(No Model.)

7 Sheets—Sheet 1.

J. W. BERRY.

WIRE FENCE WEAVING MACHINE.

No. 536,595. Patented Apr. 2, 1895.

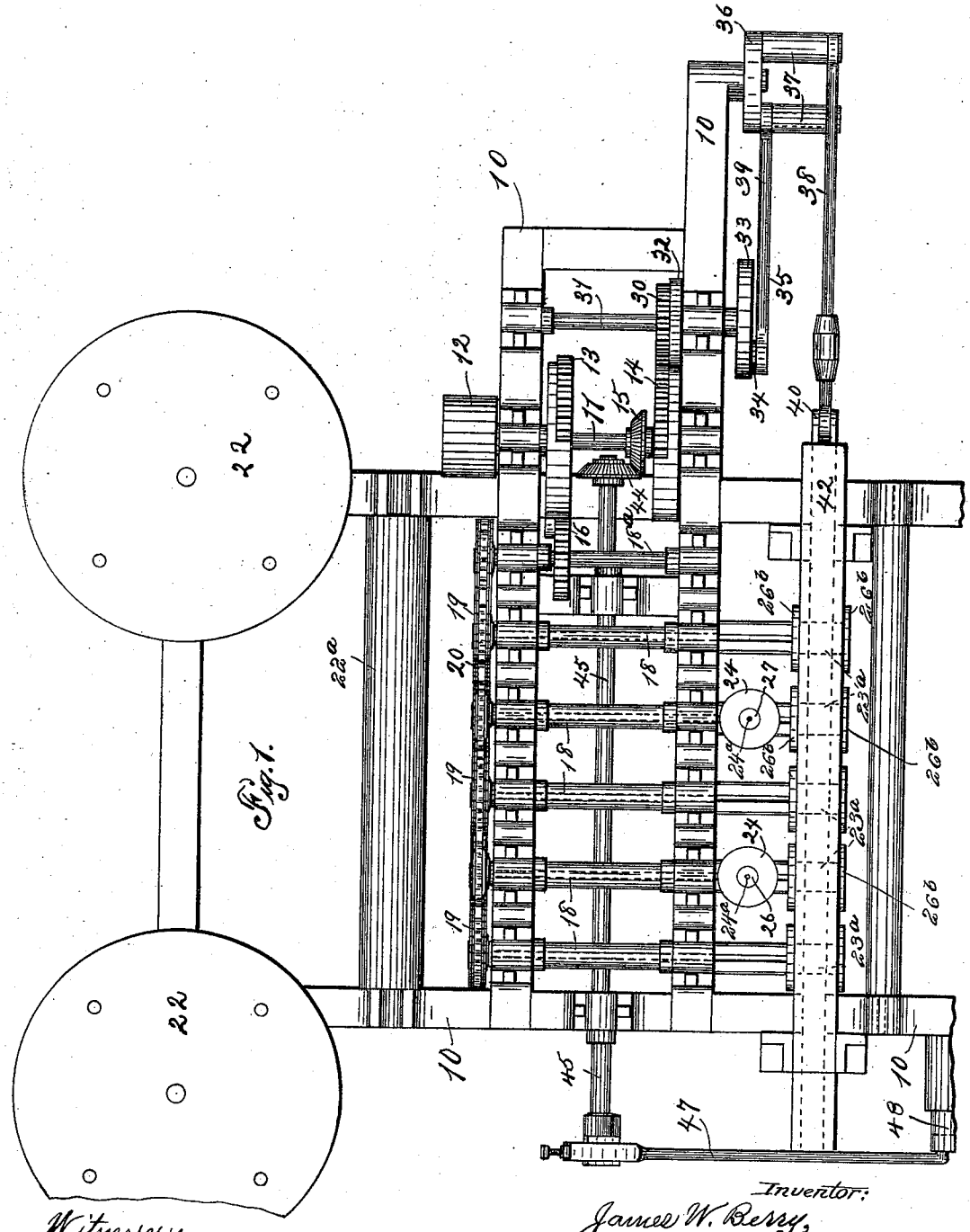


Fig. 1.

Witnesses:
F. H. Sturgis.
J. A. Camp.

Inventor:
James W. Berry,
by J. L. Sweet
his Attorney.

(No Model.) 7 Sheets—Sheet 2.

J. W. BERRY.

WIRE FENCE WEAVING MACHINE.

No. 536,595. Patented Apr. 2, 1895.

