March 19, 1963 A. L. STAUFFER ET AL 3,081,798

APPARATUS FOR WEAVING WIRE CLOTH

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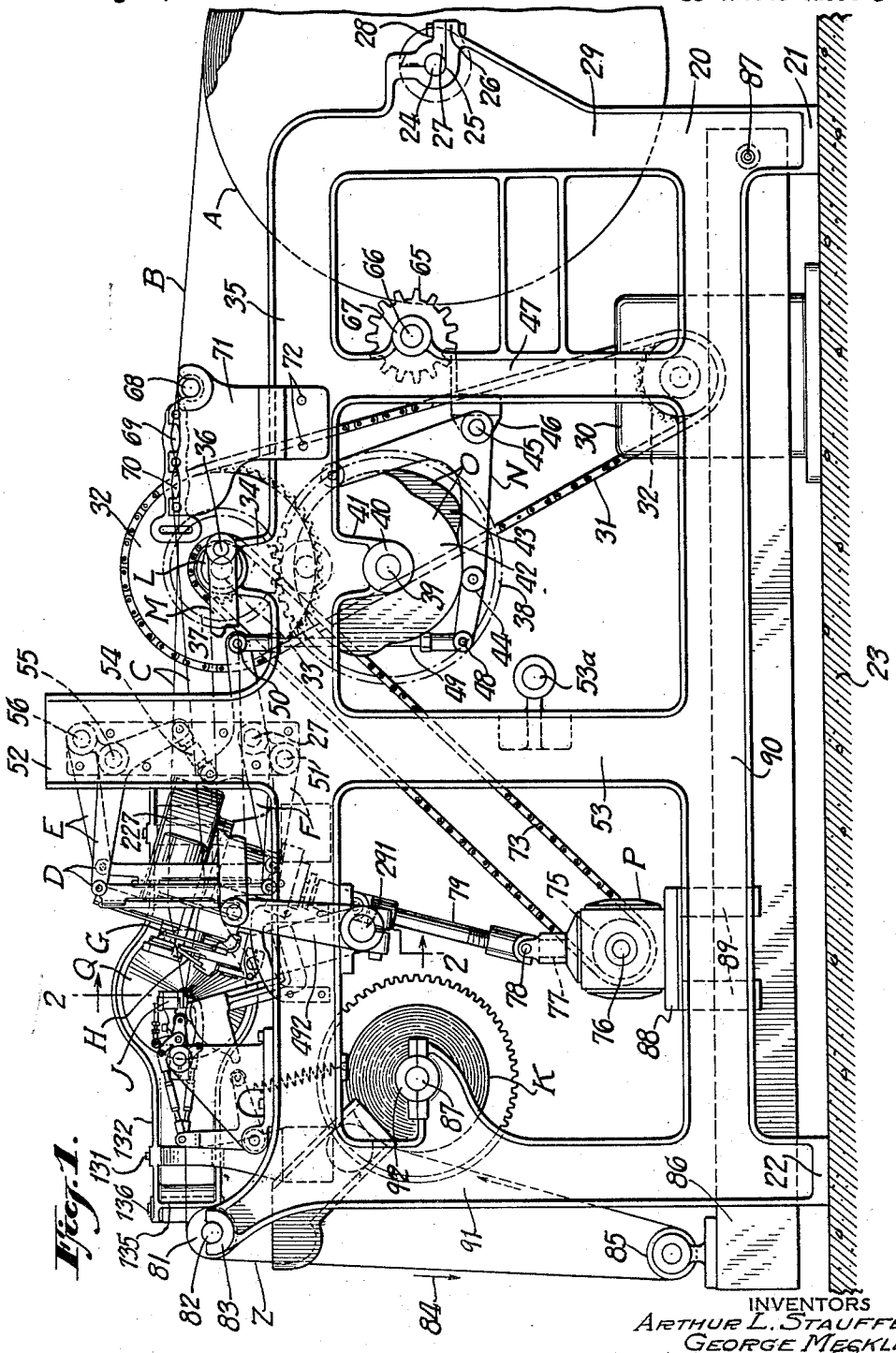


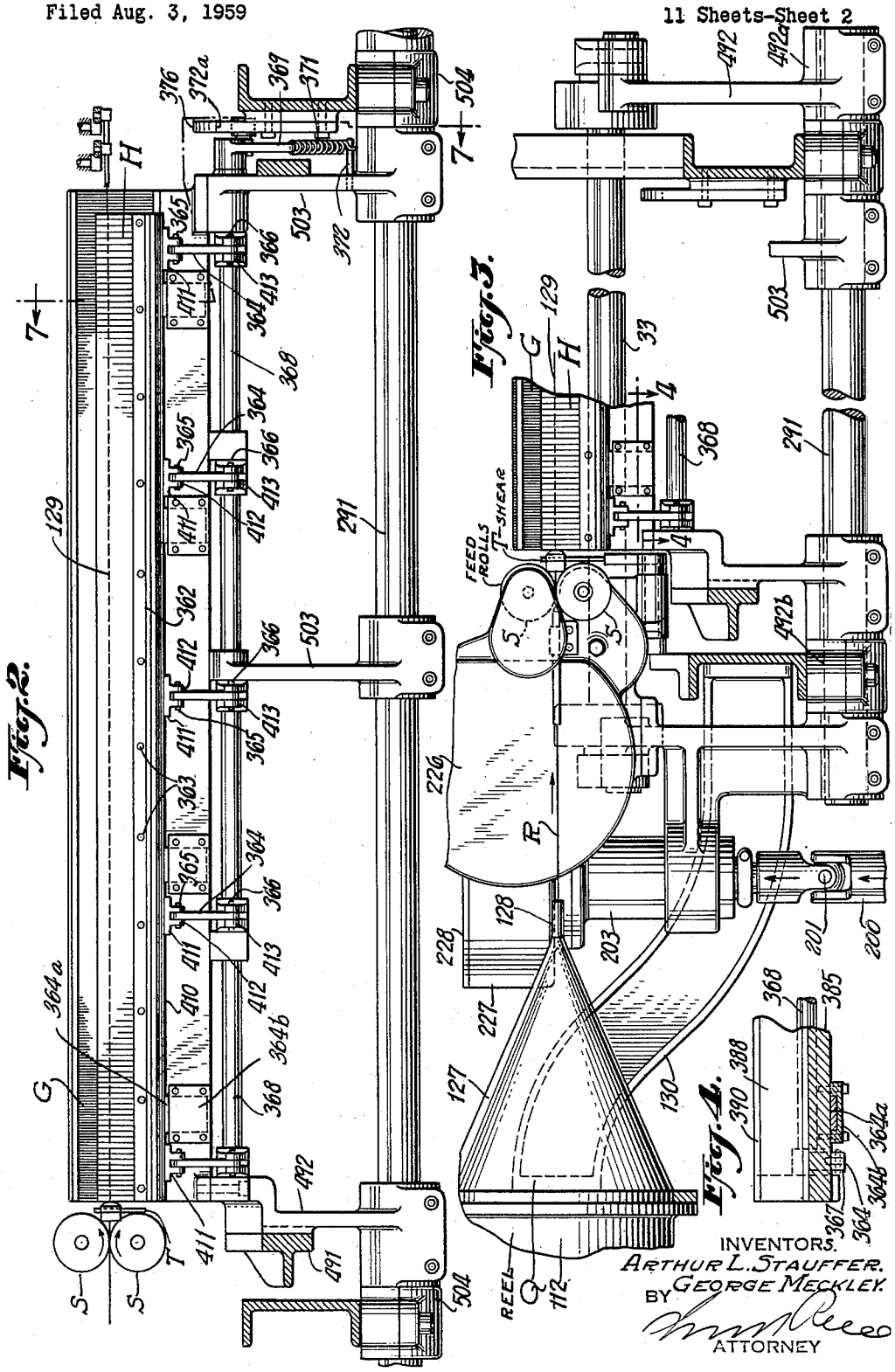
Fig. 1.

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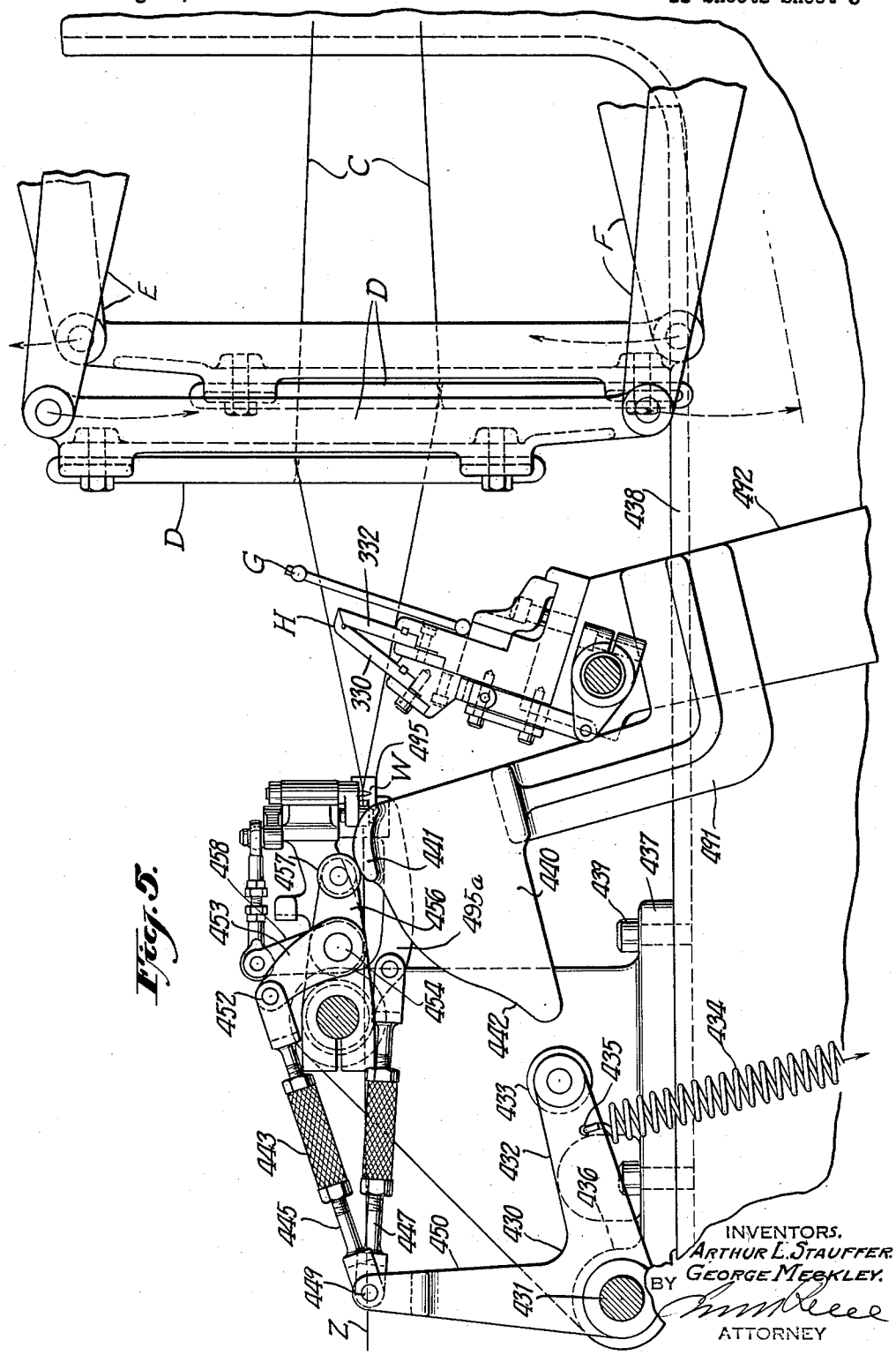


Fig. 5.

