No. 714,088. Patented Nov. 18, 1902.

W. J. WRIGHT.

WIRE WEAVING MACHINE.

(Application filed Jan. 18, 1902.)

(No Model.) 4 Sheets—Sheet 1.

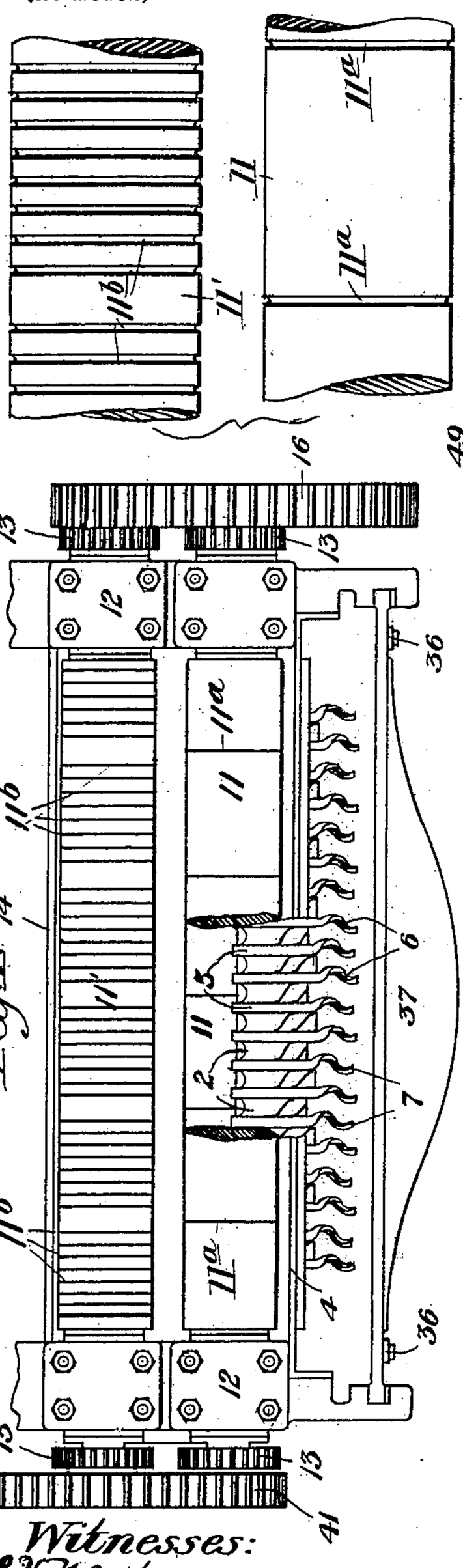

Fig. 1.