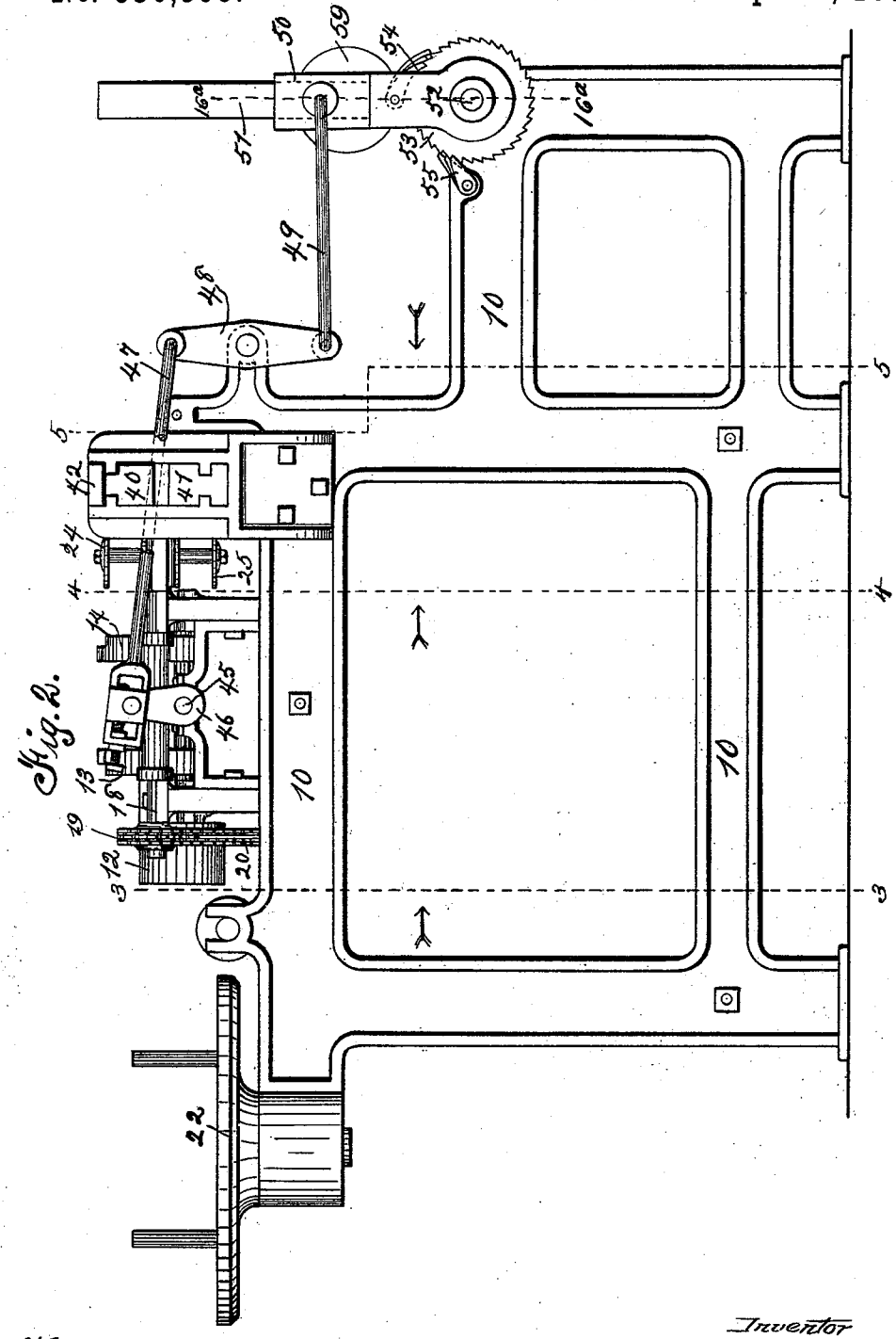


Fig. 2.

Witnesses:
A. R. Greene.
A. D. Browne.

Inventor
James W. Berry,
by Sidney Edwards
his Attorney.

(No Model.) 7 Sheets—Sheet 3.

J. W. BERRY.

WIRE FENCE WEAVING MACHINE.

No 536,595. Patented Apr. 2, 1895.