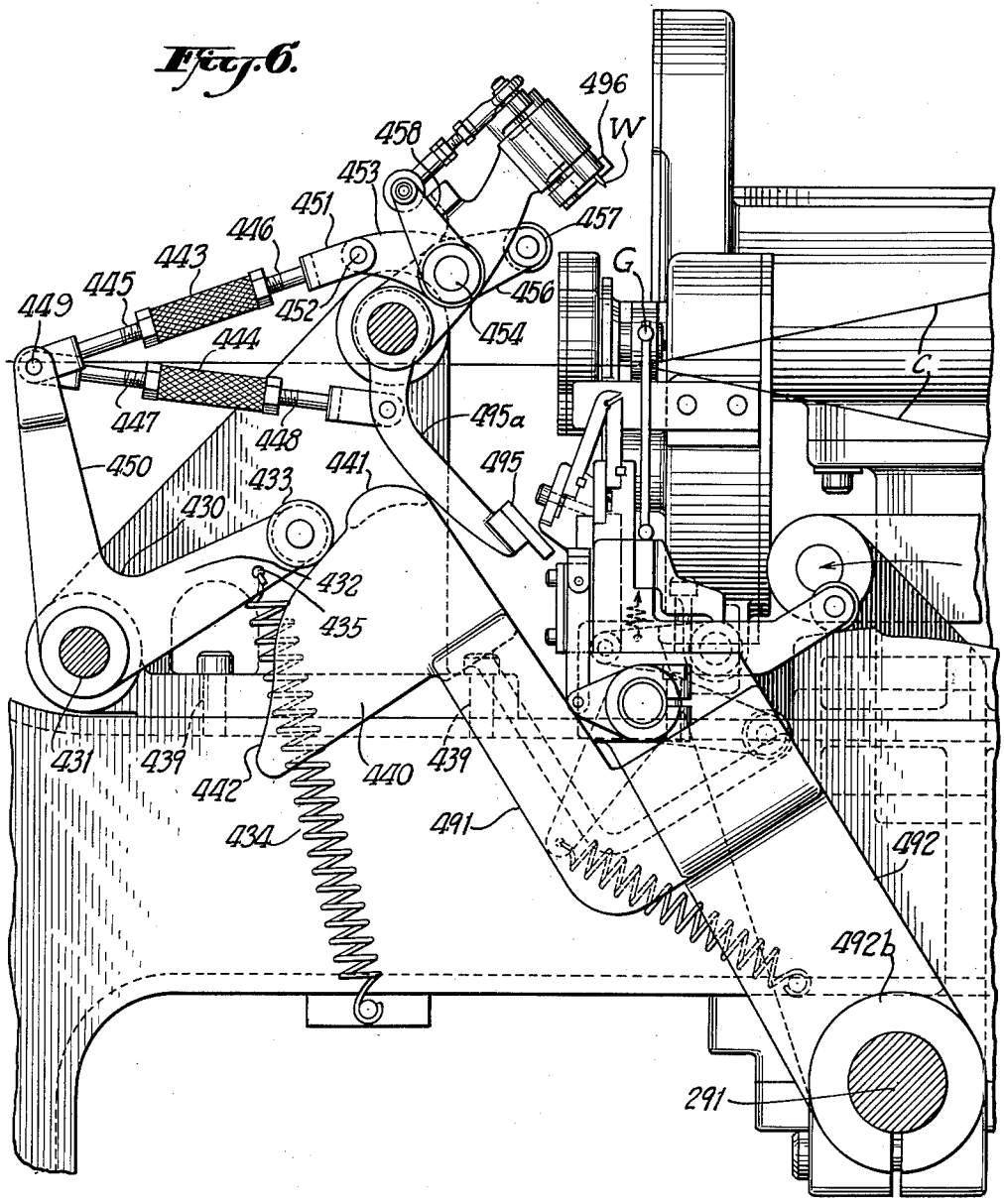
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Fig. 6.