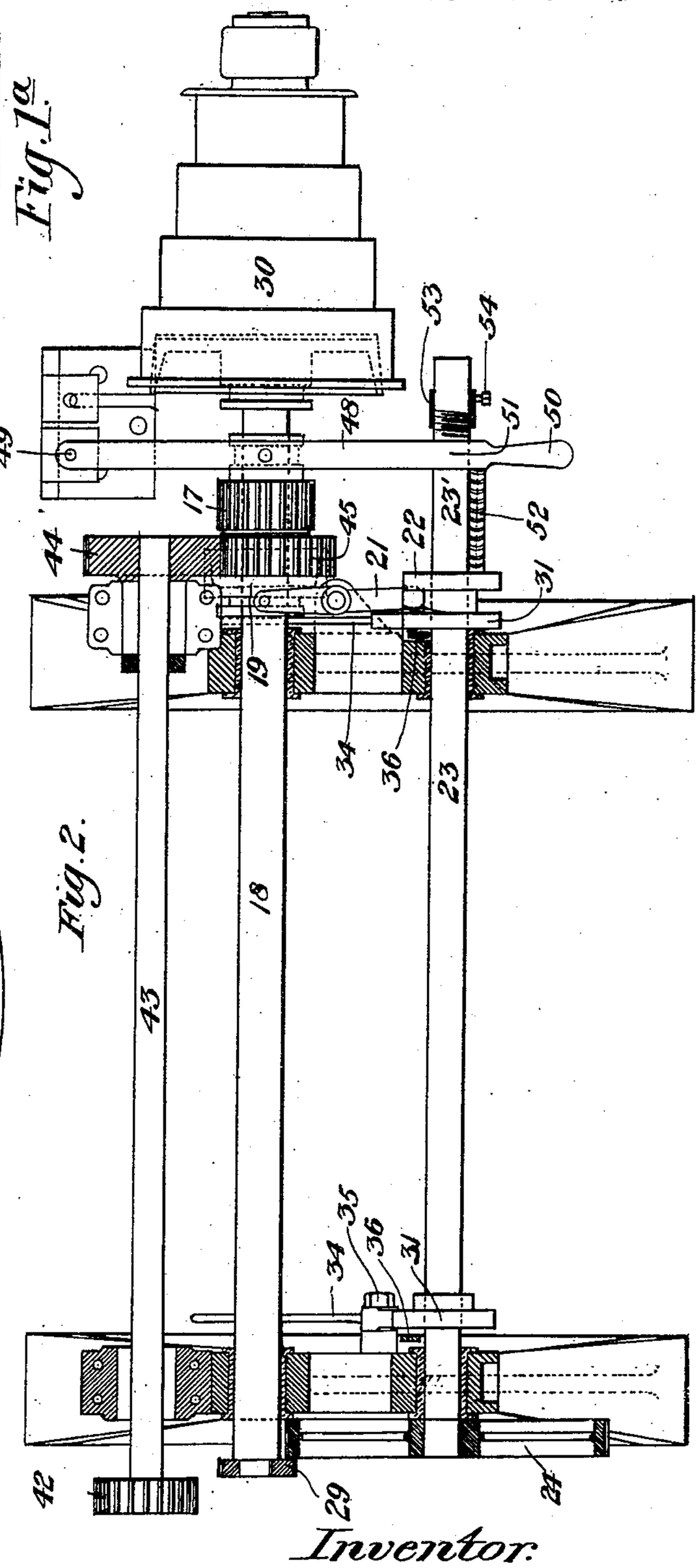

Fig. 2.

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Fig. 3.

