July 22, 1958 W. L. FREEZE 2,844,335

CREEL

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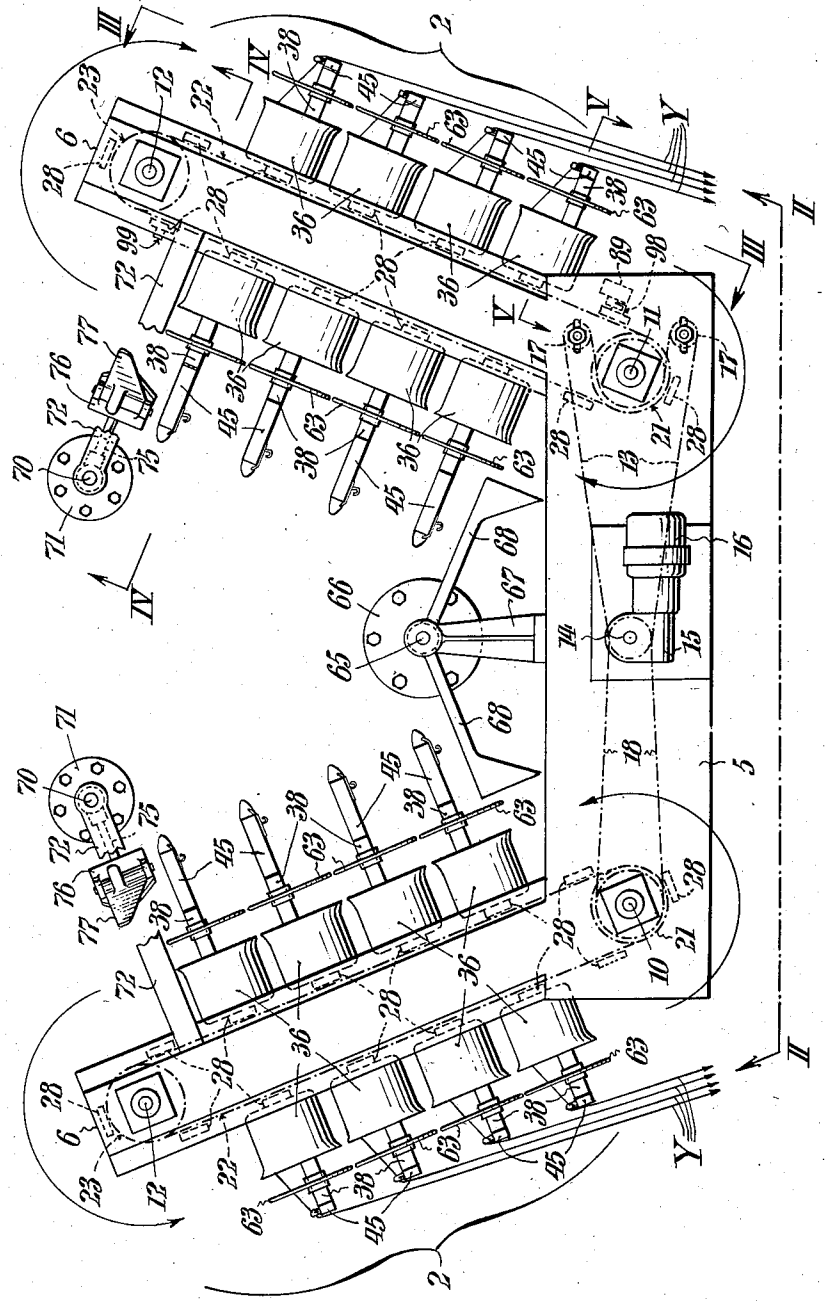

FIG. 1

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FIG. 2.