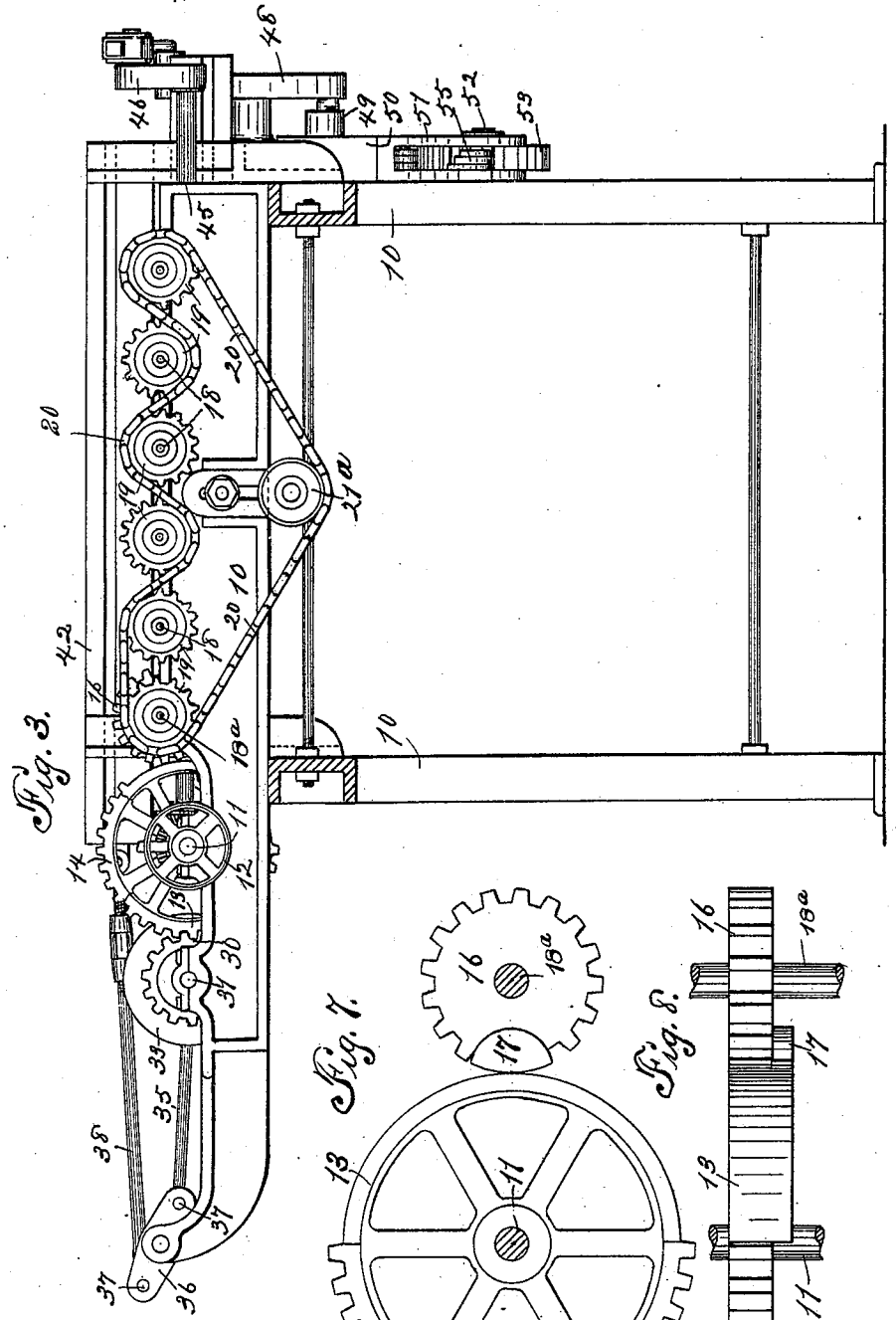


Fig. 3.

Fig. 7.

Fig. 8.

Witnesses:
G. R. Green.
A. D. Brown.

Inventor:
James W. Berry,
by J. H. Sweet
his Attorney.

(No Model.) 7 Sheets—Sheet 4.

J. W. BERRY.

WIRE FENCE WEAVING MACHINE.

No. 536,595. Patented Apr. 2, 1895.

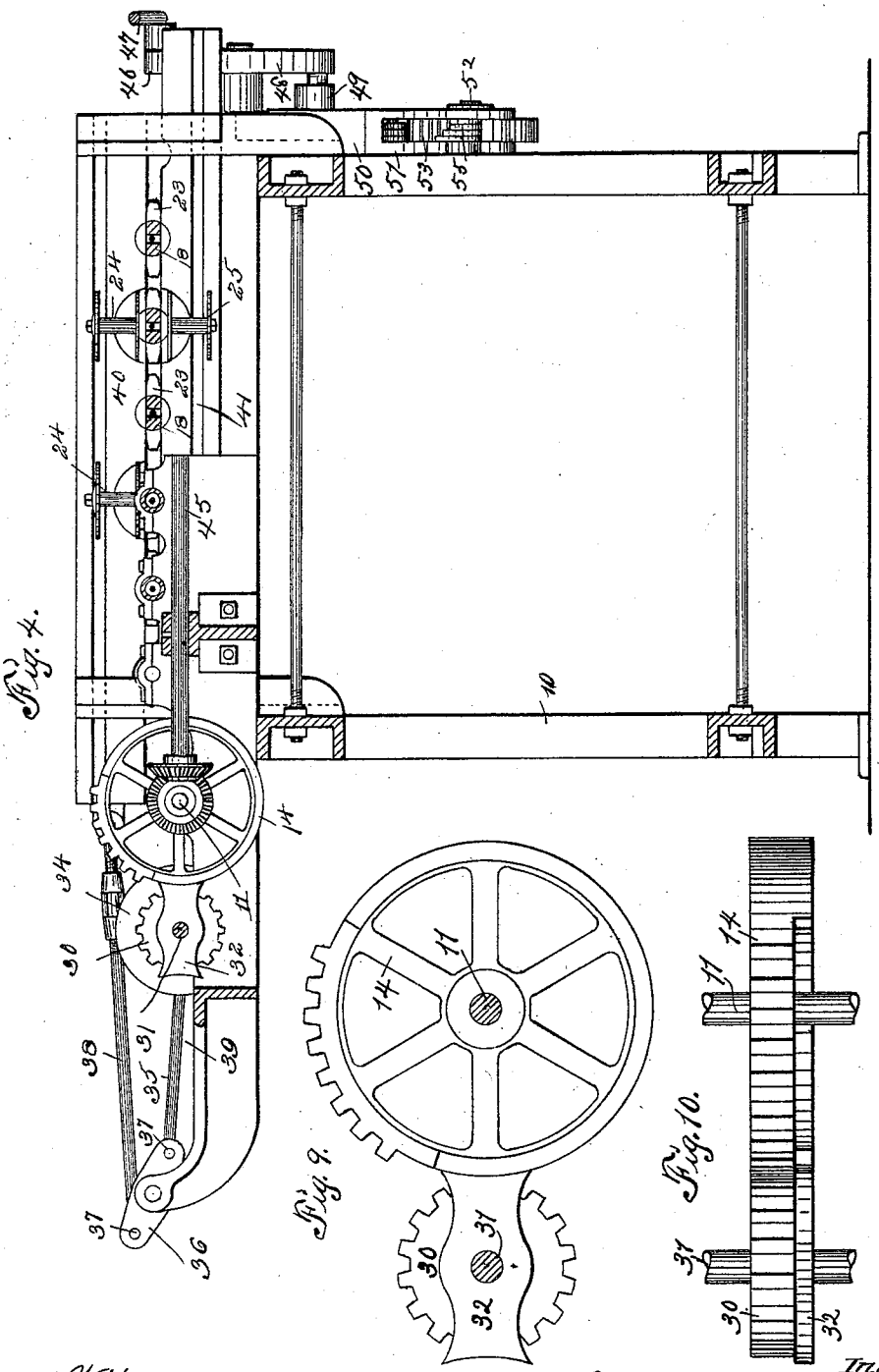


Fig. 4.

Fig. 9.

Fig. 10.

Witnesses:
E. R. Green.
A. O. Brown.

Inventor:
James W. Berry,
by J. Sherwood
his Attorney.

(No Model.) 7 Sheets—Sheet 5.

J. W. BERRY.

WIRE FENCE WEAVING MACHINE.