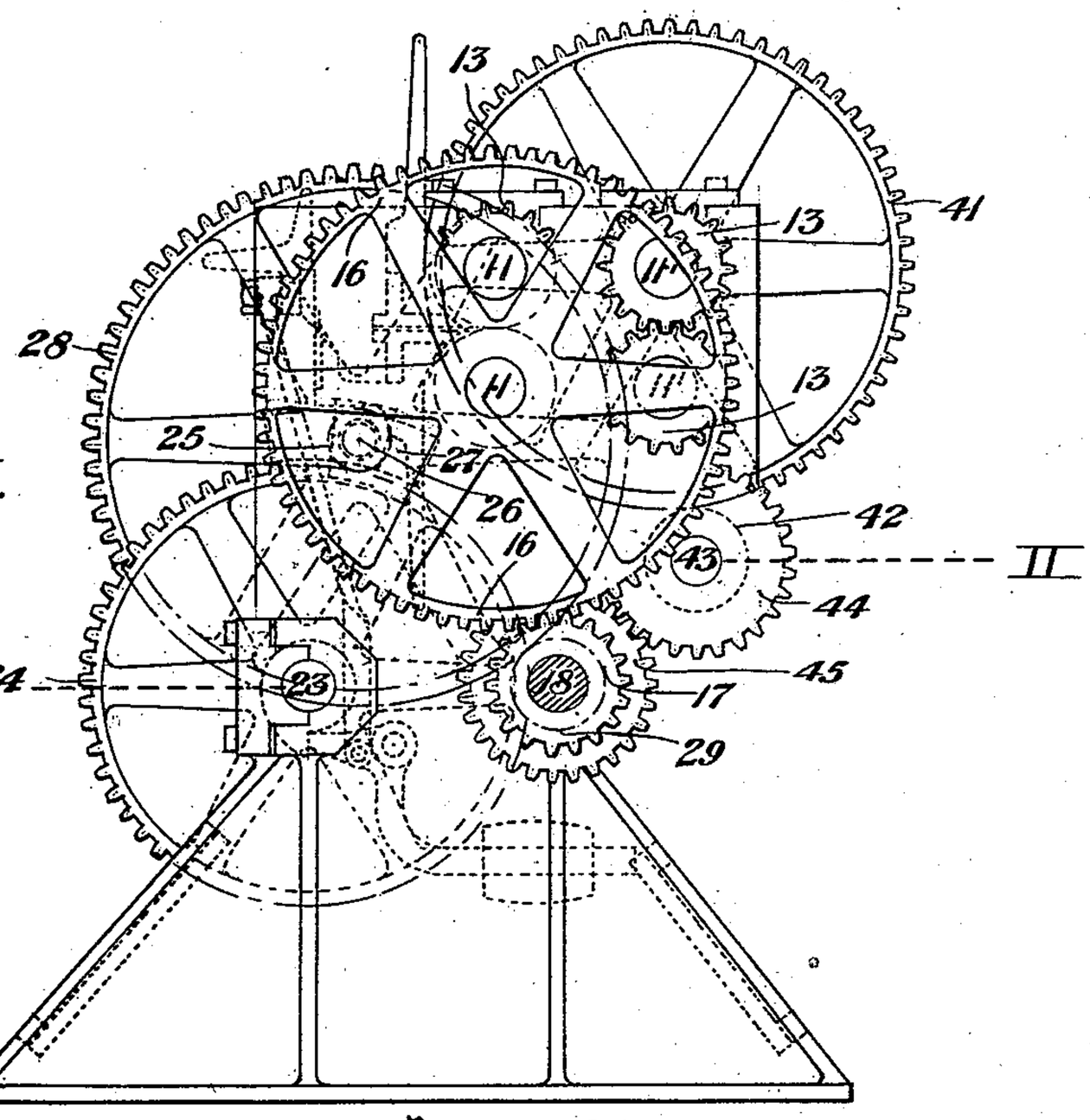
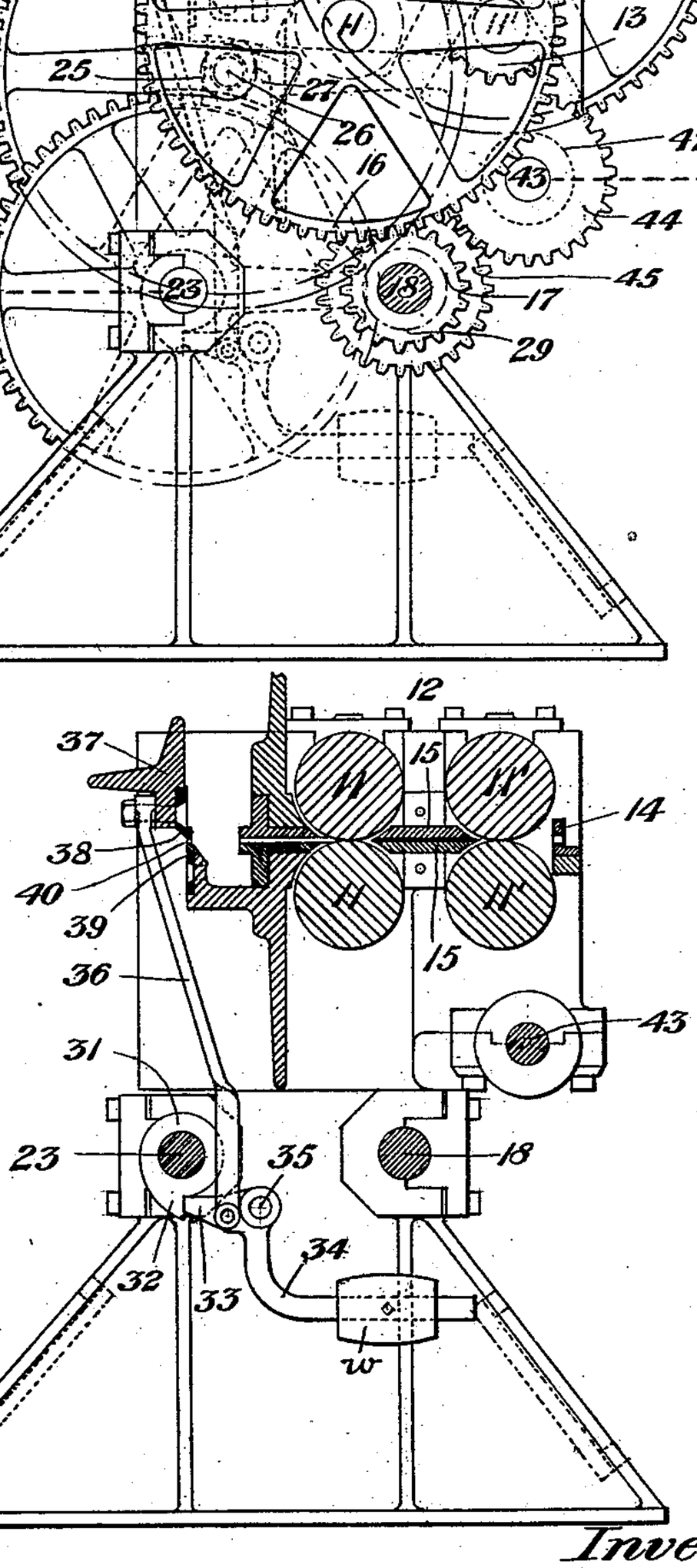