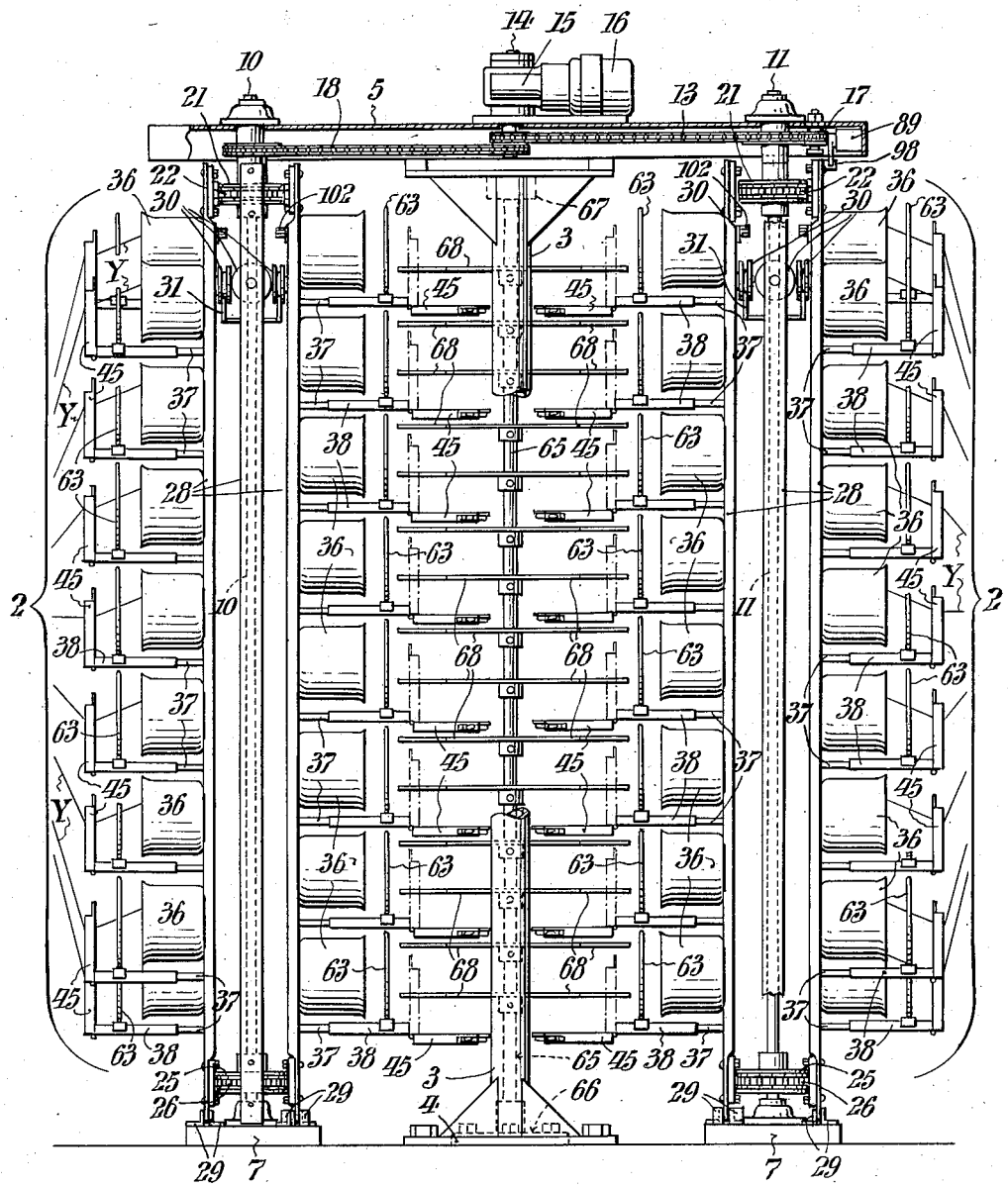

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FIG. 3.

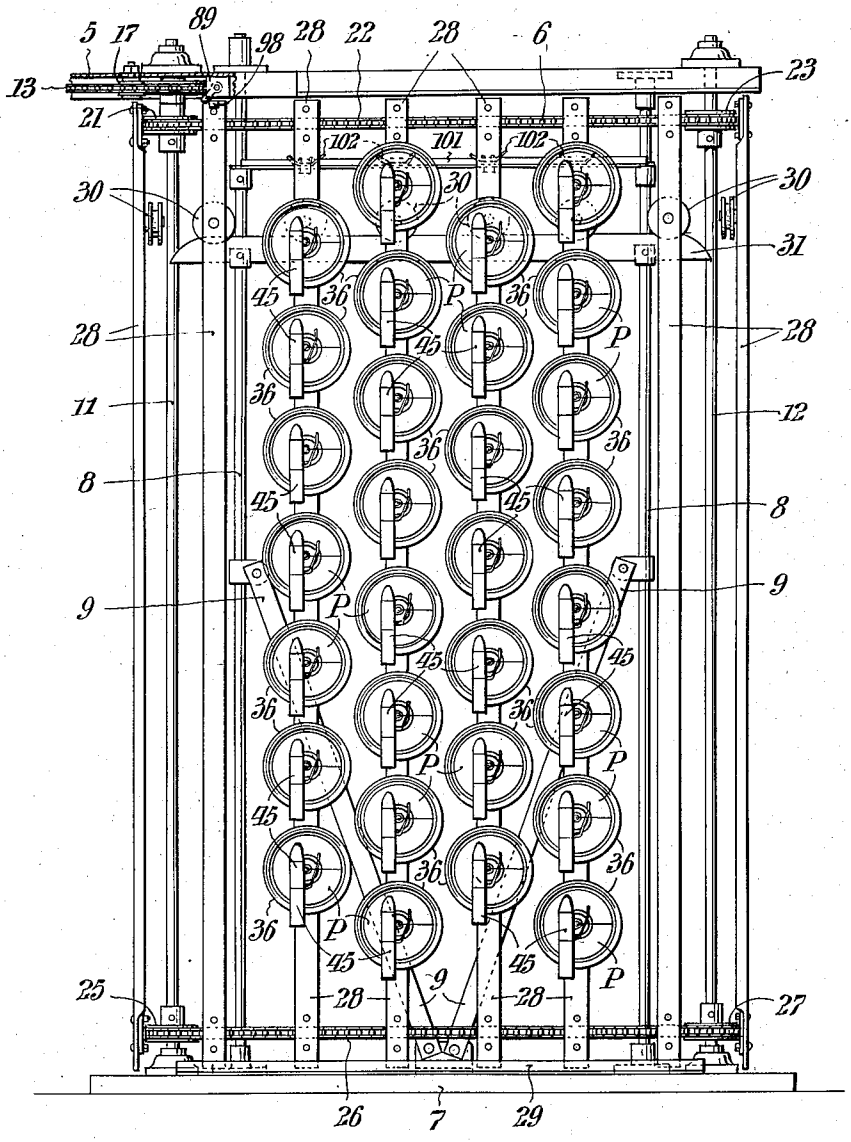

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FIG. 13.

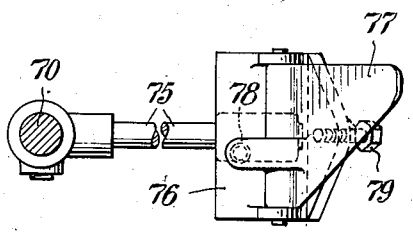

FIG. 14.

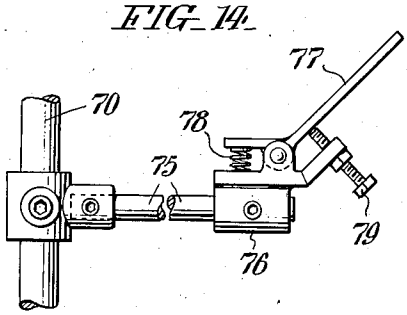

FIG. 12.