No. 536,595. Patented Apr. 2, 1895.

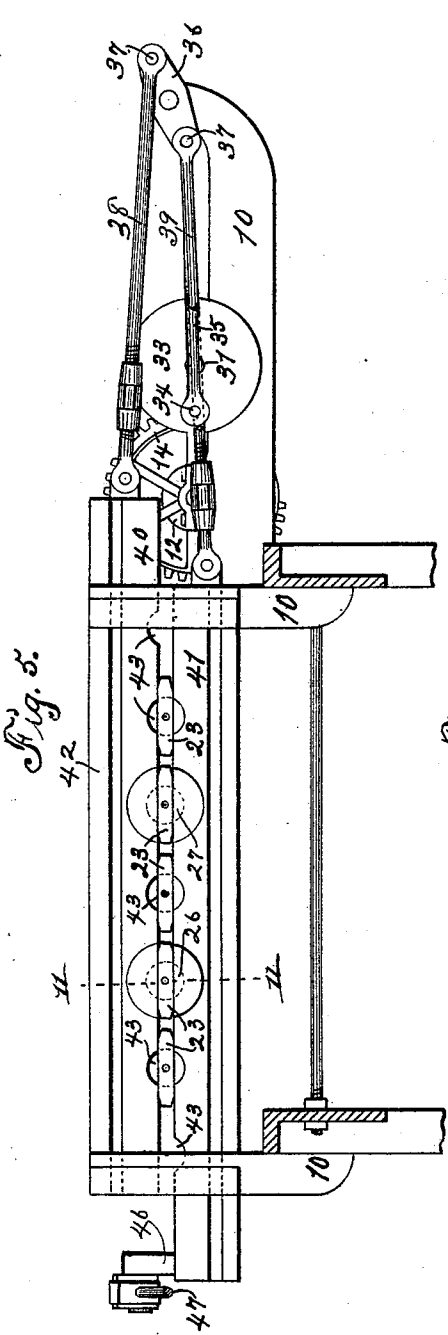


Fig. 5.

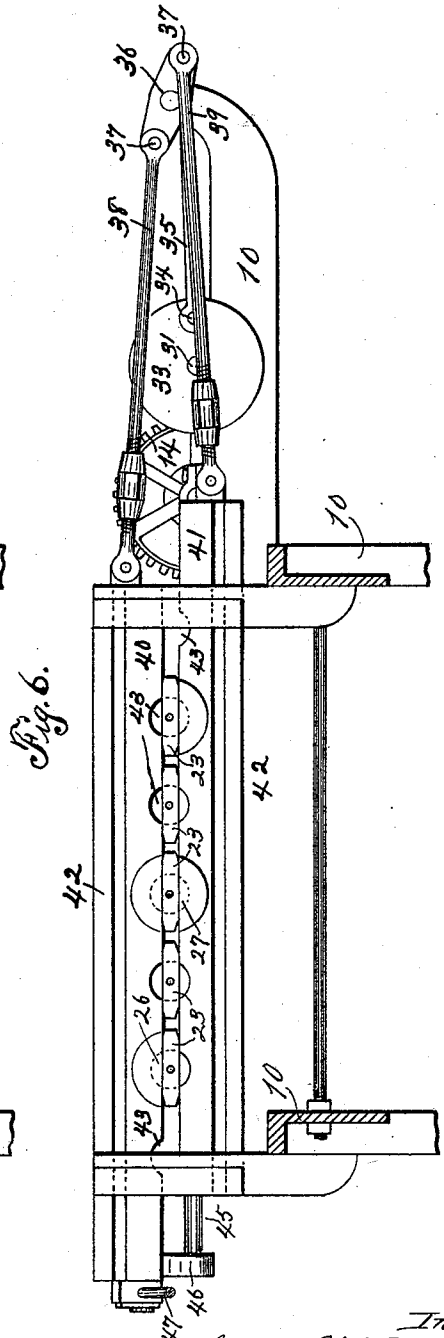


Fig. 6.

Witnesses:
G. R. Green.
A. A. Brown.

Inventor:
James W. Berry,
by Hedsweet
his Attorney.

(No Model.) 7 Sheets—Sheet 6.

J. W. BERRY.

WIRE FENCE WEAVING MACHINE.

No. 536,595. Patented Apr. 2, 1895.

Fig. 11.

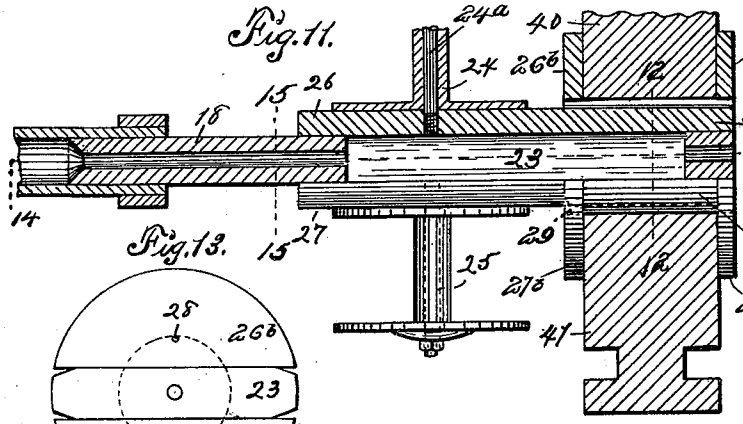


Fig. 12.

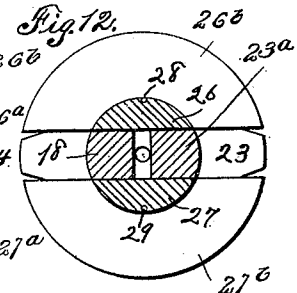


Fig. 13.