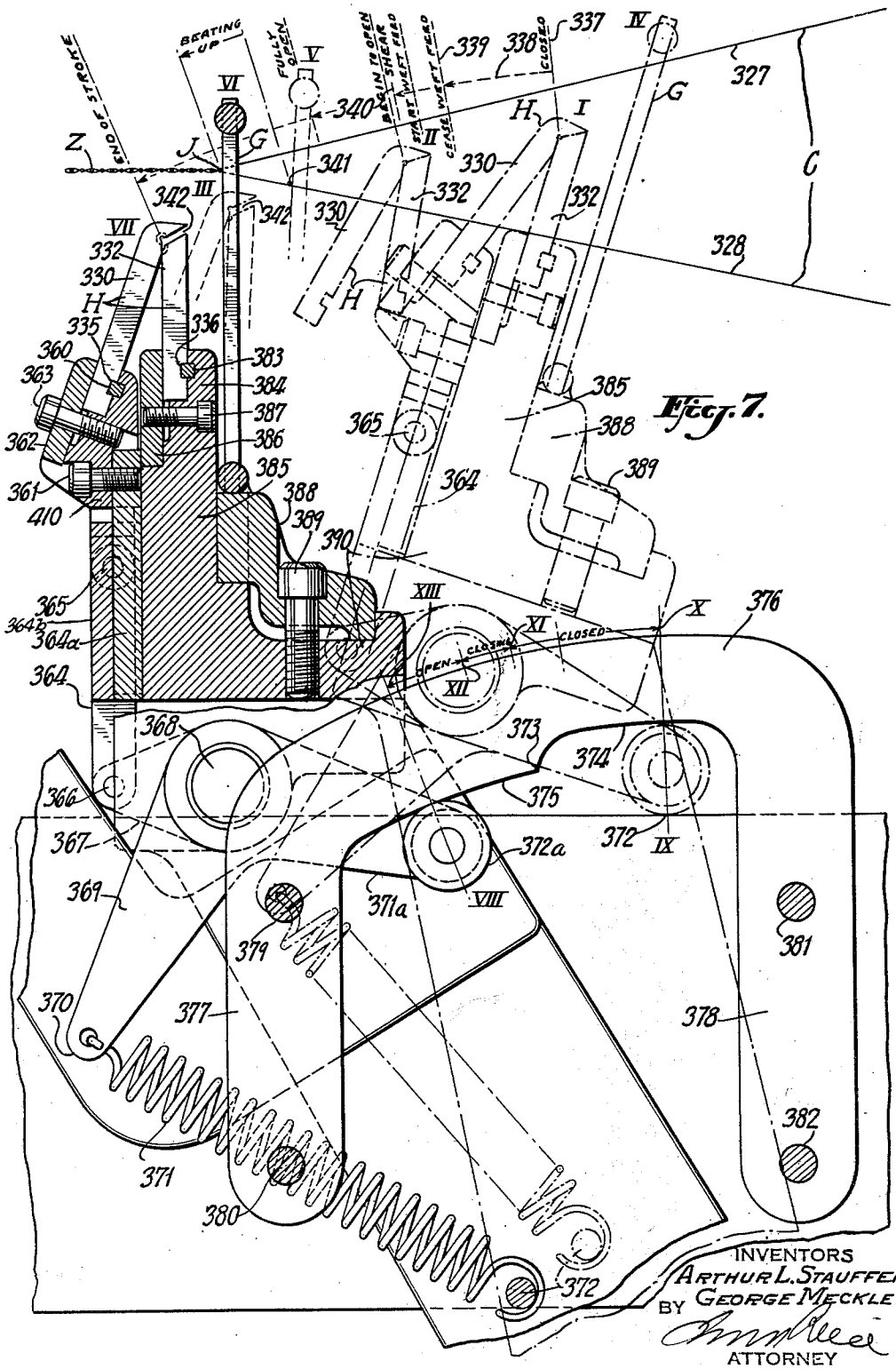


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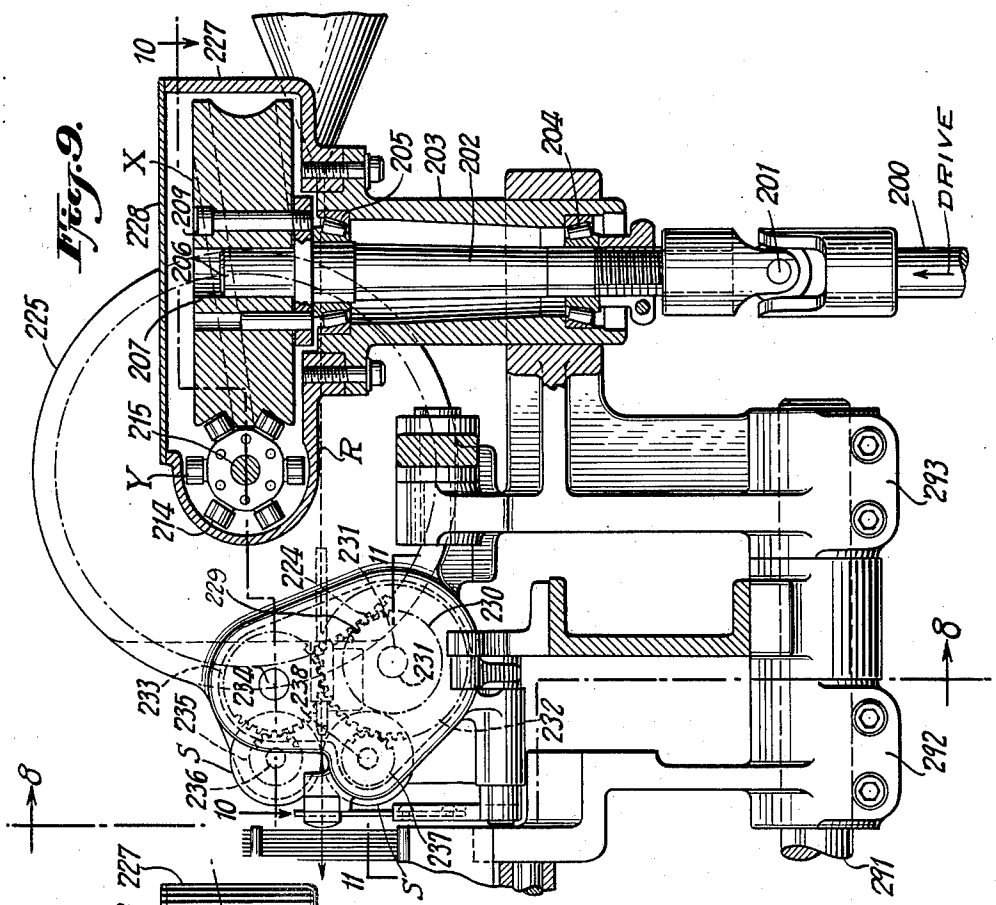
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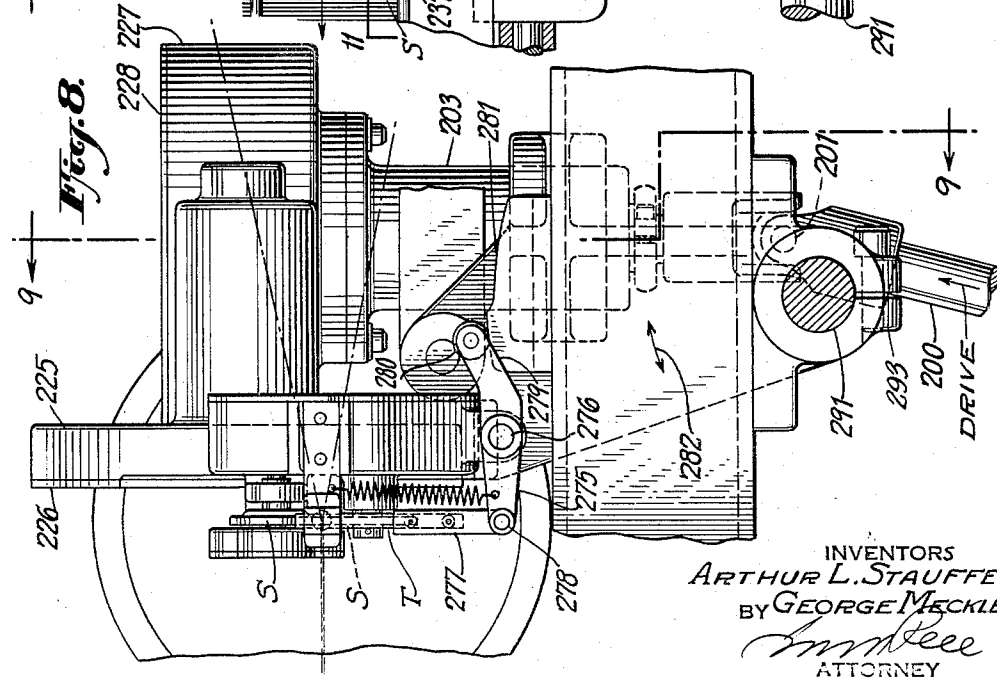


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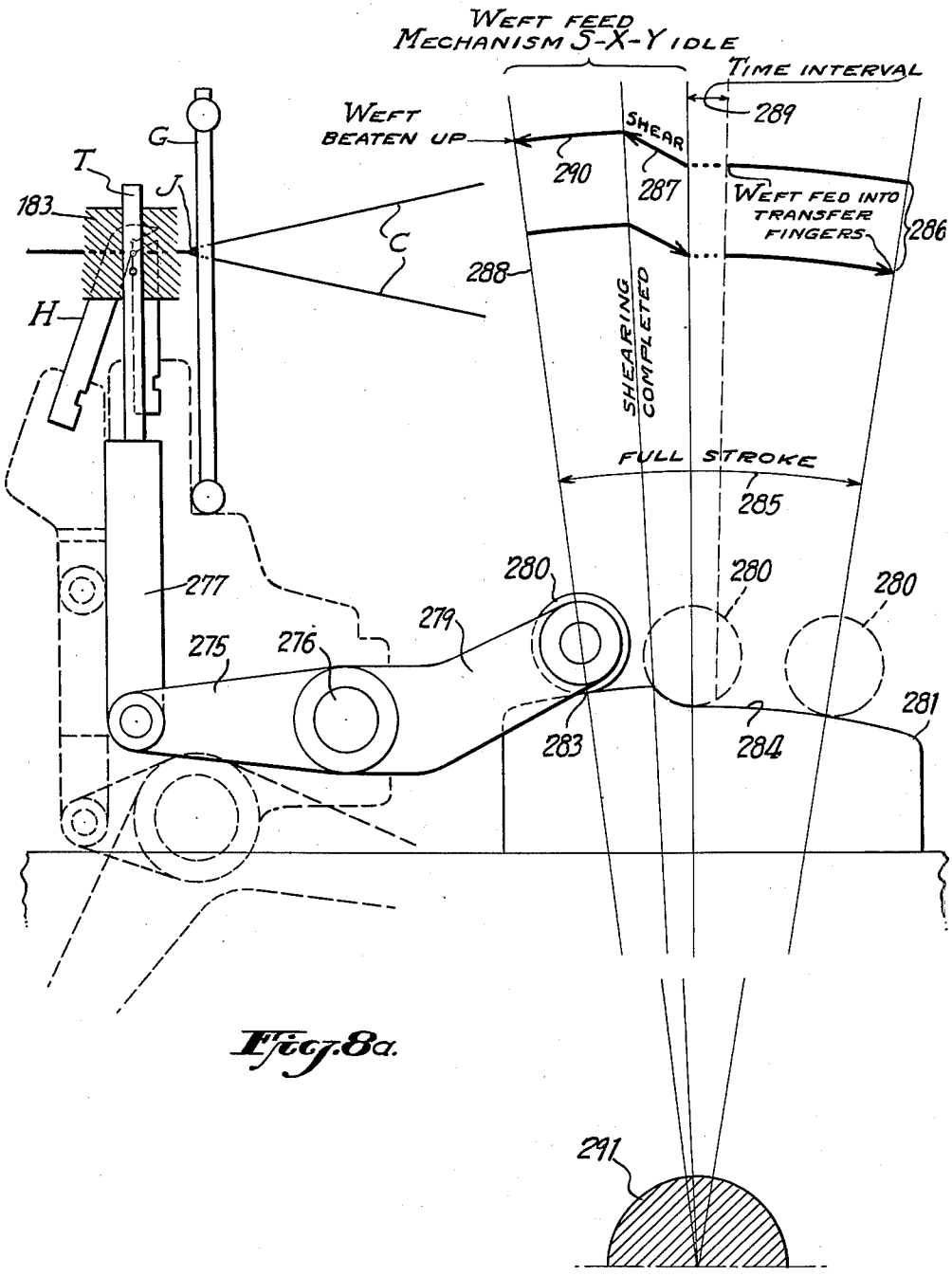


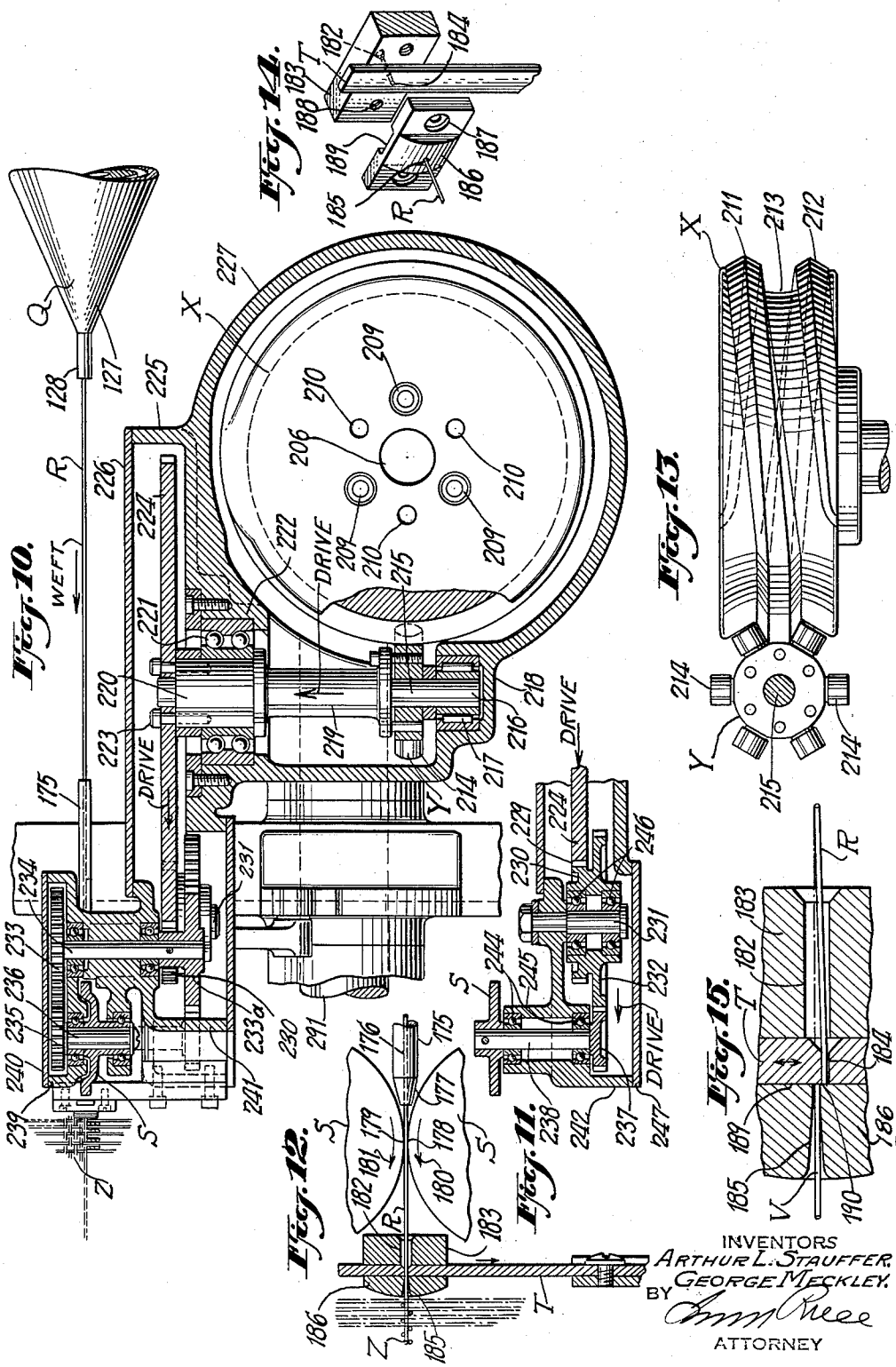
Fig. 8a.