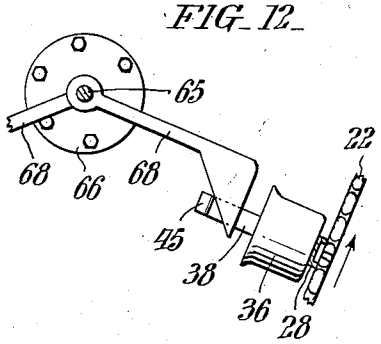

FIG. 4.

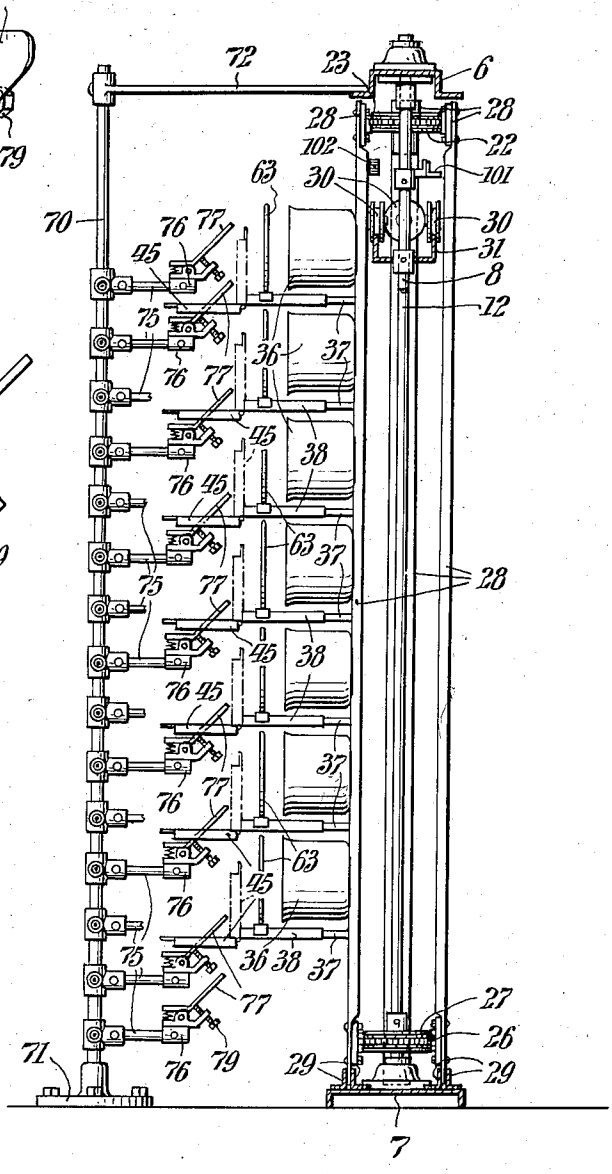

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FIG. 5

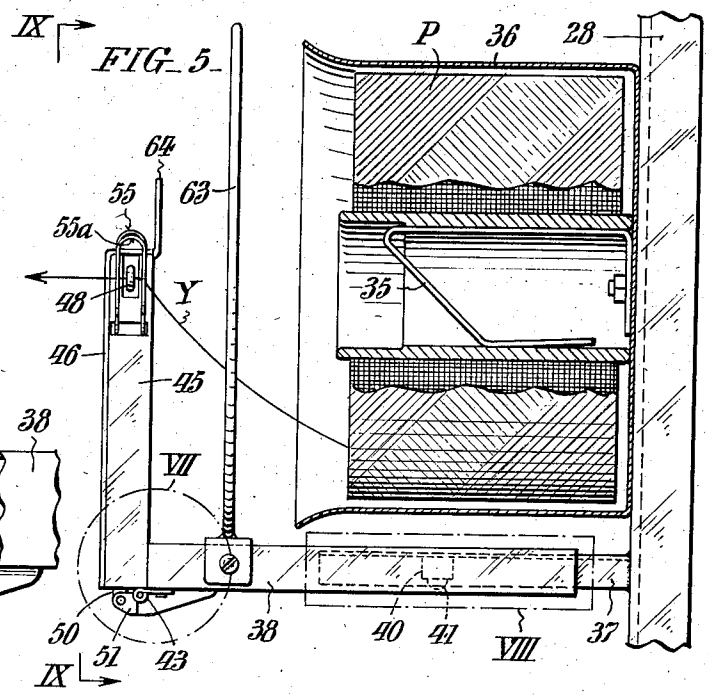

FIG. 7

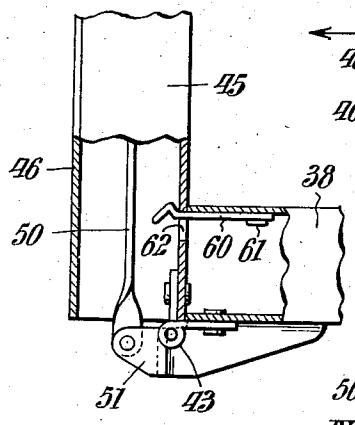

FIG. 6

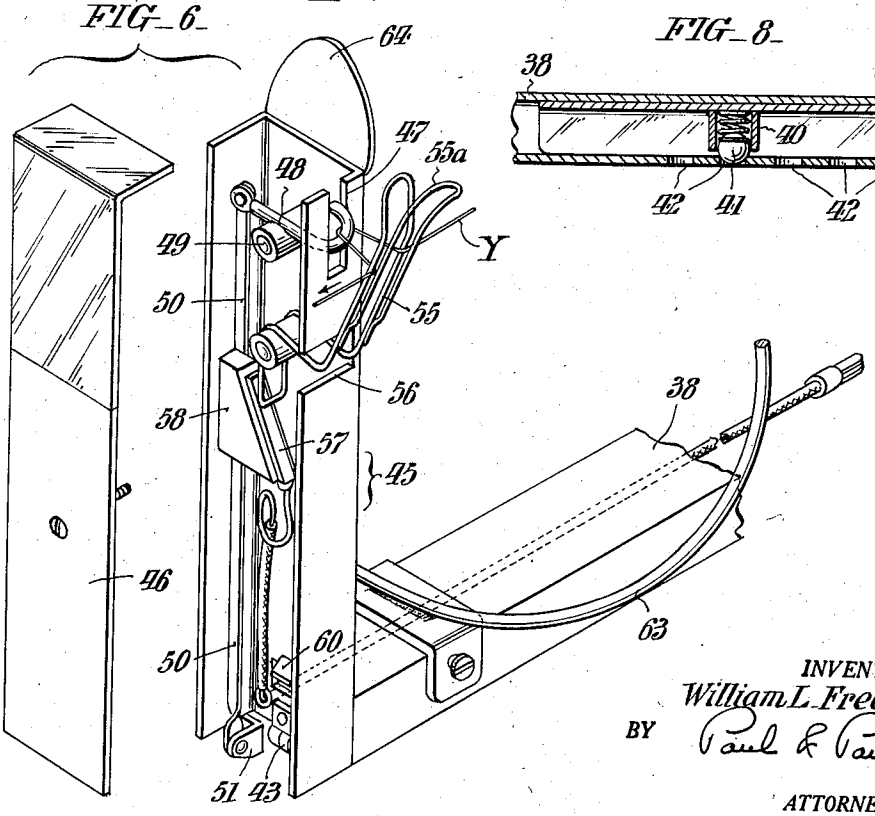

FIG. 8