Fig. 15.

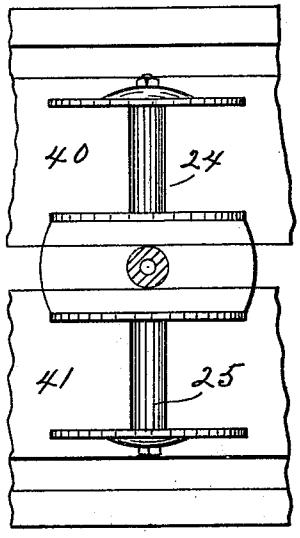


Fig. 14.

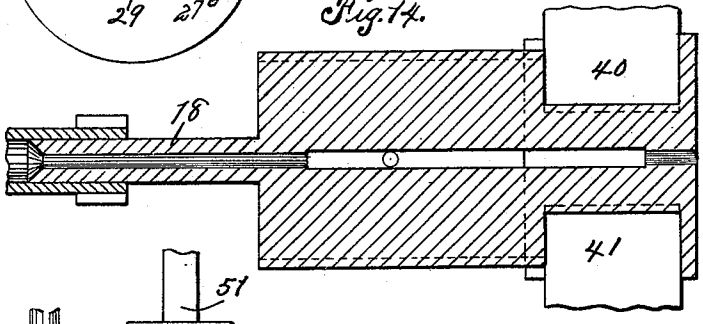


Fig. 16.

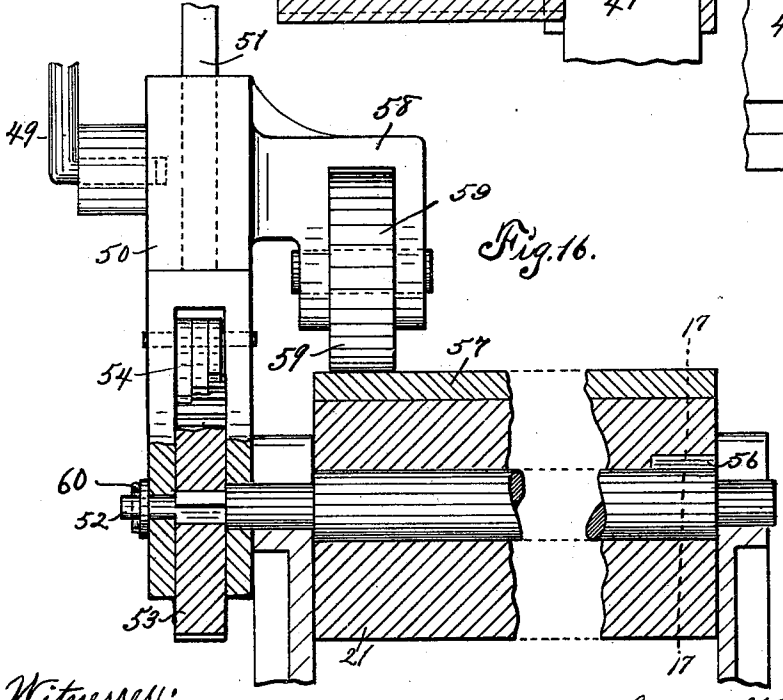
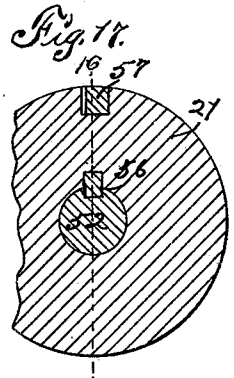


Fig. 17.



Witnesses:
S. R. Green,
A. O. Brown.

Inventor.
James W. Berry,
by Hildreth
his Attorneys.

(No Model.) 7 Sheets—Sheet 7.

J. W. BERRY.

WIRE FENCE WEAVING MACHINE.

No. 536,595. Patented Apr. 2, 1895.