Fig. 4.



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(No Model.) 4 Sheets—Sheet 3.

Fig. 5.

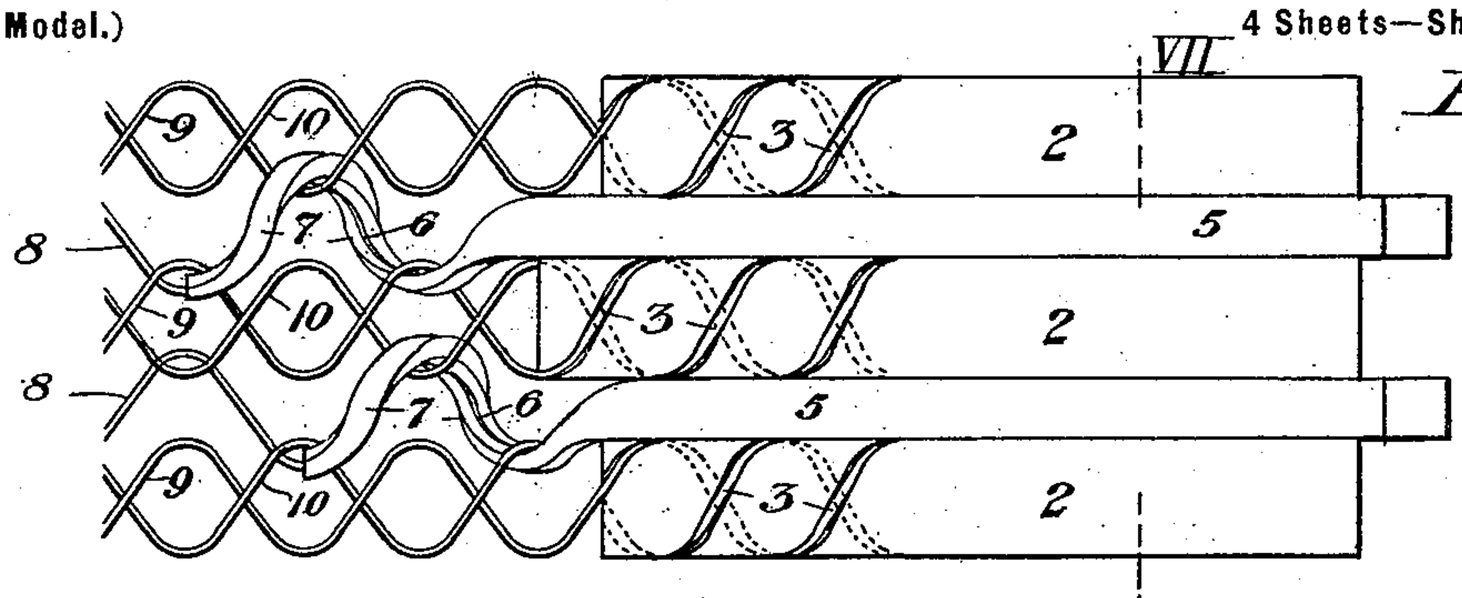


Fig. 6.

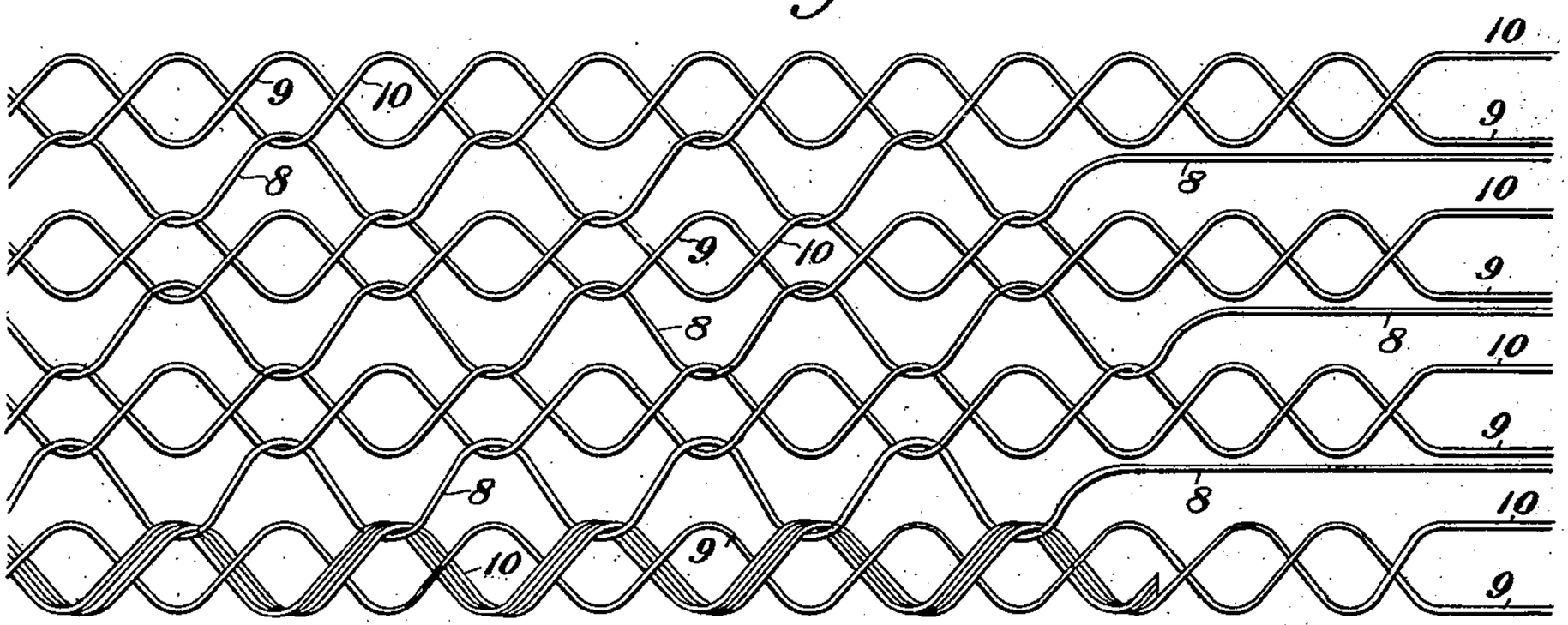
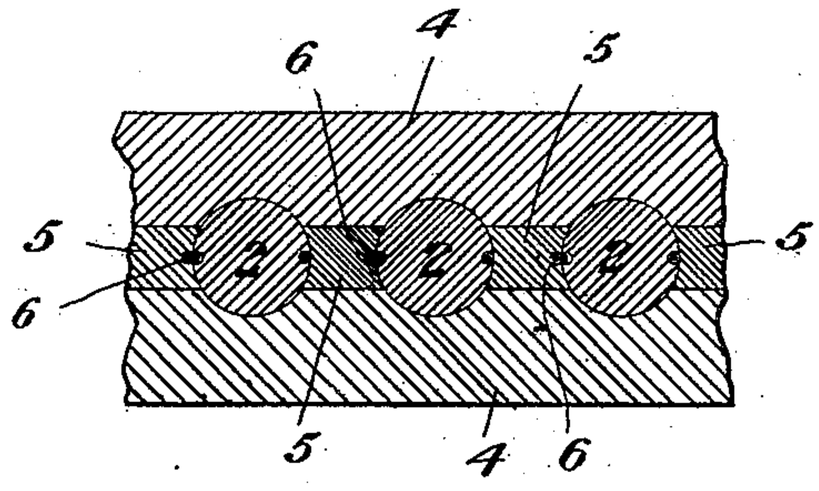


Fig. 7.