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FIG. 9.

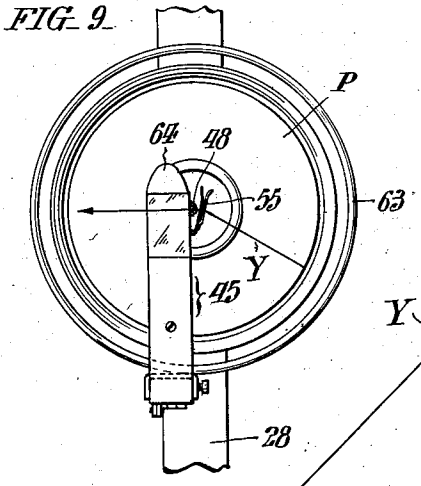
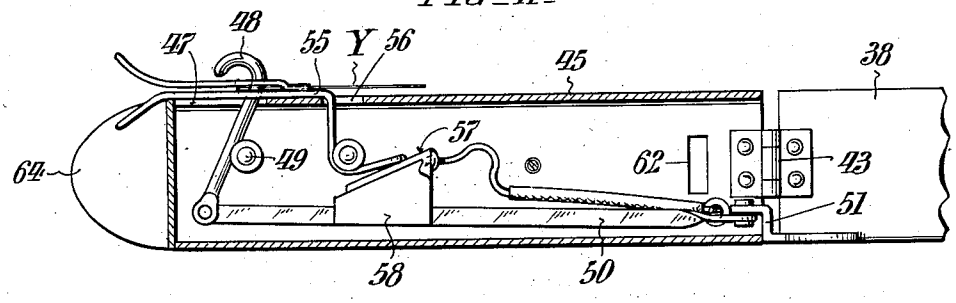


FIG. 10.

FIG. 11.



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CREEL

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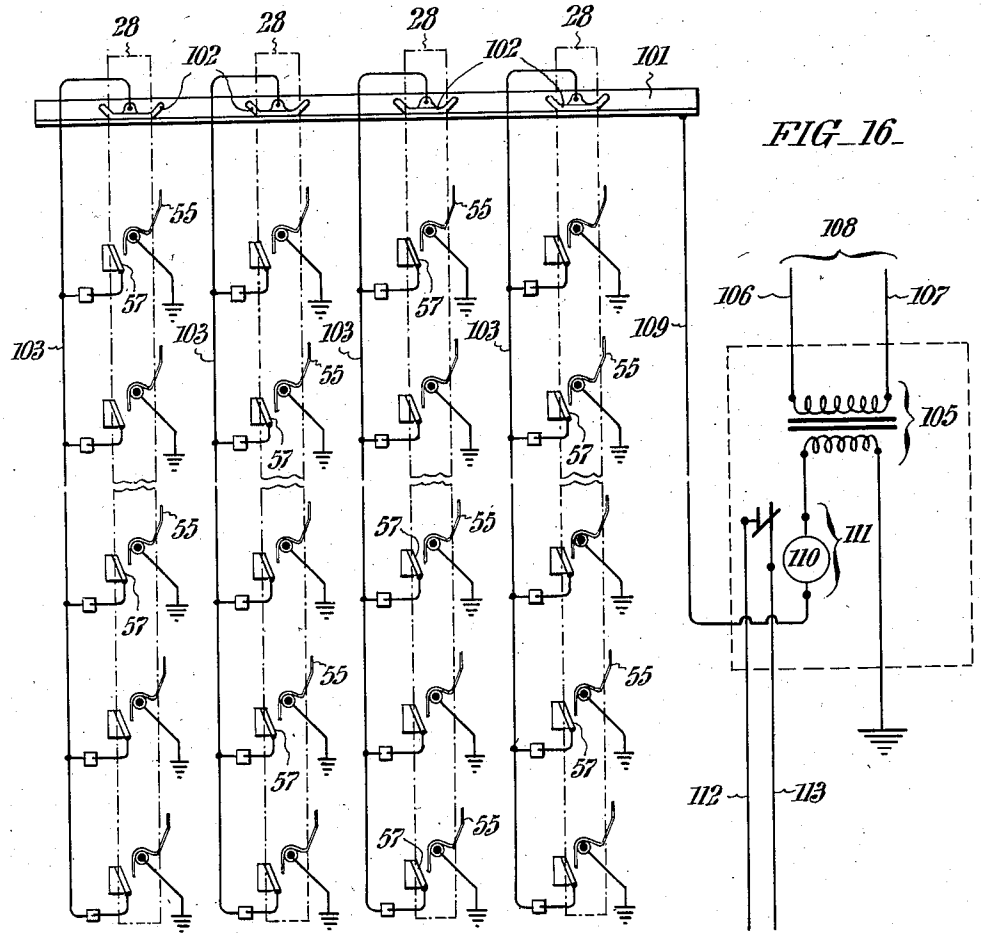