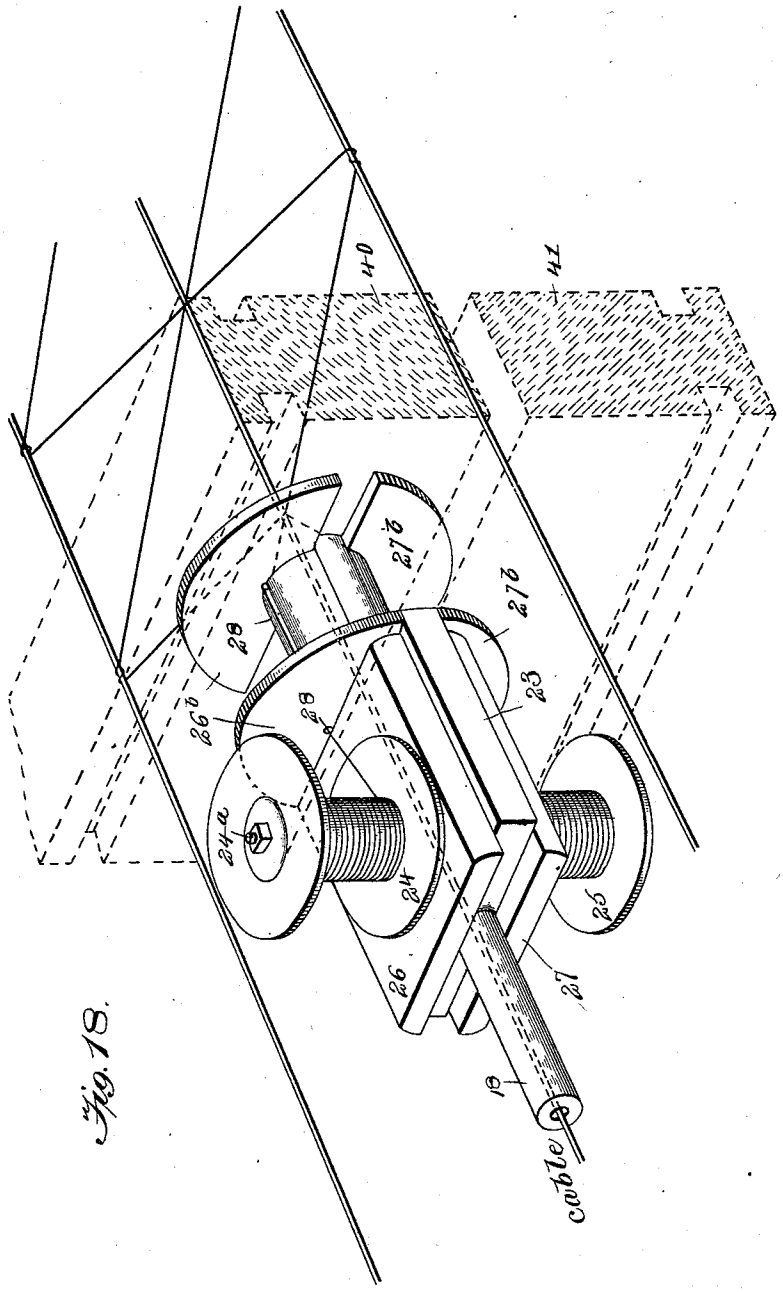


Fig. 18.

Inventor
James W. Berry,

Witnesses
John C. Shaw

By his Attorneys.
C. A. Snow & Co.

UNITED STATES PATENT OFFICE.

JAMES W. BERRY, OF IOWA CITY, IOWA.

WIRE-FENCE-WEAVING MACHINE.

SPECIFICATION forming part of Letters Patent No. 536,595, dated April 2, 1895.

Application filed February 15, 1894. Serial No. 500,314. (No model.)

To all whom it may concern:

Be it known that I, JAMES W. BERRY, a citizen of the United States of America, and a resident of Iowa City, in the county of Johnson and State of Iowa, have invented a new and useful Fence-Weaving Machine, of which the following is a specification.

My invention relates to wire fence weaving mechanism, and the objects in view are to provide means for weaving mesh wires to connect parallel cables, each mesh wire being coiled or twisted around each cable intersected thereby; to provide means for conjunctively twisting two mesh wires on a single intermediate cable simultaneously with the twisting of single mesh wires on each of the outside cables; to provide improved means for reciprocating the mesh wire twisting apparatus, to carry the same from one line of cable to another; to provide improved means for intermittently rotating the mesh wire twisting devices, whereby said devices are held from rotation during the lateral reciprocation thereof; to provide means for automatically controlling the reeling mechanism to regulate the length of the meshes in the fence, and furthermore to otherwise improve and simplify the construction of the operating mechanism to produce an efficient machine of the class described.

Further objects and advantages of the invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings:—Figure 1 is a partial plan view of a fence machine embodying my invention. Fig. 2 is an end view to show means for operating the reeling mechanism. Fig. 3 is a rear view partly broken away on the line 3—3 of Fig. 2 to show the means for communicating motion to the shafts which carry the twisting devices. Fig. 4 is a vertical section on the line 4—4 of Fig. 2 to show the mechanism for communicating intermittent reciprocatory motion to the shifting mechanism. Fig. 5 is a section on the line 5—5 of Fig. 2 to show the shifting mechanism and means for communicating opposite linear movement to the slides. Fig. 6 is a similar view showing a different relative disposition of the slides. Fig. 7 is a diagrammatic view of the stop mechanism for communicating motion from the driving shaft to the spindles of the twisting devices. Fig. 8 is a plan view of the same. Fig. 9 is a diagrammatic view of the stop mechanism for communicating motion from the driving shaft to the slide shifting devices. Fig. 10 is a plan view of the same. Fig. 11 is a detail vertical section on the line 11—11 of Fig. 5, the same being partly broken away. Fig. 12 is a transverse section on the line 12—12 of Fig. 11. Fig. 13 is an end view of the construction shown in Fig. 11. Fig. 14 is a longitudinal section at right angles to the plane of Fig. 11 and on the plane indicated by the line 14—14 of said figure. Fig. 15 is a section on the line 15—15 of Fig. 11. Fig. 16 is a detail view partly in section and partly broken away of the reeling mechanism, the section of the drum being indicated by the line 16—16 of Fig. 17 and line 16^a—16^a of Fig. 2. Fig. 17 is a transverse section of the reeling drum on the line 17—17 of Fig. 16. Fig. 18 is a detail view in perspective of a mesh wire twisting mechanism, showing the slides in dotted lines.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

The framework of the machine is indicated by the numeral 10 and may be of any preferred construction to provide the necessary bearings for the mechanism as hereinafter described.

The main or driving shaft is indicated at 11 and may be provided at one end with a belt-pulley 12, or with other equivalent means whereby motion may be communicated thereto. This main or driving shaft carries one member of a stop-mechanism, such member consisting of a mutilated gear 13, shown in detail in Figs. 7 and 8 and having teeth upon approximately one-half of its periphery. The other member of said stop-mechanism consists of a pinion 16 fixed to a shaft 18^a and having a smooth faced shoe 17 adapted to be presented to the mutilated gear during the time that the smooth portion of such gear is passing the pinion, whereby the contact of the shoe with the smooth portion of the mutilated gear holds the pinion from rotation

and hence maintains the twisting mechanism, as hereinafter described, in a state of rest. The shoe 17 is preferably attached to or formed integral with the side of the pinion 16, and the smooth portion of the mutilated gear is extended laterally or flanged, as indicated clearly in Fig. 8.

