of its sector-shaped cross-section scalloped out, as shown by the broken line 40 in Figure 2, so that it becomes an arcuate shell, or almost pawl-like in shape. Further the pin or plunger 32 may be made of fibre or plastics, instead of metal, in order to effect a further saving in weight and consequent increase in sensitivity, and the mass of the weight 25 operated by the pin or plunger may also be reduced with the same object. The same basic device may, therefore, be adapted to suit a wide variety of different conditions.

I claim:

1. For a machine utilising yarn, a yarn control device comprising in combination a body, entry and outlet guides for the yarn fixedly mounted in said body, a movable yarn guide disposed between said entry and outlet guides, a lever carrying towards one of its ends said movable yarn guide, a pivot for said lever arranged towards its opposite end and disposed so that the lever and movable yarn guide swing about the pivot in a plane inclined to the shortest path of the yarn through the device from the entry guide to the outlet guide, a counterweight to which said lever is rigidly connected and which is offset from and movable about said pivot to load said lever and is raised about the pivot as the lever turns about the latter against the loading under the varying instantaneous tension in the yarn from a position in which, with the yarn

5

passing through said movable yarn guide, the latter determines a longer path for the yarn through the device to a position in which it determines a shorter path, said counterweight being lowered on reverse movement of the lever, and a contact element disposed below said pivot with which the counterweight, when lowered, comes into electrical contact to stop the machine utilising the yarn.

2. For a machine utilising yarn, a yarn control device comprising in combination a body, an entry guide for the yarn fixedly mounted on one side of said body, an outlet guide for the yarn fixedly mounted on the other side of said body, a movable yarn guide disposed between said entry and outlet guides which are arranged in staggered relationship longitudinally of said body, a lever carrying towards one of its ends said movable yarn guide, a pivot for said lever arranged towards its opposite end, a counterweight, offset from and movable about said pivot, which loads said lever and is raised about the pivot as the lever turns about the latter, against the loading, under the varying instantaneous tension in the yarn passing through said movable yarn guide, from a position in which the latter determines a longer path for the yarn through the device to a position in which it determines a shorter path, said counterweight being lowered on reverse movement of the lever, a first disc-like member superimposed upon a second disc-like member to form a further yarn guide with the yarn passing between the adjacent surfaces of the disc-like members, means operatively associated with said lever for raising said first disc-like member as the counterweight is raised to separate the disc-like members and relieve the tension applied to the yarn by these latter, and a contact element, disposed below said pivot, with which the counterweight when lowered comes into electrical contact to stop the machine utilising the yarn said entry, outlet and movable yarn guides being disposed relatively to each other so that, with the movable yarn guide in the position in which it determines the shortest path for the yarn through the device and the yarn passing straight from the entry guide through the movable yarn guide and thence to the outlet guide, the path of the yarn through the device is straight and diagonal of the device.

3. For a machine utilising yarn, a yarn control device comprising in combination a body, an entry guide for the yarn fixedly mounted on one side of said body, an outlet guide for the yarn fixedly mounted on the other side of said body, a movable yarn guide disposed between said entry and outlet guides which are arranged in staggered relationship longitudinally of said body, a lever carrying towards one of its ends said yarn guide, a horizontally arranged pivot for said lever disposed towards its opposite end, a counterweight, offset from and movable about said pivot, which loads said lever and is raised about the pivot as the lever turns about the latter, against the loading, under the varying instantaneous tension in the yarn passing through said yarn guide, from a position in which the latter determines a longer path for the yarn through the device to a position in which it determines a shorter path and is lowered on reverse movement of the lever, a vertically slidable plunger adjacent the axis of said pivot and carried by said body, a cam formed by a surface of said counterweight against which the lower end of said plunger bears and which effects progressively increasing raising movement of said plunger as said counterweight is raised, a first disc-like member superimposed upon a second disc-like member to form a further yarn guide with the yarn passing between the adjacent surfaces of the disc-like members, said raising movement of the plunger also effecting progressively increasing raising movement of said first disc-like member to separate it from said second disc-like member and relieve the tension applied to the yarn by the adjacent surfaces of the disc-like members, and a contact element disposed below said pivot with which the counterweight, when lowered about the pivot, comes into electrical contact to stop the

6

machine utilising the yarn, said entry, outlet and movable yarn guides being disposed relatively to each other so that, with the movable yarn guide in the position in which it determines the shortest path for the yarn through the device and the yarn passing straight from the entry guide through the movable yarn guide and thence to the outlet guide, the path of the yarn through the device is straight and diagonal of the device.

4. For a machine utilising yarn and by which the yarn is drawn off from packages mounted on a creel, a yarn control device according to claim 2, wherein said body is in the form of a shallow channel adapted to extend longitudinally of a side frame of the creel and has a transverse portion with projecting side walls which carry said inlet and outlet guides respectively, said transverse portion having portions extending therefrom to form a subsidiary downwardly directed channel the walls of which carry said counterweight which lies therebetween, said device further comprising a cover plate which closes the lower end of the downwardly directed channel and upon the upper surface of which said contact element is mounted so as to be electrically insulated therefrom.