FIG. 16.

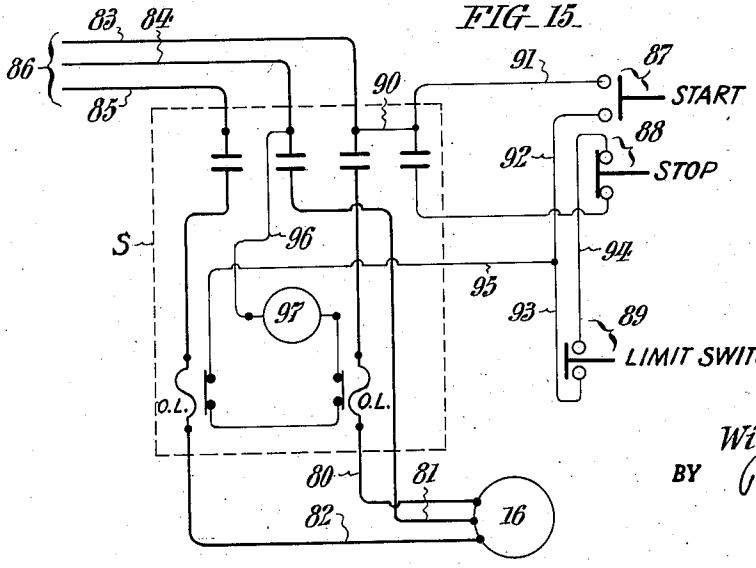

FIG. 15.

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2,844,335

CREEL

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Application May 25, 1955, Serial No. 511,044

9 Claims. (Cl. 242—131.1)

This invention relates to creels such as are used in the textile industry to support plural yarn packages from which the yarns are drawn by warp beamers or the like associated with creels.

More specifically, the invention is concerned with creels having two wings arranged at an angle to each other and each supporting multiple yarn packages from which individual yarns are drawn enroute to a beam warper.

One of the aims of my invention is to provide, in connection with a creel of the type referred to, improved manually-controlled power-operated means for transferring, from the front or running outer sides of the wings, groups of the yarn packages upon substantial exhaustion of the yarn supply thereon, to the rear or loading sides of the wings for replacement by fresh packages, and at the same time transferring previously mounted groups of fresh packages from the rear or loading sides of the wings to the front or running sides for resumption of the creeling.

Another object of my invention is to provide improved adjustable means for guiding and controlling ballooning of the yarns as they are drawn from the individual packages.

Another object of my invention is to provide automatic means for moving the yarn guides from normal operative position to threading position incident to transfer the groups of exhausted packages from the front or running sides of the creel wings to the rear or loading sides as aforesaid, and for automatically restoring the guides to operative position as fresh groups of packages are transferred from the rear or loading sides of the wings to the front or running sides.

Another object of my invention is to provide improved electric stop motion means, with self cleaning contacts, which can be relied upon to bring about stopping of the beam warper in the event of rupture of individual yarns or depletion of the yarn supply on individual packages.

A further object of my invention is to secure the aforesaid advantages in a creel which is compact in construction and requires but a minimum of floor space for its accommodation.

Other objects and attendant advantages will appear from the following detailed description of the attached drawings, wherein:

Fig. 1 shows, in top plan, a double wing creel conveniently embodying my invention.

Fig. 2 shows the creel in front elevation or as seen when looking as indicated by the arrowed lines II—II in Fig. 1, with portions broken away to expose important details which would otherwise be hidden.

Fig. 3 is a view in side elevation looking as indicated by the angled arrows III—III in Fig. 1.

Fig. 4 is a vertical section taken as indicated by the angled arrows IV—IV in Fig. 1.

Fig. 5 is a fragmentary detail section on a larger scale taken as indicated by the angled arrows V—V in Fig. 1 and showing one of the yarn guide units in its relation to the corresponding supply package.

Fig. 6 is an exploded view in perspective of one of the yarn guide units.

Fig. 7 is a detail section partly in elevation and partly in section in the region of the broken line circle VII in Fig. 5.

Fig. 8 is a fragmentary detail view of the region within the broken line rectangle VIII in Fig. 5.

Fig. 9 is a fragmentary view in elevation looking as indicated by the angled arrows IX—IX in Fig. 5.

Fig. 10 is a view generally similar to Fig. 5 showing the yarn guide positioned for threading of the yarn.

Fig. 11 is a detailed sectional view on a still larger scale taken as indicated by the angled arrows XI—XI in Fig. 10.

Fig. 12 is a detail view in plan showing the means provided for automatically moving the thread guides to threading position during transition of substantially exhausted groups of packages from the outer or running sides of the wings of the creel to the inner or loading sides of the wings.

Fig. 13 is a detail view in horizontal section showing the means provided for automatically restoring the yarn guides to operative position during transition of a fresh group of packages from the rear or loading sides of the creel wings to the front or running sides.