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(Application filed Jan. 18, 1902.)

(No Model.) 4 Sheets—Sheet 4.

Fig. 8.

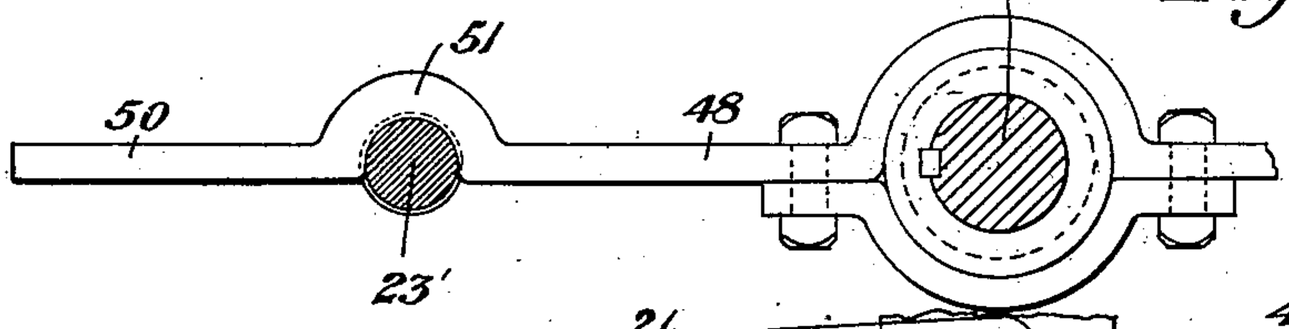
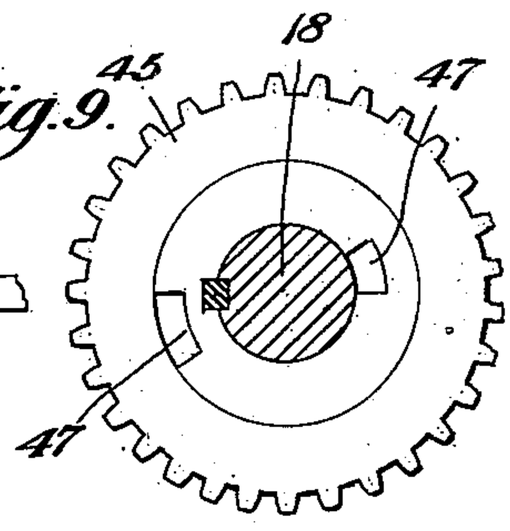


Fig. 9.