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Fig. 16.

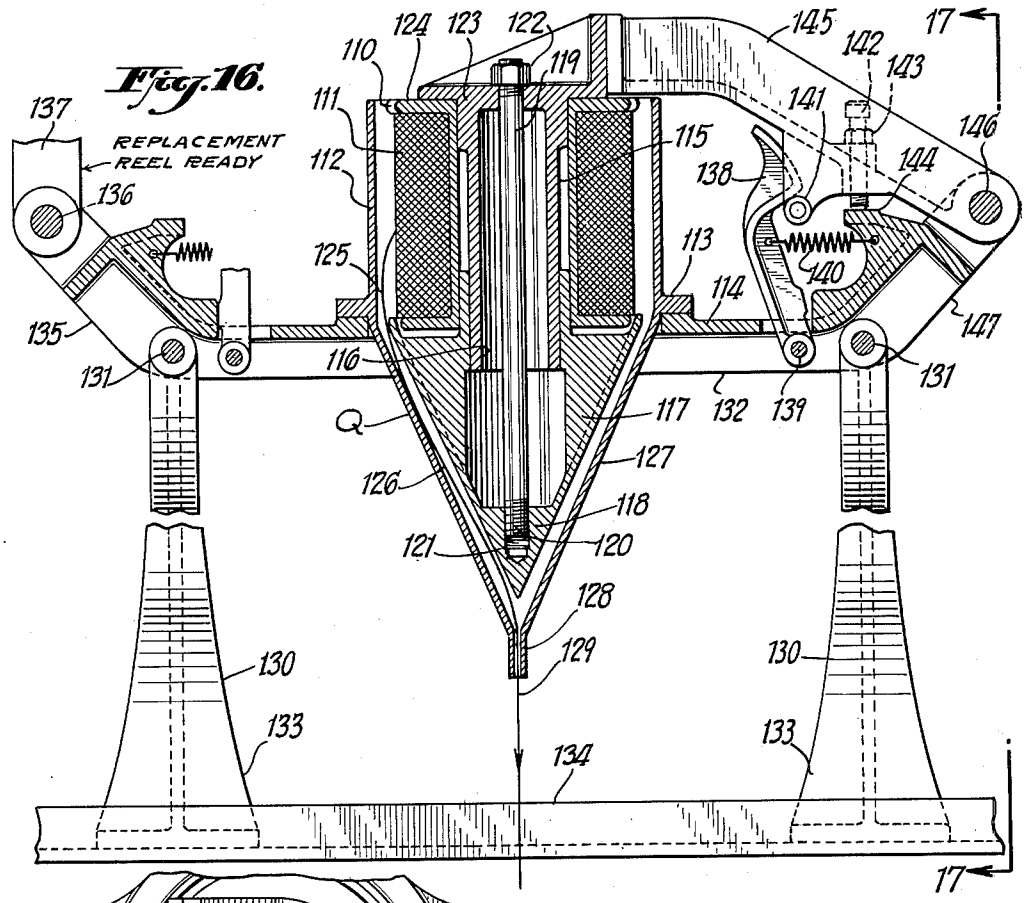


Fig. 18.

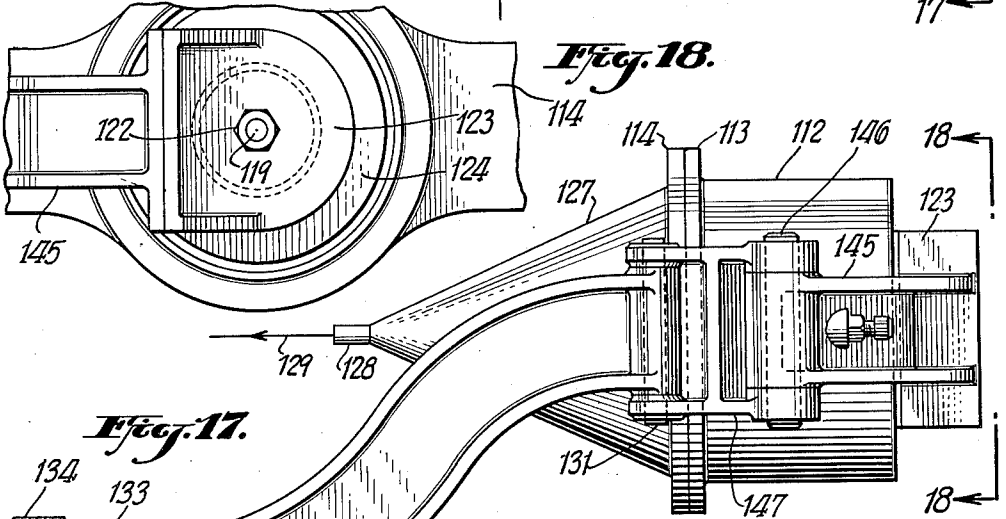
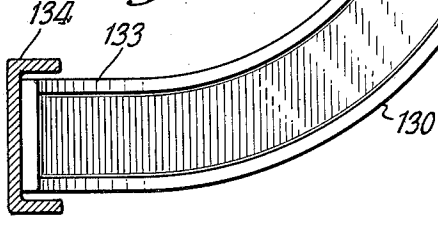


Fig. 17.

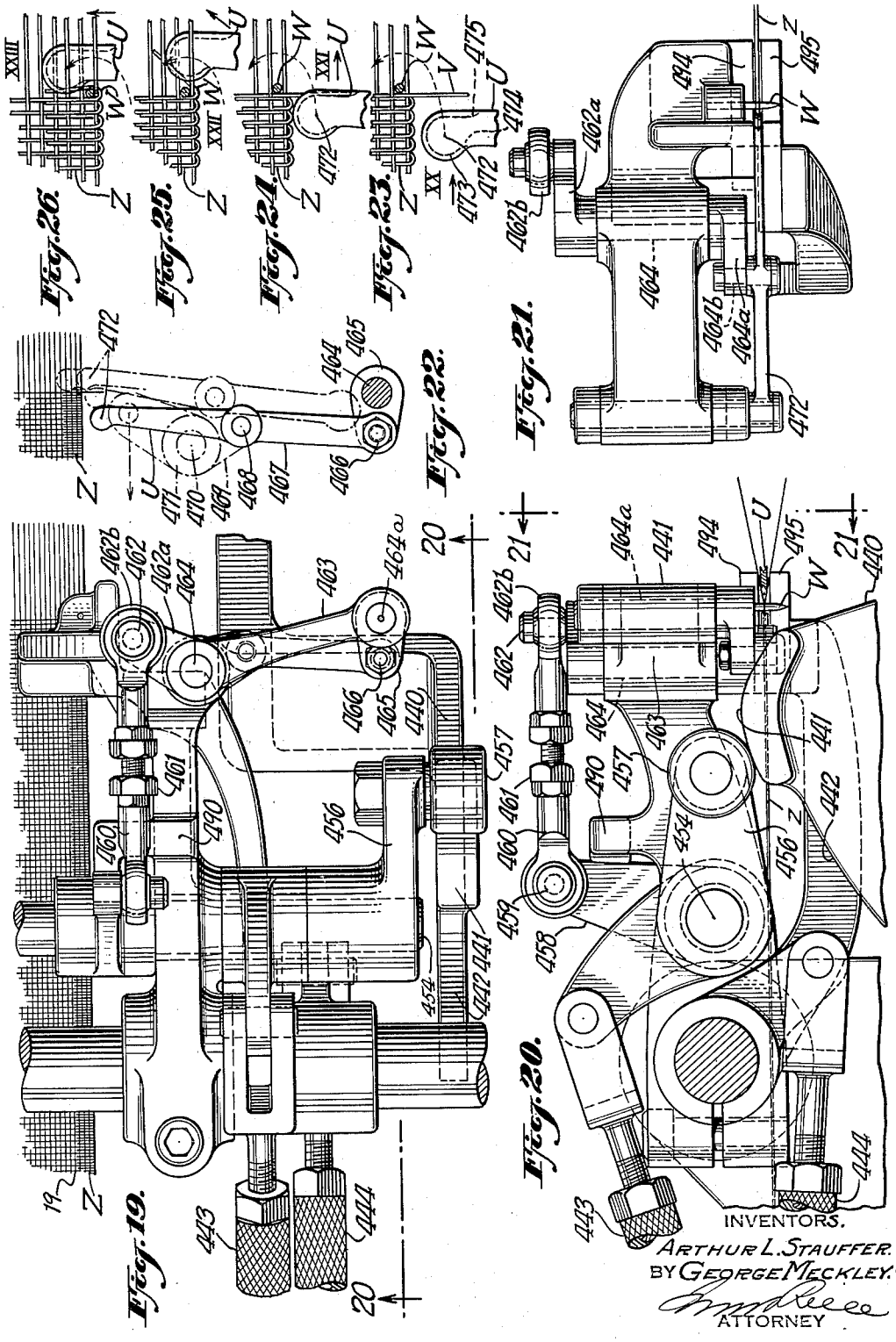


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Fig. 27.