Fig. 14 is a side elevation of the parts shown in Fig. 13.

Fig. 15 is a diagram showing the wiring connections for the creel operating motor; and

Fig. 16 is a diagram showing the wiring connections of the stop motion of the creel.

As herein exemplified, my improved creel comprises an open frame structure having straight-away flanking wings **2** disposed in angular relation to each other. Included in the frame structure is a column **3** whereof the base **4** is bolted fast to the floor on which the creel is supported. Rigidly connected to the top of the column **3** and extending laterally therefrom to equal distances in opposite directions is a hollow beam **5**; and reaching at complemental angles outwardly from opposite ends of the beam in the plane thereof are top extensions **6** for the wings **2**. Secured to the floor in the vertical planes of the extensions **6** are footings **7** for the wings **2**. These footings may be in the form of metal planks. Extending vertically between said extensions and said footings adjacent opposite ends, are tie rods **8** which are braced by inclined struts **9** as instanced in Fig. 3. Journalled in bearings adjacent opposite ends respectively of the beam **5** and at the corresponding ends of the footings **7** beyond the tie rods **8** are vertical shafts **10** and **11**; and similarly journalled in bearings respectively adjacent the outer ends of the extensions **6** beyond the tie rods **8** and at the corresponding ends of the footings **7** are vertical shafts **12**. By a sprocket chain **13** within the hollow of the beam **5**, the shaft **11** is arranged to be driven from the output shaft **14** of the speed reducer **15** of an electric motor **16** supported on the beam at the center. As shown, the chain **13** is maintained taut by a pair of idler sprockets **17** which are adjustably mounted on the beam **5**. The vertical shaft **10** is arranged to be driven from the shaft **14** through a similar sprocket chain connection **18** within the hollow of the beam **5**. As a result of this construction, the two vertical shafts **10** and **11** will be rotated at the same speed but in opposite direction as indicated by the arrows in Fig. 1. Secured to the shafts **10** and **11** immediately below the beam **5** are wheels **21** which are connected, by means of chains **22**, to sprocket wheels **23** of the same size fast on the shafts **12** immediately below the beam extensions **6**. Likewise, sprocket wheels **25** fast on the shafts **10** and **11** immediately above the footings **7** are connected by chains **26** to sprocket wheels **27** of the same size similarly located and affixed to the vertical shafts **12**.

Fixedly secured at their top and bottom ends to the upper and lower carrier chains **22** and **26** at uniformly spaced intervals, are vertical bars **28**. As shown, the bottom ends of the bars **28** are constrained to travel in guide tracks **29** formed by spaced parallel angle iron rails arranged back to back and secured lengthwise of the footings **7**. At their inner faces and near their tops, the bars **28** are provided with rollers **30** which run on the upright flanges of horizontal U-section tracks **31** supported by the tie bars **8**. Bolted to and projecting from the bars **28** at vertically spaced intervals, are holders (see Fig. 5) which are fashioned from spring strip metal and upon which the yarn packages P of "cheese" form are impaled. Bell-like shrouds **36**, secured with the holders **35** to the bars **28**, serve as guards to restrain the warp yarns Y as they are drawn from the packages P during operation of the creel. It is to be noted from Fig. 2 that the holders **35** on alternate bars **28** are staggered with relation to those on the intervening bars. As a result, the yarn packages P are accommodated in a minimum of space which favors compactness of the creel as a whole.

Welded to and extending laterally outward from each bar **28**, immediately below each shroud **36**, is a channel section projection **37**, see Figs. 5–10, over which a square section slide **38** is telescopically engaged; and spring biased within a socket **40** internally of said projection **37** is a ball **41** capable of selective engagement with longitudinally spaced apertures **42** in the bottom of the slide **38** to hold said slide in different positions of adjustment for a purpose presently explained. Pivotally connected to the distal end of the slide **38** by a hinge **43** is a channel section arm **45** of which the hollow is closed by a removable cover plate **46**. One side of the arm **45** is notched at the top as at **47** to clear the hook end of a yarn guide finger **48** which is rockable about a pivot stud **49** within said arm, and of which the tail end is connected, by a link **50**, to an anchorage lug **51** affixed to the slide **38** adjacent the hinge **43**. Pivoted within the arm **45**, somewhat below the guide finger **48**, is a drop contact finger **55** of wire which extends outwardly through another clearance notch **56** in said arm, and which has a bifurcated end **55***a* looped to clear the hook of said guide finger. The tail of the contact finger **55** extends into the path of the exposed inclined face of a contact piece **57** which is set into a block **58** of insulation affixed to the link **50**. During operation of the creel, the arm **45** is held in the upright position in which it is illustrated in Figs. 5–7 by a latch spring **60**. As shown, the spring **60** is secured, by a rivet **61**, within the hollow of the slide **38** and engages into an aperture **62** in one side of the arm **45**. When the arm **45** is in upright or operative position, the hook end of the guide finger **48** is partially withdrawn into the notch **47** to form, with the corresponding wall of the arm, a closed eye for traverse by the running yarn Y as it is drawn from the supply package P, while the drop contact finger **55** is restrained by the yarn as in Fig. 6 with its tail clearing the sloping cam surface of the contact piece **57** on the link **50**. In the event that the yarn Y should rupture or the supply on the package become depleted, the contact finger **55** will drop by gravity, and through engagement of its tail with the contact piece **57**, will close a circuit hereinafter described by which the drive motor of a beam warper (not shown) is stopped. By shifting the slide **38** along the projection **37**, it is possible to vary the distance between the yarn guide **48** and the corresponding supply package P and, in this way, to not only control the ballooning of the yarn but the tension imposed thereon as well. As a further means to control the ballooning, there is adjustably mounted on each slide **38** in concentric relation to the corresponding shroud **36**, a constraining ring **63** of stout wire. In preparation for re-threading, the arm **45** is swung down to horizontal position as in Figs. 9 and 10, stopped against the lug **51**. In order to facilitate this manipulation, the arm **45** is provided at its distal end with a grasp tab **64**.