Parallel with the counter-shaft 18^a is a series of tubular spindles 18, the bores of which are designed to serve as guides for the wire cables, and fixed to the rear ends of the spindles 18 and the shaft 18^a are the chain-wheels 19 upon which travels, and which are connected by, the chain 20, said chain being held taut by the adjustable belt tightener 21^a. The chain 20 is carried alternately over and under the wheels 19, whereby the adjacent spindles are rotated in opposite directions. Fixed to the tubular spindles near their front ends are the flat guiding webs 23, having reduced portions 23^a which are adapted to fit between the contiguous edges of the upper and lower slides 40 and 41, the thickness or vertical measurement of the said webs being approximately equal to the interval between the said contiguous edges of the upper and lower slides. These slides are provided with half bearings 43 which are equal in diameter to the width of the reduced portions of the guiding webs 23, whereby when the half bearings of the slides register the spindles 18 may be rotated, the reduced portions 23^a of the guiding webs turning freely in the half-bearings. Mounted in certain of these half-bearings are the hubs 26^a and 27^a of the twisters 26 and 27, which are disposed respectively above and below the plane of the spindles 18. These twisters are provided with flanges 26^b and 27^b to bear against the outer and inner sufaces of the slides 40 and 41 to prevent longitudinal displacement, and mounted rotatably upon the spindles 24^a, which are secured to the twisters, are mesh-wire spools 24 and 25. Mesh wire guides 28 and 29 are provided to direct the wire in its movement from the spools to the point of use.

In the construction illustrated in the drawings two of the above described twisters are mounted in each slide 40 and 41, and by the opposite reciprocation of the slides these twisters may be arranged in pairs in conjunction with the spindles upon opposite sides of the central spindle, as shown in Fig. 5, or may be disposed as indicated in Fig. 6, in which two of the opposite twisters are arranged in conjunction with the central spindle, and the other twisters are arranged in connection with the exterior or side spindles. It is obvious that in whichever position the twisters are disposed the rotation of the spindles by the means described will cause a similar rotary movement of the twisters around the axes of the spindles as centers, and hence that the mesh wire spools will be carried around the cables which are disposed in coincidence with the axes of said spindles. The "paying" reels 22 are arranged horizontally in rear of a guide roller 22^a, which is disposed in rear of the chain wheels 19, to guide the cable wires to the twisting spindles.

Fixed to the main or driving shaft 11 is a second mutilated gear 14, forming one member of a stop-mechanism for actuating the reciprocatory slides 40 and 41, the other member of the stop-mechanism being a pinion 30. The mutilated gear 14 is provided with teeth upon approximately one-fourth of its periphery, and fixed to and carried by the pinion 30 is a double-ended stop plate 32 provided with concaved terminals which are adapted to engage the smooth surface of the gear 14, as shown in detail in Figs. 9 and 10, said smooth portion of the gear 14 being extended laterally to form a flange, as indicated in Fig. 10. The pinion 30 is fixed to a counter shaft 31 parallel with the main or driving shaft and said shaft carries at one end a disk 33 having a wrist-pin 34 which is connected by means of a pitman 35, to one arm of a rocking lever 36. This lever is provided at opposite ends with pins 37 which are connected respectively to the upper and lower slides 40 and 41 by means of pitmen 38 and 39. The number of teeth on the mutilated gear 14 is sufficient to turn the pinion 30 through one-half of a revolution, and therefore the stop-plate 32 checks the motion of said pinion and hence of the shifting mechanism at the end of each half revolution of the pinion. Therefore the rocking or shifting lever 36 swings from the position shown in Fig. 5 to that shown in Fig. 6 during one movement of the pinion and then back to the position shown in Fig. 5 during the succeeding movement of the pinion, and each movement of the pinion occurs during one complete revolution of the mutilated gear. By means of this mechanism the slides 40 and 41 are alternately moved from the position shown in Fig. 5 to the position shown in Fig. 6 and then back to their original position, at intervals regulated by the speed of rotation of the main or driving shaft. During the time that the slides or shifting bars 40 and 41 are at a rest, with their half bearings in registration, motion is communicated by the main or driving shaft through the counter-shaft 18^a to the spindles of the twisting devices, and the mesh wire spools are carried around the cables one, two or more times according to the relative number of teeth on the gears 13 and 16. When the parts of the twisting mechanism are in the position shown in Fig. 5 two mesh wires will be twisted around each of the intermediate cables upon opposite sides of the central cable, and when the parts are in position shown in Fig. 6 two mesh wires will be twisted around the central cable and one around each outside cable.

The reeling mechanism receives its motion through a counter shaft 45 which is connected by gears 44 and 15 with the main or driving shaft, a crank-arm 46 fixed to the said counter-shaft, a pitman which is adjustably connected to the extremity of said crank-arm, a

rocking lever 48, and a second pitman 49, or by any other equivalent combination of devices to suit the particular location of the reeling mechanism.

The reeling mechanism comprises a drum the body portion 21 of which is loosely and removably fitted upon a shaft 52, to which it is keyed as shown at 56, this key being removable to allow the body portion of the drum to be detached from the machine when filled. An operating lever 51 is loosely mounted upon the extended spindle of the drum, and is bifurcated to embrace a ratchet wheel 53 which is fixed upon a sectionally angular portion of the spindle, said lever carrying a multiple pawl 54 for engaging the teeth of said ratchet-wheel to communicate motion from the lever to said wheel. A similar multiple pawl 55 is employed to prevent return movement of the drum. A split-pin 60 is engaged in a transverse perforation in the extremity of the shaft 52 to hold the lever in place thereon, and the bearing box at the opposite end of the drum is preferably provided with a removable cap, of any preferred construction, to facilitate the displacement of the shaft to allow the detachment of the body portion of the drum. Slidably mounted upon a reduced sectionally angular portion of the lever 51 is a sleeve 50 to which the adjacent end of the pitman 49 is pivotally connected, and projecting from said sleeve is a bracket 58 carrying the roll 59, which is adapted to bear upon the surface of the fence as it is reeled on the drum and thus shift the pivotal connection of the pitman 49 toward the outer end of the lever, or from its fulcrum, as the completed article is accumulated, whereby the throw of the lever is gradually reduced in extent to preserve a uniform tension upon the fence.