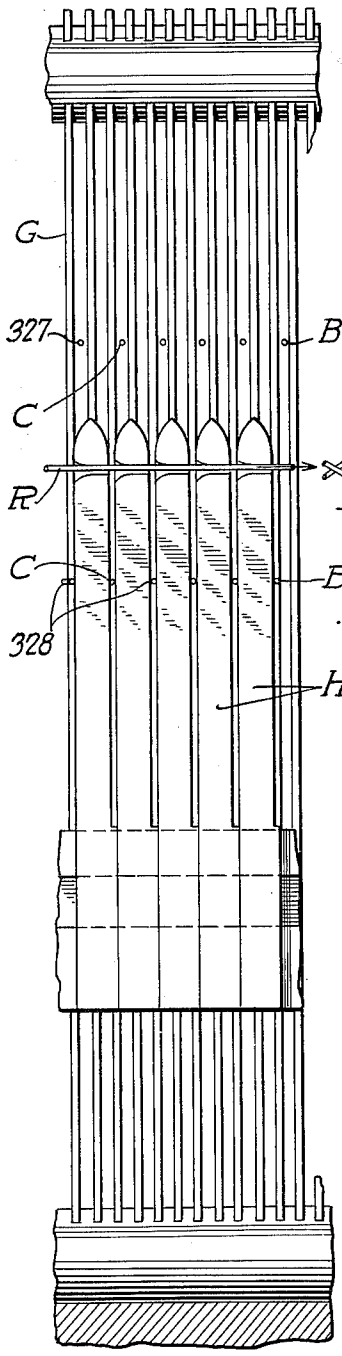


Fig. 29.

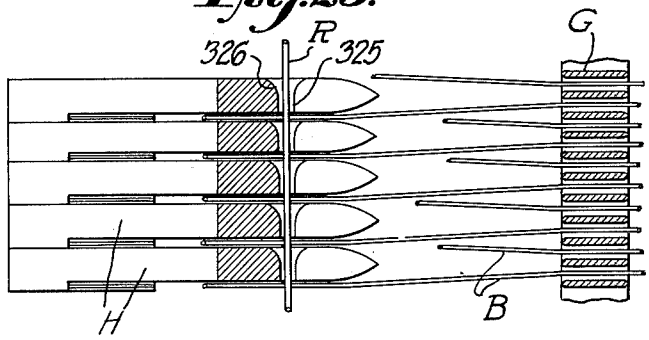


Fig. 28.

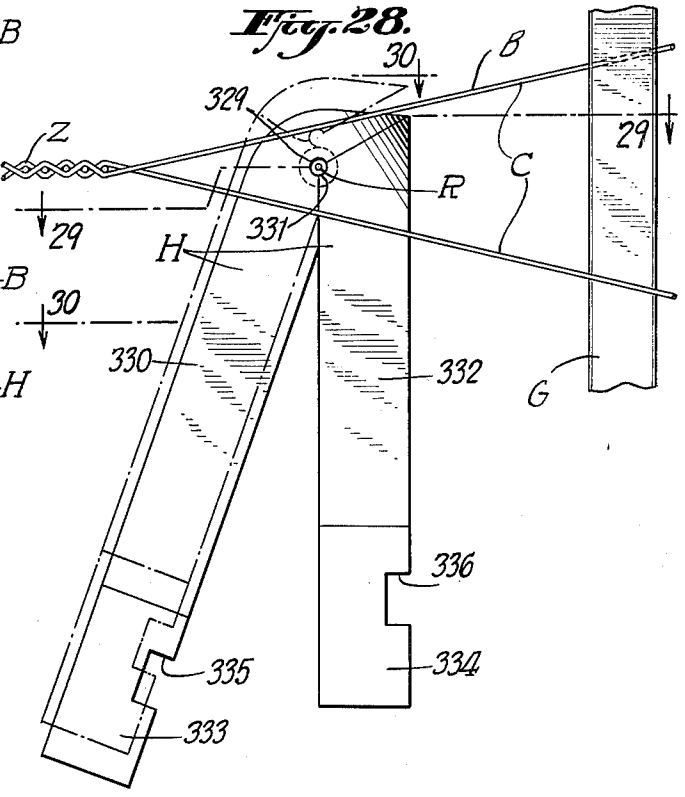
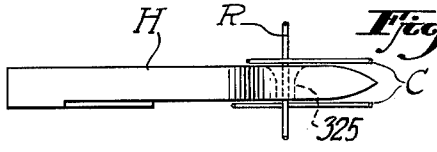


Fig. 30.



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United States Patent Office 3,081,798 Patented Mar. 19, 1963

3,081,798

APPARATUS FOR WEAVING WIRE CLOTH

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Filed Aug. 3, 1959, Ser. No. 831,336
16 Claims. (Cl. 139—127)

The present invention relates to a wire cloth loom.

In weaving or manufacturing wire cloth for screening, it has been customary to form a warp of spaced copper, brass or aluminum wire strands, which are formed in sheds by a series of upwardly and downwardly moving heddles and shuttles, or carriers containing the weft or filler strands which are carried through the sheds at intervals before they are reversed to give the weftwise or fillerwise strands, which are caused to reverse at the selvages so that there will be a continuous transversally extending weft or filler which reverses direction and advances the desired spacing of the strand at each side of the wire cloth or wire screen.

This type of loom and this system of weaving wire cloth limits the pattern that can be produced and the type of weft which may be utilized and requires relatively heavy machinery and requires considerable attention and supervision.

It is among the objects of the present invention to provide a novel means and procedure for weaving wire cloth in which a simplified mechanism will enable more economical weaving of the cloth, with less maintenance and with assurance of a higher grade and more widely varied quality of wire cloth or woven wire screening.

Another object is to provide a novel cloth loom which will more rapidly weave wire cloth with less supervision and maintenance, of higher quality and at greater unit rate, with less manual supervision.

A further object is to provide a novel wire cloth construction, which may be rapidly woven in high quality upon a wire cloth loom, with less manual supervision and with resultant production of a higher quality cloth.

Still further objects and advantages will appear in the more detailed description set forth below, it being understood, however, that this more detailed description is given by way of illustration and explanation only and not by way of limitation, since various changes therein may be made by those skilled in the art without departing from the scope and spirit of the present invention.

In accomplishing the above objects it has been found most satisfactory, according to one embodiment of the present invention, to provide a novel procedure for weaving wire cloth in which weftwise or fillerwise wire is propelled across the shed of the loom without a shuttle or quill carrying the same and in which the wire is cut to form a selvage and then folded at the selvage to give both the spacing and selvage construction that is desired.

According to this arrangement, the wire is fed from a reel through a propulsion device across the shed, which may be, for example, 36 inches wide, with 18 wires to the inch, forming a total of 648 wires in the shed.

Positioned across the width of the shed will be a plurality of opening and closing guides, which are closed when the wire is propelled at high velocity across the shed and which guides are then opened to release the wire, folowing the propulsion operation.

As the wire reaches the selvage and projects beyond the same, the ends of the wire are then folded inwardly so as to form U-shaped return bent members, which are then lodged in the weftwise wires at the shed.

This tuck-in or selvage forming operation is desirably accomplished at the end of each positioning of the wire in the shed and in synchronism with each operation.

Desirably a drive mechanism is provided for the wire which will stand still for about 180° of revolution and then feed the wire during a subsequent 180° of revolution, with the feeding taking place during one half of the cycle and the folding and cutting in of the ends of the wire during the other half of the cycle.

This may be accomplished, for example, at a rate of about 200 strokes per minute, which will feed wire in at the rate of 1200 feet per minute, with the actual rate, however, only being 600 feet per minute, since there will only be a feed operation during one half of each stroke.

The actual feed mechanism is accomplished by two rollers, which will press the wire forward at a higher rate during 180° when it is being fed. As it is being fed, the guide bars are closed so that the wire will pass through a substantially closed channel across the shed.

When the wire is in position, there will be a cutting of the end thereof, followed by the reversing and turning in of the cut wire end to give the selvage construction.

By this method of operation with a peripheral speed of 1200 feet per minute and the feed rollers acting on the weft wire, it is possible to weave the wire in 200 beats per minute, as compared to the old shed type of weaving, which would be about 50 to 74 beats per minute, done with production of a superior wire cloth product.

With the foregoing and other objects in view, the invention consists of the novel construction, combination and arangement of parts as hereinafter more specifically described, and illustrated in the accompanying drawings, wherein is shown an embodiment of the invention, but it is to be understood that changes, variations and modifications can be resorted to which fall within the scope of the claims hereunto appended.

In the drawings wherein like reference characters denote corresponding parts throughout the several views:

FIG. 1 is a side elevational view of a new loom construction, according to the present invention.

FIG. 2 is a transverse vertical sectional view, taken upon the line 2—2 of FIG. 1, upon an enlarged scale as compared to FIG. 1, showing the reed and wire guide arrangement of the loom, together with the clamp bars which hold the movable wire guide fingers, as well as the side actuating cam and follower roller.

FIG. 3 is a transverse sectional view, showing the manner in which the wire is propelled from the side of the loom into the shed, with the cut off feed rolls and crank being shown.

FIG. 4 is a transverse detailed sectional view.

FIG. 5 is a side elevational view of the left portion of the loom, as shown in FIG. 1, upon an enlarged scale, showing the guide fingers in closed position, with the heddles holding the shed in open position as the wire is propelled across the shed.

FIG. 6 is a transverse vertical sectional view similar to FIG. 5, showing the next position where the filler wire has been beat up to the fell, with the separating head elevated.

FIG. 7 is a side sectional view similar to FIGS. 5 and 6, showing the varying positions of the reed and the guides extending from the weft feed position to the beating up position in forming the wire cloth.

FIG. 8 is a transverse sectional view taken on the line 8—8 of FIG. 9, showing the wire feed mechanism.

FIG. 8*a* is a diagrammatic schematic view showing the timing of the various operations of feeding and shearing.

FIG. 9 is a transverse sectional view taken upon the line 9—9 of FIG. 8, showing the 180° drive arrangement for controlling the feed and propulsion of the weft wire across the shed.

FIG. 10 is a transverse sectional view, taken upon the line 10—10 of FIG. 9, showing the operation of the 180° feed arrangement.