As the arm **45** is so moved, the guide finger **48** is turned about its pivot **49** by the action of the link **50**, and its hook end thereby projected as shown in Fig. 10, and the contact finger **55** is at the same time turned flat against the arm **45** by camming action of its tail with the inclined surface of the contact piece **57**, the latter being incidentally wiped clean of any lint which may cling to it. The hook end of the guide finger **48** being thus cleared, the broken end of the warp yarn Y from the supply package is inserted into the bifurcation at the end of the contact finger **55** as in Figs. 10 and 11 and engaged into the hook of said guide finger. With this accomplished, the arm **45** is swung upright to its normal position as in Fig. 5. After the guide finger **48** has been re-threaded and operation of the creel is resumed, the contact finger **55** will fall away from the guide finger **48** and absorb the slack in the yarn as in Fig. 6.

In the present instance I have shown but two groups of four vertical rows of the yarn package holders on adjacent bars **28**, three bars between opposite ends of the groups being devoid of such holders. During the operation of the creel, the warp yarns are drawn from the groups of the packages at the front or running sides of two wings of the creel while fresh packages are substituted for previously exhausted packages at the rear or loading sides of the wings by an attendant stationed in the clear-space between said wings. When the supply of yarn on the running packages is substantially exhausted at the completion of a beaming operation, the creeling is stopped and the motor **16** is started to drive the shafts **10** and **11** through the chain connections **13** and **17**, with the result that by induced movement of the chains **6** and **26**, the substantially depleted groups of packages are moved from the front or running sides of the wings **2** and transferred to the rear or loading sides, while at the same time new groups of packages are brought to the front sides of the wings in preparation for a new beaming operation.

For the purpose of automatically lowering the arms **45** to threading position as the groups of substantially exhausted packages are transferred to the rear or loading sides of the two wings of the creel in the manner above explained, and for afterwards automatically raising said arms as the groups of fresh packages are moved to the outer or running sides of the wings, I have provided means as follows:

Secured at spaced levels to a rod **65** upstanding from a floor anchorage foot **66** in the clear-space between the creel wings **2** and sustained at its upper end by a bracket **67** extending rearwardly from the center of the beam **5**, are cam elements **68** which reach into the path of the yarn guide arms **45**. As the arms **45** encounter the sloped edges of the cam elements **68** during movement of the chains **6** and **26**, said arms are released from the restraint of their latch springs **60** and drop to the horizontal position in which they temporarily remain for package replacement and threading of the yarn ends from the new packages into the guides **48**. Stationed adjacent the outer ends of the two creel wings within the clear-space between said wings are rods **70** which rise from floor anchorages **71** and which, at their upper ends are sustained by brackets **72** extending laterally from the extensions **6** of the beam **5**. Projecting laterally from the posts **70** toward the creel wings **2** at spaced levels are arms **75** to the distal ends of which are secured brackets **76** whereto are pivoted upwardly-inclined cam elements **77**. The springs, indicated at **78**, act upon the tails of the cam elements **77** to normally maintain them stopped, as shown in Figs. 4 and 13, against screws **79** adjustable in the brackets **76**. Thus as the chains **6** and **26** are moved to transfer groups of fresh yarn packages from the rear or loading sides to the front or running sides of the wings **2**, the lowered arms **45**, by encounter with the sloped edges of the cam elements **77** are automatically restored to upright position.

The motor **16** for driving the chains **13** and **18** is supplied with electric current, as shown in the diagram of Fig. 15, through conductors **30**, **81** and **82** extending from a starter S to which the leads **83**, **84** and **85** of a three wire three phase power line **86** are connected. Operation of the motor **16** is controlled by "Start," "Stop" and "Limit" switches respectively designated **87**, **88** and **89**, the switches **87** and **89** being normally open. Through the wiring **90**, **91**, **92**, **93**, **94**, **95** and **96**, the switches **87**, **88**, **89** and the coil **97** of the starter S are connected across the power mains **83** and **84**. From Figs. 1 and 2, it will be noted that the limit switch **89** is supported on the top beam **5** of the creel framework and is arranged to be actuated by lugs **98** and **99** respectively on the blank chain carrier bars **28** immediately ahead of each group of the packages P at the right hand wing **2** so as to be opened each time that the chains **22** and **26** of the two wings have travelled through a half circuit. The chains **22** and **26** can be stopped at any point in their travel simply by pressing the stop switch **88** as will be readily understood from Fig. 15. The "Start" and "Stop" switches may be suitably located on the creel framing convenient of access to the attendant of the creel.

Supported between the rods **8** immediately below the sprocket chains **6** of the respective creel wings **1** and **2** at the front or running sides of the latter with interposition of insulation, are rails **101** adapted to be overtravelled by contact shoes **102** on the respective bars **28** carrying the yarn packages. As instanced in the diagram of Fig. 16, each bar **28** is grounded through the framing of the creel, as are also the drop contact fingers **55** associated with the respective bars **28**. The cam pieces **57** associated with the fingers **55** are connected, through conductors **103**, in series with the respective shoes **102**. The current for the stop motion is supplied at reduced voltage from a transformer **105** of which the primary coil is connected across the mains **106** and **107** of a power line **108**. By means of a conductor **109**, the rail **101** on each wing **2** of the creel is connected to one terminal of the transformer secondary of which the other terminal is grounded as shown. Interposed in the conductor **109** is the coil **110** of a stop motion relay **111** from which conductors **112** and **113** extend to the motor (not shown) of the beam warper associated with the creel. Accordingly, upon rupture of any of the yarns or exhaustion of any of the supply packages P and dropping of the corresponding drop fingers **55** to engage the associated cam pieces **57**, a circuit will be established through the coil **110** of the stop motion relay to interrupt the current to drive motor of the beam warper which is thereby brought to a standstill. While the preferred embodiment of this invention has been described in some detail, it will be obvious to one skilled in the art that various modifications may be made without departing from the invention as hereinafter claimed.