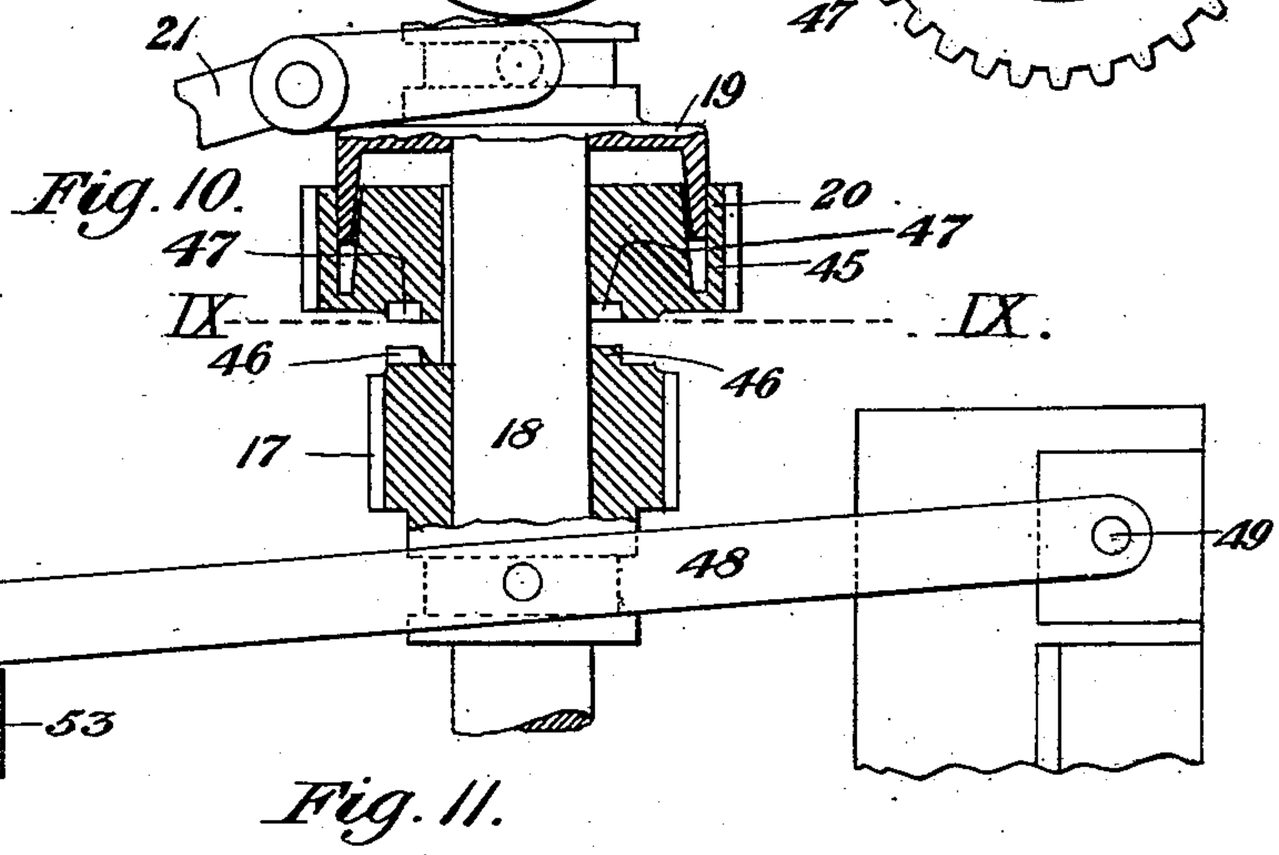
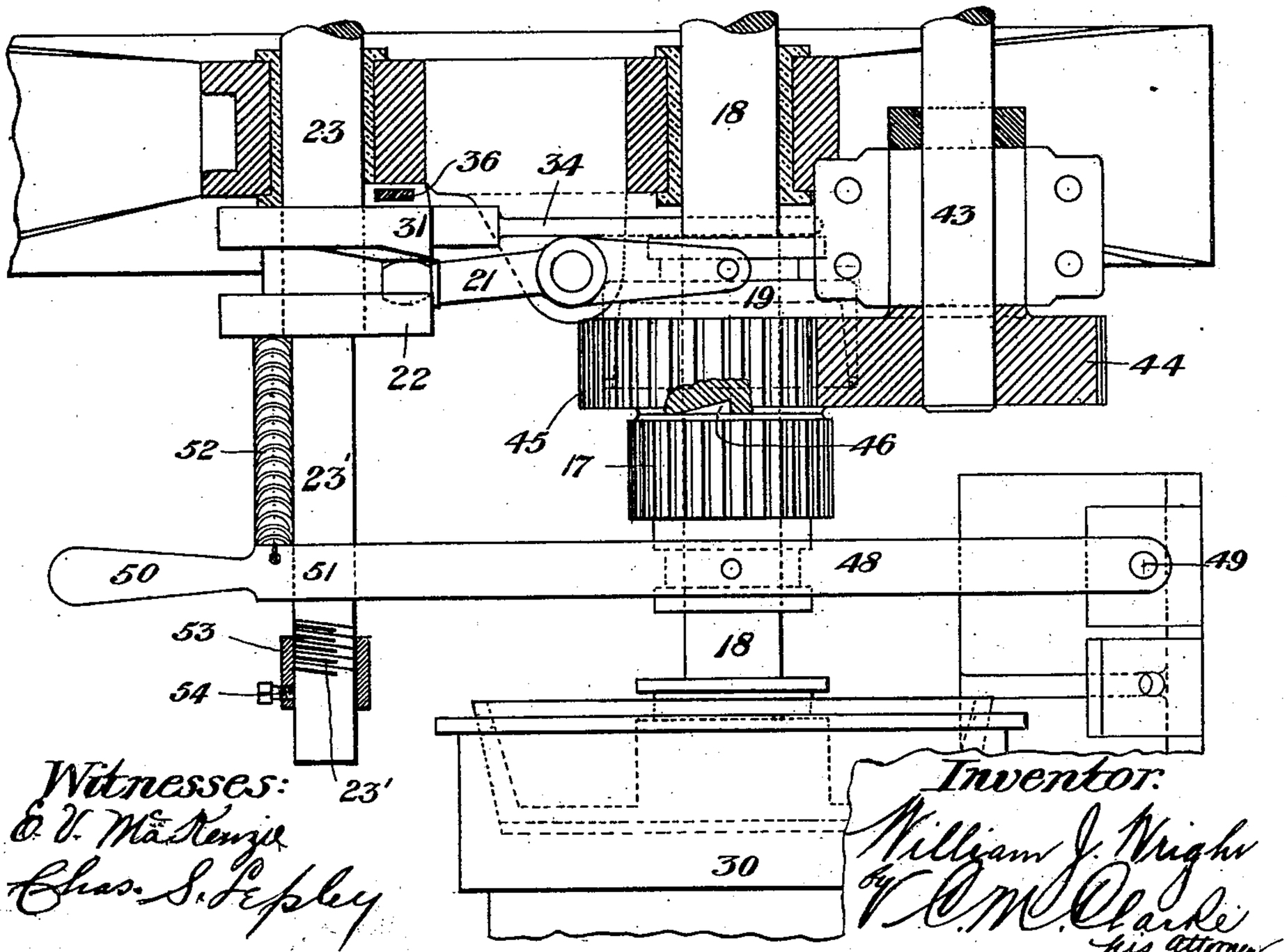


Fig. 10.

Fig. 11.



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UNITED STATES PATENT OFFICE.

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WIRE-WEAVING MACHINE.

SPECIFICATION forming part of Letters Patent No. 714,088, dated November 18, 1902.