FIG. 11 is a detailed sectional view of the 180° feed arrangement, taken upon the line 11—11 of FIG. 9.

FIG. 12 is a diagrammatic side elevational view, showing the manner in which the wire is propelled across and through the weft wires and is beaten up by the shed.

FIG. 13 is a diagrammatic view of the 180° drive arrangement illustrating the manner in which the dwell of 180° is achieved, together with a subsequent feed of 180° for each 360° cycle.

FIG. 14 is a separated view, showing the feed guide member for the weft wire at the side of the loom, through which the drive rollers propel the weft wire, together with the reciprocable blade member which cuts off the end of the wire.

FIG. 15 is a transverse sectional view similar to FIG. 14, showing the cutting of the wire so as to leave a projecting end portion beyond the selvage to be folded in to form said selvage.

FIG. 16 is a transverse sectional view, showing the manner in which the weft wire is fed from the reel to the propulsion rollers.

FIG. 17 is a side elevational view taken upon the line 17—17 of FIG. 16.

FIG. 18 is a transverse sectional view, showing the end of the feed reel taken upon the line 18—18 of FIG. 17.

FIG. 19 is a fragmentary top plan view of the mechanism at the selvage for laying the severed end of the wire in position at said selvage.

FIG. 20 is a side elevational view taken upon the line 20—20 of FIG. 19, showing the location pin in position at the selvage.

FIG. 21 is an end elevational view taken upon the line 21—21, showing the position of the location pin at the selvage transversal of the woven fabric.

FIG. 22 is a diagrammatic top plan view, showing the manner of operation of the selvage laying in mechanism which turns the severed end of the wire and positions it in a U-shaped turn in the warp wires at the selvage.

FIG. 23 is a diagrammatic plan view, showing the first position from which the severed end is moved into the selvage.

FIG. 24 is a horizontal sectional view similar to FIG. 23, showing the laying in finger in the next position, with the wire in contact with the finger.

FIG. 25 is a transverse horizontal sectional view similar to FIG. 24, showing the severed end of the wire partly bent into position in the selvage.

FIG. 26 is a horizontal sectional view similar to FIG. 25, showing the laying in operation of the severed end of the wire at the selvage being completed.

FIG. 27 is a transverse sectional view upon an enlarged scale, showing a section of the reed and guide fingers in position with the wires of the shed.

FIG. 28 is a side elevational view of the arrangement shown in FIG. 27, showing the guide fingers closed, with the shed open, in the position in which the wire is propelled across the shed between the warp wires.

FIG. 29 is a transverse sectional view taken upon the line 29—29 of FIG. 28.

FIG. 30 is a transverse sectional view taken upon the line 30—30 of FIG. 28.

Referring to FIG. 1, there is shown a warp beam A which supplies the warp wires B which form the upper and lower sheds C. These sheds are formed by the reciprocating heddles D, which have a bell crank lever drive arrangement E at the top and F at the bottom.

The reed G reciprocates with the guide fingers H, said guide fingers H acting to guide and carry the weft wire as it is propelled across the sheds C.

After the guides H have been released, it is beat up to fell position at J and the wire cloth is then wound on to the finished cloth drum at K.

The crank L drives the reed back and forth to the beat up position, while the bell crank levers E and F, which operate the heddles to form the sheds, are operated from the lever arrangement M.

The cams O and cam lever N operate the pedal control levers M.

From the gear box P is driven the mechanism which controls the propulsion of the weft wire across the sheds C.

Referring to FIGS. 2 and 3, there is shown the reel or supply arrangement Q, which feeds the weft wire R to the drive rollers S. The shear arrangement T shears the wire after it has been positioned in the shed.

The selvage laying in mechanism is best shown in FIGS. 19 to 21 and it consists of an oscillating finger U which positions the cut end V around the location pin W to cause the cut end to assume the position of a reverse U, as shown in FIG. 26.

The 180° drive mechanism is best shown in FIGS. 9, 10 and 13 and it consists of a cam X having the six membered guide Y.

The woven cloth is indicated at Z in FIGS. 19 and 22 to 26.

Referring again to FIG. 1, the wire cloth loom has the side frames 20 with the legs 21 and 22 supported upon the floor or concrete foundation 23.

The warp beam A is supported by the shaft 24, which rests in the bearing 25 formed between the bracket member 26 and the frame leg 29. The shaft 24 is held in position by the insert member 27 and the bolt 28.

The main drive motor or other main drive mechanism may be carried on the frame or positioned on the floor, as indicated at 30 in FIG. 1, and there will be an upwardly extending chain drive indicated at the dotted lines 31 from the motor, going up to the main sprocket wheel 32.

The main sprocket wheel will drive the crank shaft 33, which has bearings in the standard 34 carried by the horizontal frame member 35.

The crank shaft 33 (see FIGS. 1 and 3) will drive the crank L, which in turn is connected to the reed H to cause reciprocating movement of the reed to beating up position of the fell and then reverse movement after the weft wire has been placed in position at the fell.

The crank connection is indicated at 36. The crank shaft 33 will also drive the gear wheel 37, which in turn meshes with and drives the gear 38.

The gear 38 drives the cam shaft 39, which has bearings at 40 in the beginning portion 41 of the horizontal frame section 35. This cam shaft 39 drives the two cams O, which are respectively indicated at 42 and 43, controlling the position of the heddles D through the cam lever N.

The cam lever N carries the roller 44, which rides on the cams and has a bearing shaft 45 held in the bearing member 36 on the vertical frame member 47.

The forward end of the cam shaft has a pivotal connection 48 to the vertically extending, adjustable rod 49, which operates through the pivotal connection 50.

The lever M is connected to the upper bell crank levers E by means of the adjustable linkage 54 and the bearings 55 and 56. The lower bell crank levers F are connected directly to the lever M by the bearings 51 and 27.

These bearings 27, 51, 55 and 56 are positioned inside of the vertical frame extension 52 of the frame member 53.

The operation or reciprocation of the lever M by the cams O will cause first one heddle and then the other heddle to descend and then will cause a reverse movement to form the sheds C, a change in position following each beating up of a weft wire in position.

At the right of FIG. 1 is a pinion 65 having a shaft 66 with a bearing at 67 on the vertical frame member 47 which controls the let off of the warp, said shaft be-

ing driven through the worm gear meshing with the worm not shown.

The warp wires B pass over the roller 68 to line up the warp wires and then through a series of separators 69 and 70 which assure correct position of said warp wires in the sheds C. This arrangement is supported upon the bracket 71, which in turn is supported at 72 on the horizontal frame member 35.

The gear box P is driven by means of the chain drive 73. Said chain 73 at its lower end drives the inlet shaft 76 through the gear or sprocket 75.

The out-take shaft 77 has a universal connection 78 which has a connection 79 to the drive connection 200 of FIGS. 8 and 9.

The woven cloth Z passes over the roller 81, having the shaft 82 in the bearing 83, and then it passes downwardly, as indicated by the arrow 84, to ride under the guide roller 85, which is pulled down by the weighting member 86, which controls the wind up clutch at 87. The weighting lever 86 extends the full length of the frame 20 and it is pivotally mounted at 87 on the leg 21 at the other side of the frame.

The woven cloth is then wound up on the finished cloth roll K.

It will be noted that the gear box P is supported upon the pedestal 88 on the legs 89 on the lower horizontal frame member 90 between the feet 21 and 22. The forward vertical member 91 will carry the bearing 92 for the shaft 87 of the finished fabric roll K.

Now referring to the weft feed, the wire spool 110 carrying the weft wire, as indicated at 111 in FIG. 16, is enclosed in the cylindrical member 112, which has a flange 113 supported upon the structural partition 114 (see also FIGS. 17 and 18).

The wire spool may carry steel, copper, brass, aluminum or other types of wire, and the dimension, for example, may be 0.011 inch in steel and 0.013 inch in aluminum.

The spool 110 is mounted on the spinning sleeve 115, the end of which at 116 telescopes at the opening 117 in the conical nose guide portion 118.

The shaft 119 with the threaded end 120 will fit into the tapped opening 121 in the interior of the conical nose 118. The nut 122 (see also FIG. 18) will hold the shaft 119 in position, clamping the flange 123 against the flange 124 of the spool 110.

The weft or filler wire 125 will be drawn off the spool 110 and will spin around in the space 126 between the conical nose 118 and the conical shell 127, and it will finally pass outwardly through the narrow tubular nose or nozzle 128, as indicated at 129 on its way to be positioned in the shed (see also FIG. 17).

The wall 114 is supported by the brackets 130 by means of the pivotal connections 131 on the cross member 132. The base portions 133 of the brackets will be supported on the cross channel bar 134 (see also FIG. 17).

The arm 132 has an extension at 135 to the hinge connection 136 and the holder 137, which carries an extra reel ready for replacement inside of the cylindrical container 112.

The arm 132 also carries the latched lever 138 pivotally mounted at 139 and biased by means of the coiled spring 140. The roller 141 rests on the latch 138, at a position depending upon the adjustment 142 having a nut at 143.

The adjustment 142 consists of a bolt which contacts the stock 144 at one end. The arm 145 extends over to the pivotal connection 146 on the extension 147 of the arm 132.

By the arrangement shown in FIGS. 16 to 18, it is possible by releasing of the latch 138 to remove an empty spool and readily to place a new spool in position, with the latch being readily engaged with the roller 141.

Referring to FIG. 16, the filling or weft-wire 129 will be whipped around in the space 126 as it is fed toward the driving rollers S. (See FIG. 3.)

As shown in FIGS. 2 and 3, the weft wire is engaged between the driving rollers S, through an eye, past the shear T, and through the shed. The driving rollers will drive the wire for 180° of each cycle and then will stand still for the next 180°.

Referring to FIG. 10, the wire R passes into the guide tube 175 and through the tube as indicated at 176 in FIG. 12. The tube 175 has a conical nose 177 which feeds the wire directly between the tangential contacting portions 178 and 179 which will tightly grasp the wire.

These rollers S, as they rotate in directions 180 and 181, will propel the wire through the opening 182 into the block 183 (see FIGS. 12 and 15) through the opening 184 in the vertically reciprocating cutter T and then through the outlet eye 185 of the curved face member 186.

The member 186 is bolted through the openings 187 and 188 to the block 183, and the recess 189 (see FIG. 14) will hold in position and form a face guideway for the reciprocating cutter T, which cuts off the wire after it has been propelled across the shed and laid in position, as indicated in the portion of the woven fabric shown at Z in FIG. 12.