5. For a machine utilising yarn, a yarn control device comprising in combination a body, a yarn guide, a lever carrying towards one of its ends said yarn guide, a horizontally arranged pivot for said lever disposed towards its opposite end, a counterweight, offset from and movable about said pivot, which loads said lever and is raised about the pivot as the lever turns about the latter, against the loading, under the varying instantaneous tension in the yarn passing through said yarn guide, from a position in which the latter determines a longer path for the yarn through the device to a position in which it determines a shorter path and is lowered on reverse movement of the lever, a vertically slidable plunger adjacent the axis of said pivot and carried by said body, a cam formed by a surface of said counterweight against which the lower end of said plunger bears and which effects progressively increasing raising movement of said plunger as said counterweight is raised, a first disc-like member superimposed upon a second disc-like member to form a further yarn guide with the yarn passing between the adjacent surfaces of the disc-like members, said raising movement of the plunger also effecting progressively increasing raising movement of said first disc-like member to separate it from said second disc-like member and relieve the tension applied to the yarn by the adjacent surfaces of the disc-like members, and a contact element disposed below said pivot with which the counterweight, when lowered about the pivot, comes into electrical contact to stop the machine utilising the yarn, the counterweight being of substantially sector shape in cross-section and arranged so that the curved surface of the counterweight is uppermost and forms said cam, the lower corner of the counterweight making contact with the contact element.

6. For a machine utilising yarn and by which the yarn is drawn off from packages mounted on a creel, a multiplicity of yarn control devices according to claim 2 the bodies of which for a given row of packages carried by the creel are formed from a common channel member extending longitudinally of the creel portion carrying said row of packages, said contact element extending continuously along the length of the channel.

7. For a machine utilising yarn and by which the yarn is drawn off from packages mounted on a creel, a yarn control device comprising in combination a body in the form of a shallow channel the side walls of which are adapted to extend longitudinally of a side frame of the creel, an entry guide for the yarn fixedly carried by the inner side wall of said body, an outlet guide fixedly carried by the outer side wall of said body, said entry and outlet guides being horizontally aligned with each other and arranged in staggered relationship longitudinally of said body, a movable yarn guide disposed be-

tween said entry and outlet guides, a lever carrying towards one of its ends said movable yarn guide, a horizontally arranged pivot for said lever arranged towards its opposite end, and a counterweight, offset and movable about said pivot, which loads said lever and is raised about the pivot as the lever turns about the latter against the loading from a position in which, with the yarn passing through said movable yarn guide, the latter determines a longer path for the yarn to a position in which it determines a shorter path, the entry, outlet and movable yarn guides being disposed relatively to each other so that, with the movable yarn guide in the position in which it determines the shortest path for the yarn through the device and the yarn passing straight from the entry guide through the movable yarn guide and thence to the outlet guide, the path of the yarn through the device is straight and diagonal of the device, so that the yarn passes through the latter with only two changes in direction, one of such changes being effected at the entry guide and the other at the outlet guide.

8. A yarn control device according to claim 7 wherein the total resultant change in direction of the path of the yarn between entering and leaving the device is of the order of 90°, this change being composed of said two changes in direction in each of which the direction of the yarn changes by about 45°.

9. A yarn control device according to claim 7, and further comprising a contact element disposed below said pivot with which the counterweight, when lowered about the pivot as the lever turns to the position in which it determines the longest path for the yarn through the device, comes into electrical contact to stop the machine utilising the yarn.

10. A yarn control device according to claim 7, and further comprising a vertically slidable plunger adjacent the axis of said pivot, a vertical cylindrical guide for said plunger carried by the body, a cam formed by a surface of said counterweight against which the lower end of said plunger bears and which effects progressively increased raising movement of said plunger as the counterweight is raised, a first weighted disc-like member superimposed upon a second disc-like member to form a further yarn guide with the yarn passing between the adjacent surfaces of the disc-like members, said raising movement of the plunger also effecting progressively increasing raising movement of said first weighted disc-like member to separate it from said second disc-like member and relieve the tension applied to the yarn by the adjacent surfaces of the disc-like members, said vertical cylindrical guide being arranged slightly to one side of the diagonal path of the yarn through the device so that said diagonal path passes between the disc-like members.

References Cited in the file of this patent

UNITED STATES PATENTS

2,017,008	Lonctaux et al. _____	Oct. 8, 1935
2,387,369	Vossen _____	Oct. 23, 1945
2,420,513	Arrowood _____	May 13, 1947
2,771,254	Stanier _____	Nov. 20, 1956

FOREIGN PATENTS

788,137	France _____	Oct. 4, 1935
1,102,704	France _____	Oct. 25, 1955
806,538	Germany _____	June 14, 1951