Having thus described my invention, I claim:

1. In a creel, a framework with two straight-away upright wings disposed in angular relation to each other; vertical shafts journalled in opposite ends of the respective wings and having wheels respectively secured to them adjacent their upper and lower ends; endless carriers connecting corresponding pairs of the wheels of the wings; sets of laterally-spaced vertical bars extending at intervals between the straight runs of the carriers at the inner and outer sides of the respective wings; yarn package holders vertically spaced on the bars of the two sets; yarn guides supported by the individual bars respectively adjacent the yarn package holders thereon, said guides being individually movable from an operative position to a retracted position to facilitate threading of the yarns through them; means for simultaneously actuating the carriers of the two wings to bring the groups of yarn packages and the associated yarn guides at the outer sides of the wings, after the yarn supply on the packages is substantially depleted, to the innersides of the wings for replacement by fresh packages; automatic means for incidentally moving the guides associated with the groups of substantially depleted packages to threading position in preparation for threading of the yarns of the new packages; and means automatically operative as the groups of new yarn packages are progressed from the inner sides of the two wings by another actuation of the carriers, to restore the associated yarn guides to operative position.

2. A creel according to claim 1, wherein the yarn guides are supported by arms hingedly connected to the bars so as to be swingable from upright operative position to horizontal threading position; wherein the means for moving the guides to horizontal threading position and again restoring them to upright operative position incident to successive actuations of the carriers of the two wings, comprises groups of vertically-arranged cam elements stationarily supported respectively adjacent opposite ends of the two wings in the clear-space between said wings.

3. A creel according to claim 1, wherein the means for actuating the carriers of the two wings comprises an electric motor and drive connections between the motor and the vertical shafts; and further including a manual start switch and a pair of normally closed unit switches in circuit with the motor, said switches being affixed to the framework at opposite ends of one of the wings of the creel; and a pair of lugs affixed in spaced relation to one of the carriers of said one wing respectively for opening said limit switch to stop the motor after such carrier has moved through a half circuit.

4. In a creel, a support having multiple holders thereon for horizontally sustaining as many individual yarn packages of the cheese type for endwise withdrawal of the yarns therefrom; lateral projections on the support adjacent the respective holders; hollow arms hingedly connected to slides adjustable along the respective projections; normally retracted yarn guide fingers within the hollows of the respective arms and having hook ends extending through lateral openings in side walls of the arms, said hook ends normally forming, in conjunction with the outer faces of the side walls, closed eyes for traverse of the running yarns when said arms are in upright position; and means automatically operative when the arms are swung to horizontal position to move the guide fingers for projection of their hook ends outwardly beyond the side walls of the arms so that the yarns can be laid into said hook ends, and to reversely move the guide fingers to their original positions when the arms are swung back to upright position.

5. The invention according to claim 4, wherein the yarn guide fingers are medially fulcrumed and have rearward tails; and wherein the means for moving the guide fingers comprises links pivotally connected respectively at one end to the tails of the fingers and each pivotally connected at the other ends to fixed anchorages at the distal ends of the corresponding projections on the support.

6. The invention according to claim 4, further including spring latches on the projections adapted to cooperate with notches in the sides of the arms to yieldingly maintain said arms in upright position.

7. The invention according to claim 4, wherein the guide fingers are medially fulcrumed and have rearward tails, and further including metallic contact pieces respectively affixed, with interposition of insulation, to the links and having sloping cam surfaces; electric circuit closing gravity drop contact fingers medially pivoted within the hollows of the arms inwardly of the fulcra of the guide fingers, said contact fingers having looped ends extending through openings in the walls of the arms in the planes of the guide fingers and being of a length to overreach the guide fingers, said contact fingers being normally restrained by the running yarns with their tail ends clear-

ing the cam pieces on the links when the arms are in an upright position, and being turned rearwardly against the arms through wiping engagement of their tails by the contact pieces when the arms are swing to horizontal position.

8. The invention according to claim 7, wherein the contact fingers are bifurcated with the terminals of the bifurcations curved outwardly relative to each other to facilitate entry between them of the yarns in threading the guides.

9. In a creel, an elongate upright metallic framework; vertical shafts journalled respectively at opposite ends of the framework and having wheels secured to them adjacent their upper and lower ends; endless carriers connecting corresponding pairs of the wheels; sets of laterally-spaced vertical bars extending at intervals between the straight runs of the carriers at opposite sides of the framework; yarn package holders vertically spaced on the bars of the two sets; means for actuating the carriers to bring the yarn packages at the front or running side of the creel, after they are substantially depleted, to the rear or loading side of the creel for replacement by fresh packages and at the same time bring a previously mounted group of new packages from their rear of the creel to the front of the creel; lateral projections on the respective bars adjacent the yarn packages; metallic gravity drop fingers pivoted on the projections of the respective bars, said fingers being normally engaged by the running yarns and adapted, upon rupture of individual yarns or upon depletion of the supply on individual package, to engage the corresponding adjacently positioned contact elements; a horizontal track rail supported, with interposition of insulation, by the framework; shoes on the individual bars adapted to frictionally engage the rail when the packages on said bars are in running position at the front side of the creel, said shoes being connected by conductors to the individual contact elements corresponding to the fingers pivoted on the projections on the respective bars; and a circuit in which the fingers and the rail are connected together with a stop motion relay for controlling a separate warper holding circuit.

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