This is indicated in FIG. 15, where the cutter T has sheared off the end of the wire at 190, leaving a portion V to be turned into the selvage edge, as is indicated in FIGS. 23 to 26, by the finger member U.

These propulsion wheels S are driven by means of the mechanism shown in FIGS. 8, 9, 10, 11 and 13.

The drive, as shown in FIGS. 8 and 9, comes in through the shaft end 200 from the shaft 79 and the gear box P as shown in FIG. 1.

The shaft 200 has a universal connection at 201 to the shaft 202, which is held in the collar or tube 203.

In the collar 203 there are the roller bearings 204 and 205 which carry both ends of the shaft 202. The stud 206 projects into the opening 207 in the cam wheel X. The stud 206 is held in position by means of the plate 208 and the bolts 209. (See also FIG. 10.)

The studs 210 act as locater members. The cam X, as shown in FIG. 13, is provided with the ribs 211 and 212, between which are the grooves 213 which receive the rollers 214 on the wheel Y. (See FIGS. 9 and 13.)

In the form of cam as shown, for each complete revolution of the shaft 202 and of the cam X there will be a dwell of 180°, followed by a movement of 180° during which one of the rollers 214 is moved a distance of 30°.

This movement for 180° of each cycle, with a dwell of 180°, will take place at such a rate as to give 200 strokes per minute, or 200 weftwise propulsions per minute, feeding wire at the rate of 600 feet to 1200 feet per minute, with 200 fillings or wefts being laid in the shed each minute.

The shaft 215 of the roller wheel Y, as shown in FIG. 10, has a bearing end 216 which is held by the roller bearing 217 in the boss 218, and it has a drive extension 219 to the hub 220 which has the roller bearing 221 mounted in the body portion 222.

The hub 220 is bolted at 223 to the large gear 224. It will be noted that the large gear 224 is enclosed in the receptacle 225, the open end of which is in turn covered by the plate 226.

The cam X is enclosed by the circular housing portion 227, which in turn is covered by the plate 228. (See FIG. 9.)

The large gear 224, which may have 165 teeth of 24 pitch, meshes with the small gear 230 at 229. (See FIG. 9.)

The gear 230 turns the shaft 231, which drives the gear 232. The gear 232 meshes with and drives the gear 237, having the shaft 238, and it also drives the gear 233 on the shaft 234.

The gear 233 meshes with and drives the small gear 235 on the shaft 236. The gears 235 and 237 will be of the same size and driving in opposite directions, and they will be directly connected to the weftwire drive wheels S which drive the weft across the shed to lay it in position in the warp.

This operation of propulsion of the weft will take place once every second 180° of the rotation of the cam X.

This gearing arrangement **230** to **237** is shown in face view in FIG. 9 and in side sectional view in FIGS. 10 and 11.

The gear **235**, meshing with the gear **233**, is enclosed in the housing cup **239**, which has a closure plate **240**. (See FIG. 10.)

The shaft **236** of the gear **235** is a stub shaft, as shown at the left of FIG. 10, while the shaft **234** of the gear **233** extends through the structure to carry the gear **233***a* in the housing **241**. Both the gear **233** and the gear **233***a* in the form shown may be two inch gears, while the gear **235** may be a one inch gear.

In the same housing **241** there will also be positioned the gear **230**, which through shaft **234** drives the gear **233***a*, and the section of FIG. 11 is taken through the shafts **238** and **231**, as indicated upon FIG. 9. The shaft **238**, as indicated in FIG. 11, carries the gear **237** internally of the housing **242** and it also carries an external drive roller S.

The shaft **238**, as shown in FIG. 11, has the ball bearings **244** which are carried in the sleeve member **245**. In the housing **242** the gear **237** will mesh with and be driven by gear **232** on the shaft **231**. This gear **232** has the same body as the gear **230**, which meshes at **229** with the main gear **224**.

The main gear body **230–232**, which carries the drive from the gear **224** to the gear **237**, is carried by the ball bearings **246** and shaft **231**. The housing **242** is closed by the closure plate **247**, as shown in FIG. 11.

Although the exact arrangement may be changed, in one form of the invention the gear **230** has 48 teeth of 24 pitch, the gear **232** has 72 teeth of 24 pitch, while the gear **237** has 24 teeth of 24 pitch.

The cutting control which actuates the cutting blade T is operated by means of the main control lever **275**. (See particularly FIG. 8.)

This lever is pivotally mounted on the shaft **276**. The cutting blade T is actuated by the link **277**, which is pivotally connected at **278** to the forward end of the lever **275**.

The rear end **279** of the lever **275** has a roller **280** which rides on the cam face **281**. The cam face **281** is reciprocated, as indicated by the double headed arrow **282**, to actuate the arm **275** to raise and lower the cutting member T and sever the weftwire after it has been laid into the shed.

In the diagrammatic view of FIG. 8*a*, the roller **280** is shown in three different positions. On the upper face **283** of the cam **281** the knife T is in down position and the wire is being fed across the sheds to be laid in the fabric at the fell position. In the lower position, as indicated at **284**, the roller **280** will have moved the shearing blade to cut off the wire.

The full stroke is indicated at **285**, while the wire feed strokes are indicated at **286**. The shearing stroke is indicated at **287**, with the strand being beat up into the fell at position **288**.

There is a time interval at **289** between the wire being fed and the shearing stroke, while the shearing knife will have a dwell at **290**. The shaft **291** is fixed in the collars **292** and **293** and it carries the entire mechanism shown in FIGS. 8 and 9 backwardly and forwardly, as indicated by the double arrow **282**.

The wire is positioned in the shed by means of a series of split guide fingers H, which are shown in detail in FIGS. 27 to 30.

The weftwire R is projected between the shed C by the feed wheels S, and it passes through the eyes **325** which have the flared inlet portions **326**.

One of the split guide fingers H is provided for each two warp wires B, which pass through the reed G, as indicated in FIGS. 27, 28 and 29.

As indicated in FIG. 27, one group of weft wires is at position **327**, forming the upper part of the shed, and the other at **328** between the guide fingers H, forming the lower part of the shed.

The lower wires **328** are moved out of position so that they appear to be in front of the wires or bars of the reed G.

The flared opening **325—326** will be formed about ¾ of the circumference, as indicated at **329**, FIG. 29, in the upper portion **330** of the fingers H, while the other ¼ or ⅓ will be formed at **331** in the lower or straight finger **332**.

The fingers **330** and **332** are held by their base portions **333** and **334** and the notches **335** and **336** in carriers, and they are moved into contact, as indicated in FIGS. 28 and 29, when the weftwire is propelled therethrough, which is also indicated in small scale in the middle of FIG. 5.

After the wire has been propelled into position with the fingers closed, as indicated at position I in FIG. 7, continuing to about position II in FIG. 7, the weft feed will cease.

As indicated in FIG. 7, the flared eyes **325—326** are closed at position **337**, and as the fingers H move to the left in the direction of the arrow **338** they will remain closed until the feed of the weft ceases at **339**.

Then the shear will take place at position **340** and the flaring eyes **325—326** will start to open as the fingers **330** and **332** separate, as indicated, for example, at position III.

When this occurs, the weftwire indicated at position **341** will have been laid in the shed C and the reed G will advance from position IV to position V in FIG. 7, finally bearing up the weft **341** at the fell J of the newly woven fabric Z.

The guide fingers H, in separated position, as indicated at position VII in the main will have moved beyond the fell J and will be out of the way.

It will be noted that the weftwire is elevated through the opening **342** between the open jaws of the finger by the lower shed **328**, as indicated in FIG. 7. It will be noted by reference to FIG. 29 that the flared openings **325** and **326**, when closed, will form a substantially complete guideway for the propelled weftwire R, as it is driven into the shed.

It will be noted by reference to FIG. 7, that the overhanging finger member **330** is keyed at **360** to the member **335** and is clamped in position by the clamp plate **362** and the bolt **363**. The bolt **361** will clamp the structure carrying the finger **330** to the reciprocating plate **364***a* which is held inside of and guided by the plate **364***b* (see also FIG. 4).

The fingers **330** are reciprocated by the link **364** having the pivotal connections **365** and **366**. The pivotal connection **366** is guided by the arms **367** on the shaft **368** (see also FIGS. 2 and 4).

The shaft **368** is operated by means of the bell crank lever **369**, which has its end **370** strongly biased by the spring **371** mounted on the pin **372** (see also FIG. 2 at the right).

The lever **369** has another arm **371***a* carrying the roller **372***a*, which rides on the cam **373** having a recessed face **374** and an elevated face **375** (see also FIG. 2).

When the roller is in position VIII, the link **364** will be elevated, opening the eye of the finger H and permitting the weft to move out of the guide fingers.

On the other hand, when the roller **372***a* is in position IX, riding on the recessed portion **374** of the cam **373**, the space **342** will be closed and the jaws of the fingers H will be closed, as indicated at positions I and II in FIG. 7.

The cam **373** is fixed on the inside face of a U-shaped bar **376**, which has the side legs **377** and **378** fixed in position by the pins **379** and **380** on the left side and **381** and **382** on the right side.

The lower finger member 332, as shown at the left of FIG. 7, is provided with a key 383 which holds it in position in the jaw member 384. At the top of the structure 385 the face member 386 is clamped by the bolt 387 to hold the guide fingers 332 in position.

The reed G, as shown in FIG. 7, is mounted upon the S shaped bracket 388, which is held down by the bolt 389 upon the base 390 of the member 385 (see also FIG. 4).

As indicated in the lower part of FIG. 7, the eye is closed, from position X to XI. It is opening from position XI to position XII and it is fully open from position XII to position XIII.

The entire unit, as shown in FIG. 7, during the propulsion of the weft between positions I and II, during the opening of the jaws between positions II and III and during the beating up operation between positions V and VI, will be swinging between the dot and dash position at the right in FIG. 7 and the solid line position at the left of FIG. 7.

Referring to FIG. 2, there is a clamp bar 362 which is mounted by means of the bolts 363 and which rests upon the base member 410.

The base member 410 carries the brackets 411 having the downwardly extending clevises 412 which carry the pivots 365.

The links 364 extend down to the clevises 413, which receive the pivot rods 366. The levers 367 (see FIG. 7) are driven by the shaft 368.