Application filed January 18, 1902. Serial No. 90,291. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. WRIGHT, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Wire-Weaving Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

Figure 1 is a partial plan view, partly broken away, of my improved wire-weaving machine. Fig. 1ª is a detail view, on an enlarged scale, showing the clearance-grooves of the rolls. Fig. 2 is a horizontal sectional view on the line II II of Fig. 3. Fig. 3 is an end elevation. Fig. 4 is a vertical sectional view at the middle portion of the machine. Fig. 5 is a detail plan view illustrating the relative arrangement of the coiling guides and spindles. Fig. 6 is a plan view of several interwoven coiled strands before being stretched, illustrating the application of the reinforcing-strands. Fig. 7 is a cross-sectional view through several of the coiling guides and spindles with the housing indicated by the line VII VII of Fig. 5. Fig. 8 is a detail view of a portion of the screw-actuated clutch-shifting lever. Fig. 9 is a cross-sectional view on the line IX IX of Fig. 10, showing the face of the clutch-actuated pinion. Fig. 10 is a detail sectional plan view of the clutch-actuating mechanism for intermittently actuating the feeding-rolls. Fig. 11 is a similar view including additional features of construction and showing the screw-actuated lever released with the pinions in driving engagement with each other.

My invention consists of an improved machine for weaving wire into fabric or netting composed of interfitting spiral coils, whereby the full width of the netting desired may be made at one time of any desired number of wires simultaneously and continuously and in one operation.

In the practice of my invention I employ a plurality of spindles 2, having the usual spiral grooves 3 3, which spindles are mounted in a suitable housing or frame 4 at such a distance apart as will permit of the location between the spindles of separate coiling-guides 5, which for approximately the full length of the spindles are straight. These guides have on one side a groove 6 of sufficient size to admit of the wire, but partly closed, so as to not allow the wire to escape outwardly, and at or beyond the delivery end of the spindles each of the guides is formed into a spiral 7 of the same pitch and relative position as the spiral groove 3 of the spindle, the groove 6 of the guides being maintained on the inner side, as shown. By reason of the close arrangement of the pairs of spirals formed on the spindle 2 to the next adjacent pair similarly formed it will be seen that the spiral guide 7 may be located as to the alternate opposite spiral loops of such pairs without interference with the forward progress of the coiling members, so that when the independent spiral coils 8 are finally delivered from the ends of the guides 7 they will travel forward in the same relation to the coils 9 10 from spindles 2 and will interengage with such coils, as by reason of the close proximity of each independent coil 9 10 sufficient clearance is allowed for free engagement and interaction, and it will be seen that such assemblage and interaction of the coils will be continuous throughout the operation.

The forward feed of the wires is accomplished by means of upper and lower feed-rolls 11, mounted in suitable housings 12, the rolls being geared together by toothed gearing 13, so as to operate simultaneously and at uniform speed, an auxiliary set of rolls 11′ being located immediately back of the main feeding-rolls, which auxiliary rolls are driven at the same peripheral speed as the others during the rotation of rolls 11, and also independent of them, while such main feed-rolls 11 are inoperative.

Any suitable guiding device, as a bar 14, suitably provided with intervening openings for the individual wires, may be mounted across the outer face of the feeding-rolls 11′, while between such feeding-rolls and the rolls which introduce the wires to and force them through and over the spiral guides and coiling-spindles are located in suitable housings the guides 15, having intervening passes for the wire in proper position to correspond

with the wire-passes of the guides and spindles.

Motion is transmitted to one of the feeding-rolls 11 through a toothed wheel 16 in engagement with a similar wheel 17, mounted upon the main shaft 18 and adapted to be thrown into gear with such shaft by means of the interfitting clutch members 19 20, the clutch member 19 being automatically operated by lever 21 in engagement with it and operated by cam 22 on shaft 23. The shaft 23 is rotated at slow speed through pinion 24 on its outer end in mesh with a driving-pinion 25, mounted upon the outer end of spindle 26, which is adjustably set in the segmental slot 27 in the housing, which permits the spindle to be set toward or from the main shaft 18, so as to permit of the insertion of gears of different sizes to vary the relative speed of the main shaft and feeding-rolls and such shaft 23, by which the shearing mechanism is operated, whereby the machine may be set to cut off different lengths, as desired.

Power is imparted to the driving-pinion 25 through toothed wheel 28, mounted upon the spindle 26 and preferably secured to pinion, the pinion 28 being in mesh with driving-pinion 29 on the opposite end of the main shaft 18. Such main shaft is driven by belt or other connections through pulleys 30 or other suitably-connected mechanism from any source of power. Upon shaft 23, carrying cam 22, are mounted cams 31, one of such cams being formed integral with cam 22 adjacent to the bearing of the shaft, which cams 31 for three-quarters of their peripheries are of uniform diameter, the other quarter being formed into the cam projection 32, which projection in the rotation of the cam depresses the end 33 of lever 34, pivoted at 35 to the frame, provided with pivotally-connected pitmen 36, attached to and for the purpose of operating the knife-beam 37, mounted in vertical slideways at each end of the machine. The lever 34 is provided with a counterweight *w*, by which the depressing action of the cam is reversed and the shear-beam raised.

The construction of the cam-lever and connections therefrom to the knife is, as shown, the same at each end of the machine to insure uniform action.

The shear-beam is provided with a knife 38, which slides upon the outer face of the stationary shear 39 through openings 40, of which the woven netting passes outwardly from the weaving-spindles.