It will be understood that in practice various changes in the form, proportion, and minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described my invention, I claim—

1. In a machine of the class described the combination with driving mechanism including a main shaft and a second shaft parallel therewith, of a series of tubular spindles provided at their front ends with lateral webs extending in opposite directions and arranged in common planes, connections between the spindles and the said second shaft, stop-mechanism connecting said main and second shafts to communicate intermittent motion from the former to the latter, parallel slides arranged upon opposite sides of the plane of said spindles and provided in their adjacent edges with half-bearings, said adjacent edges of the slides being spaced apart to receive the lateral webs on the spindles and being in contact therewith, twisters having their hubs mounted in alternate half-bearings of the slides and adapted to be arranged respectively in operative relation with the webs of the tubular spindles, and connections including a stop-mechanism between the slides and the driving-mechanism, whereby said slides receive an intermittent movement in opposite directions, substantially as specified.

2. The combination with a driving mechanism including a main shaft and a second shaft parallel therewith, of tubular spindles operatively connected with said second shaft and provided with lateral oppositely extending webs disposed in common planes and having reduced intermediate portions, connections including a stop-mechanism between the main and second shafts, parallel slides arranged respectively upon opposite sides of the plane of the tubular spindles and provided in their adjacent edges with half-bearings corresponding in diameter with the widths of the reduced portions of the webs, twisters having their hubs mounted in said half-bearings and provided in contact with opposite faces of the slides with flanges the diameters of which are equal to the full widths of the webs and connections including a stop-mechanism between said slides and the driving mechanism, substantially as specified.

3. The combination with a main and driving shaft, a parallel second shaft, tubular spindles operatively connected with the said second shaft, parallel slides arranged upon opposite sides of the plane of said spindles and provided in their adjacent edges with half-bearings, twisters having their hubs mounted in said half-bearings, connections between said twisters and the spindles when said parts are in prescribed relative positions, and connections including a stop-mechanism between the slides and the main or driving shaft, of a stop-mechanism for communicating motion from the main to the second shaft including a mutilated gear secured to the main shaft, a pinion secured to the second shaft, and a smooth convex faced shoe carried by the pinion and equal in projection with the teeth thereof to engage a smooth faced flange on the mutilated gear, substantially as specified.

4. In a machine of the class described, the combination with driving mechanism, of tubular spindles bearing chain-wheels, an endless chain passed alternately over and under said chain-wheels to connect the same for simultaneous movement, connections between said driving mechanism and the chain for imparting an intermittent movement in a constant direction thereto, shifting bars, means for imparting an intermittent reciprocatory movement to the shifting bars, twisters carried by the said shifting-bars and adapted to be arranged concentric with the spindles, and means for communicating motion from the spindles to the twisters, substantially as specified.

5. In a machine of the class described, the combination with a main or driving shaft, twisting mechanism, and connections between

the shifting mechanism and the main or driving shaft whereby an intermittent motion is communicated to the former, of shifting mechanism arranged in operative relation with the twisting mechanism, and including a counter-shaft, and a stop-mechanism having a mutilated gear fixed to the driving shaft, a pinion fixed to the said counter shaft and adapted to mesh with the teeth of the mutilated gear, and a stop-plate having opposite concaved ends to engage the smooth portion of the periphery of the mutilated gear, substantially as specified.

6. The combination with a main or driving shaft, twisting-mechanism and connections between said shaft and the twisting mechanism, whereby an intermittent motion is communicated to the latter, of shifting bars arranged in operative relation with the twisting-mechanism, a rocking-lever pivoted at an intermediate point and provided at its opposite extremities with wrist pins, rods connecting the wrist-pins respectively with the shifting bars, a counter-shaft having a crank disk operatively connected with said rocking-lever, and connections including a stop-mechanism between the main and counter-shafts, substantially as specified.

7. The combination with a driving shaft, twisting and shifting mechanisms, and connections between said parts whereby intermittent motion is communicated alternately to the twisting and shifting mechanisms, of reeling mechanism including a drum, a lever carrying pawls for engagement with a ratchet-wheel on said drum, a sleeve mounted slidably upon the lever, a roll mounted upon the sleeve and adapted to bear upon the surface of the article reeled upon the drum, and connections between said sleeve and the main or driving shaft, whereby a continuous motion is communicated to the lever, substantially as specified.

8. In a machine of the class described, the combination with a driving mechanism, twisting and shifting mechanisms, and connections between said parts whereby intermittent motion is communicated alternately to the twisting and shifting mechanisms, of reeling mechanism having a drum comprising a spindle and a cylindrical body portion removably attached to the spindle, means for locking said body portion upon the spindle, a ratchet wheel attached to the spindle of the drum, a lever carrying pawls for communicating motion to the ratchet wheel, and connections between said lever and said driving mechanism, substantially as specified.

In testimony whereof I have hereunto set my hand, this 29th day of November, 1893, at Iowa City, Iowa.

JAMES W. BERRY.

In presence of—
G. W. SCHMIDT,
IRA E. TRELLOSS.