The device that tucks in the ends of the wire to form the selvage is best shown in FIGS. 5, 6, 19 to 20 and 26.

As shown in FIGS. 23 to 26, a location pin or stud W is placed in position at the selvage and it is around this pin that the wire end is turned inwardly, as indicated at the successive positions from FIGS. 23 to 26. This pin member W is shown in down position in FIGS. 5, 20 and 21 and also in FIGS. 23 and 26, and it is shown in up position in FIG. 6.

The pin W is carried by a head, which also carries the swinging lever U and causes the grooved end of the swinging lever U to proceed in the successive positions indicated in FIGS. 23 to 26.

The bell crank lever 430 as shown in FIG. 5 is pivotally mounted on the shaft 431 and it has an arm 432 which carries the follower roller 433. The arm 432 is normally held down by means of the spring 434 which is connected thereto by the hook and eye 435.

The pivot 431 is mounted upon the frame eye 436, which in turn is mounted on an extension of the plate 437 which is mounted on the frame structure 438 by the bolts 439.

The follower 433 is actuated by means of the reciprocating cam 440 (see FIGS. 5 and 6), which has a top pad 441 and a curved lower surface 442.

The movement of the roller 433 over the cam surfaces 441 and 442 will move the structure from the position as shown in FIG. 5 to the position as shown in FIG. 6.

The spring 434 will normally pull the structure, as shown in FIG. 5, downwardly so that the pin W will then be in position so that the finger U is moved to turn the end V into position, as shown in FIGS. 23 to 26.

However, when this is completed the structure will be elevated, as shown in FIG. 6, so that the reed G may move up to its beat up position at the fell of the fabric, with the next wire then being moved into the position as shown in FIG. 23 and with the sequence of operations then taking place with this cut end V being turned into its selvage, as indicated in FIGS. 24, 25 and 26.

It will be noted in FIG. 6 that there are two adjustable link members 443 and 444, which have the adjustments 445 and 446 and 447 and 448.

The linkages 443 and 444 come to a pivot 449 at the top of the arm 450.

The upper linkage 443 is connected by the clevises 451 to the pivot connection 452. The pivot connection 452 is connected to the arm 453, which is mounted on the shaft 454. Connected to the same shaft is the lever 456 (see FIGS. 19 and 20), which has a follower roller 457 which rides upon the pad portion 441 of the cam 440, as shown in FIG. 5.

Connected to the shaft 454 in FIGS. 5 and 20 is also the lever 458 which is connected to the pivot 459 of the linkage 460.

The linkage 460 has an adjustment at 461 (see FIGS. 19 and 20) to the pivotal connection at 462 which operates the lever 463 having the bearing mount 464. The lever 463 as shown in FIG. 19 has a shaft or stud 464*a* with the connection 465 to the pin 466.

The pin 466 as shown in FIG. 22 operates the end 467 of the lever U. The lever U is carried by the central pivot connection 468 upon the arm 469 having the shaft 470. The shaft 470 in turn is mounted in the eye structure 471.

The active end or circular grooved wiping finger 472 of the lever has a groove 473 which extends substantially around the entire periphery thereof from position 474 to position 475 (see FIG. 23) when the head goes down, as indicated in the initial position XX, as shown in FIG. 23.

In the next position, XXI, the end 472 will move up to contact the cut end V of the wire. Then in the next position XXII the wire will have been rolled around into the position as shown in FIG. 25.

In the final position, XXIII, the wire will have been rolled into selvage position and the finger U will be withdrawn and then elevated so that the next wire may be beat into position at the fell, as indicated in FIG. 23.

These positions are shown in succession in FIG. 22 and are shown in sequence in FIGS. 23 to 26.

The arm 462*a* (FIG. 19) extends from the eye 462*b* at the end of the arm 462*a* to the bearing mount 464.

As soon as the operation is completed, as shown in FIG. 26, the finger U will be withdrawn and the pin W will be elevated into the position as shown in FIG. 6. This operation takes place on each side of the fabric Z, with the cut ends V being turned in on both sides.

The stop element 490, as shown in FIGS. 19 and 20, will limit the movement of the tuck in mechanism or arm U, while the levers 460 and 463 will control the movement as indicated in FIGS. 22 to 26.

The swinging arm 491 as shown in FIGS. 5 and 6 will carry the cam 440 and it is connected by means of the member 492 carried by the hub 492*b* (see FIG. 6) and the shaft 291 to operate in synchronism with the forward and backward movement of the reed.

During the tucking in mechanism the fabric will be clamped between the jaws 494 and 495, as shown in FIG. 21.

The jaw 495 is carried by the arm 495*a* (see FIG. 6).

Having now particularly described and ascertained the nature of the invention, and in what manner the same is to be performed, what is claimed is:

1. A loom for weaving wire cloth comprising a warp supply means, means to form the warp into sheds, a weft supply means, a pair of contacting rollers to grip the weft wire and propel it at high speed across the warp wires between the shed, drive means to drive the contacting rollers during 180° of each cycle and to hold said rollers still during the remaining 180° of each cycle, means to cut off the end of the propelled weft wire at the rollers after it has been laid between the sheds with short ends projecting beyond each selvage edge, a reed to beat up the weft wire into the fell of the fabric, a lay to carry said reed, and a plurality of separable guide fingers, spaced from and positioned in the front of the reed including a fixed finger and a movable finger having contacting faces at the upper ends thereof, said fingers being positioned at repeated intervals between the warp wires, said fingers each carrying a partial recess on said contacting faces to form circular openings when the faces are in contact,

said openings serving to receive and hold the weft wire during its propulsion across the shed and means to separate the contacting faces to release the propelled weft wire from between the guide fingers, so that the reed may beat up the weft wire to the fell.

2. The loom of claim 1, said rollers, said drive means, said cut off means and said guide fingers being all carried on a swinging lay to move between and below the shed during the weaving operation.

3. The loom of claim 1, said guide fingers being positioned between each second warp and said faces having angular contacting faces with the recesses in the corners at their upper ends to form the aligned openings which are wider at the propulsion side to permit ready entry of the propelled wire.

4. The loom of claim 1, said fingers consisting of elongated vertical members extending upwardly and obliquely and converging at their upper end to form a plurality of aligned openings to receive the propelled weft wire and means to separate said fingers vertically at their meeting ends so as to form a gap through which the propelled weft wire may be removed after propulsion.

5. The loom of claim 1, a circular grooved wiping finger to roll against the short ends projecting beyond the selvages and to wipe the ends into the selvage after the beating up operation and upon the next opening of the sheds.

6. The loom of claim 1, a hollow nozzle to guide the wire between the rollers and a guide block having aligned openings at the outlet of the rollers and before the shed and a recess in said guide block to receive a reciprocating cutter forming said cut off means, said cutter having an opening aligned with said finger openings through which the weft wire passes before cut off.

7. A shuttleless loom for weaving wire cloth comprising a warp supply, heddles to form the warp into sheds, a weft wire supply, means to propel the weft wire from the supply across and between the sheds, a swinging lay, a reed on one side of said lay and a plurality of separable movable and fixed vertically extending fingers on the other side of the lay spaced from the reed, said fingers having upper contacting portions, each contacting portion having a partial recess, and upon contact forming a closed circular guide opening to receive and guide the propelled weft wire and means to move the movable finger so that the contacting portions will separate after the weft wire has been placed therein to release said weft wire between the separated portions.

8. The loom of claim 7, said fingers contacting along angular faces and said guide openings being formed in the apices of the angles between said faces.

9. The loom of claim 7, the fixed fingers being adjacent the reed and parallel to the reed and the movable fingers being at angles to the fixed fingers and extending obliquely upwardly toward the reed and toward the upper end of the fixed fingers.

10. The loom of claim 7, weft cutters located at each side of the sheds to cut the weft wire and the cutter adjacent the weft wire supply having an opening aligned with said guide opening and serving also to guide the propelled weft wire.

11. The loom of claim 7, cam means below said lay, a roller actuated by said cam, a lever operated by said roller and a link operated by said lever to actuate said movable finger upwardly and downwardly.

12. A shuttleless loom for weaving wire cloth comprising a warp supply, heddles to form the warp into sheds, a weft wire supply, means to propel the weft from the supply across and between the sheds, a swinging lay, a reed on one side of said lay and separable guide elements on the lay having contacting vertically separable upper and lower recessed portions forming transverse guide openings to receive and guide the propelled weft wire, means to move said portions vertically apart to release the propelled weft wire and means to move said separated guide elements after release of the weft wire below the sheds.

13. In a shuttleless wire cloth loom, a warp supply, heddles to form sheds from said warp supply, a weft wire supplier, means to propel the weft wire across and between the sheds, a lay, a reed carried on one side of said lay, a plurality of pairs of guide fingers carried on the other side of said lay, one of each said pair of fingers being fixed and the other being movable and the movable finger being positioned on the side of the lay away from the reed, said fingers having contacting upper portions, each with a partial transverse circular recess which upper portions upon contact form a complete transverse circular recess closely to receive and guide the propelled weft wire, and means to move the upper portions into and out of contact to close said recess to receive the weft wire and to open said recess to release the weft wire.

14. The loom of claim 13, said contacting upper portions contacting along angular faces and said recesses being positioned at the corners of the angles of said faces.

15. The loom of claim 13, a cutter to cut off the weft wire adjacent the side of the shed, said cutter including a blade having an opening therein aligned with the circular recesses.

16. In a shuttleless wire cloth loom, a lay, a reed on the front side of said lay, a weft wire supply, a plurality of separable warp wire guide fingers carried on rear side of said lay and extending upwardly from the upper portion of the lay, including a fixed finger having a top oblique contact face extending forwardly and upwardly and parallel back and front faces, said fixed finger having a transverse partial circular recess at the lower end of the oblique contact face and the upper end of the back face and also including a movable finger having parallel back and front faces and a top obliquely upwardly and forwardly extending overlap portion, said portion having an under oblique contact face to contact said upper oblique face when the guide fingers are brought together and said front face of the movable finger having a bevelled front contact face fitting against and sliding on said back face of the fixed finger, said front contact face and under oblique contact face having a transverse partial circular recess at the upper end of said front face and at the lower end of the under face, said transverse recess when the oblique contact faces are closed together serving as a guide and location circular opening for the warp wire and when opened permitting release of the warp wire.

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