The clutch 19 is held in engagement with the member 20, so as to transmit rotatory movement to the rolls to feed the wires during three-quarters of the revolution of the shaft 23 by reason of the relative arrangement of the cams 22 and 31. The clutch is thrown out of gear during the downward travel of the knife, so that the feeding-rolls remain stationary for one-quarter of the revolution of shaft 23, or until the shearing action is completed, the shearing-knife being raised simultaneously with the renewed clutching engagement produced by cam 22.

The auxiliary feeding-rolls, which are geared together in the same manner as are the front feeding-rolls by gearing 13, are operated through a toothed wheel 41 on the outer end of the upper feeding-roll 11′, such wheel 41 being in mesh with the driving-pinion 42 on the outer end of the counter-shaft 43, on the inner end of which is a pinion 44 in engagement with pinion 45 on shaft 18, which intermeshing pinions are adapted to be intermittently actuated by the clutch-lever 21, as has been described, whereby feeding movement is transmitted to feeding-rolls 11 and 11′ at the same peripheral speed during the time when the shear-knife is raised, by which means the desired length of the woven fabric is fed forward until the feed-rolls are stopped by the clutch mechanism being drawn out of gear, at which time the shear-knife descends and cuts off the fabric, when the feeding action is again renewed. The especial advantage of this construction over the other types of machines employing but a single pair of feed-rolls is that in machines of this character, where a great number of wires are fed forward between a single pair of rolls, some of the wires, by reason of inaccuracy in their gage or spring of the roll, may not be tightly gripped by the rolls, thus resulting in slippage.

The particular object of the present invention is to incorporate in the machine which I have described means whereby certain ones of the wires may be maintained in a stationary condition while repeated sections of other wire or wires may be fed forward, reinforcing the original coil as many times as such additional sections are fed forward. The use of such additional strengthening or reinforcing wires is well understood in the manufacture of spring-mattresses, which is a fair instance of their use, and in the present case I have provided for weaving such extra wire by temporarily stopping the front pair of rolls for such a length of time as is necessary to feed forward as many lengths as are desired. To such end I have provided the pinion 17, which is slidingly mounted upon the main shaft 18, with one or more clutches 46, adapted to engage corresponding recesses 47 upon the face of the intermittently-actuated pinion 45. The lever 48, pivoted at 49, is connected with pinion 17 by a sliding engagement, as shown, so that the clutches of the pinion may be moved in and out of engagement by the lever. This lever has a forwardly-extending handle 50 and a threaded portion 51, which rests upon the screw-thread extension 23′ of shaft 23, by which means upon rotation of the shaft 23 the lever 48 will be fed inwardly, and it will be moved a distance equaling the pitch of a thread. The thread terminates, as shown,

before the clutch 46 comes into engagement, and for the purpose of drawing the lever inward I have provided a spring 52, the result being that as soon as the lever has reached the extent of its limit of travel on the threads the lever will be drawn quickly inward and the clutches will be brought into engagement at the proper intervals of rotation, when both sets of rolls will be again intermittently actuated.

It will be noted that the clutches 46 are so located that they can only come into engagement with the proper sockets at one point in the complete revolution, and such point is arranged so that the engagement will take place and both rolls will be rotated at the same time when the last extra strand of wire has been fed forward and sheared off.

By lifting the lever 48 and setting it back to cover as many threads as are desired to allow such numbers of reinforcing-wires to be fed forward by the back roll it will be seen that this operation will be carried on, as shown, as long as the clutches are held out of engagement and that the continuous operation of the machine, feeding forward all of the wires by both rolls, will then be resumed until the lever is again lifted back.

For the purpose of accurate adjustment upon the threads I have provided a sliding stop 53, adapted to be set upon the threaded shaft 23′ by set-screw 54, and it will be seen that by setting such stop forward or back the proper number of extra wires may be readily gaged.

The extra wires are fed forward by the back rolls 11′, and for the purpose of permitting these wires to be fed freely forward while the forward rolls 11 are stationary such forward rolls are provided with grooves 11^a, through which the reinforcing-wires may be freely fed, the rolls 11′ being in gripping engagement with all of the other wires of the series, which are during such extra feed maintained in a stationary position for the purpose of providing clearance for the stationary wires during the feed of the reinforcing-wires by the back rolls 11′. They are provided with corresponding registering grooves 11^b, occupied by the temporarily stationary wires gripped by rolls 11. By this arrangement of alternately-arranged grooves and sets of grooves the whole series of wires are engaged either altogether or in part by one or both pairs of rolls.

The advantages of the double feed-rolls will be understood and appreciated, the gripping action of the wires being thereby increased, although in the present case each set of wires is only fed forward by its particular pair of rolls. The operation as I have described it will be continuous and automatic, each set of rolls operating independently and together in proper successive order, feeding forward the desired length of netting, which is sheared off at suitable intervals, without further attention from the operator than from time to time to renew the wire to the spools (not shown) as the same become emptied.

The machine is capable of a very greatly increased output over the present method of making wire-netting, especially the particular reinforced weave which I have already described, and its advantages will be appreciated by those familiar with the art.

The machine is very compact and comparatively simple in construction, not liable to get out of order, and may be operated by one capable of exercising ordinary skill.

The size of the mesh may be varied by the substitution of various spindles and guides, and such changes and other variations may be made by the skilled mechanic without departing from my invention, as I do not desire to be confined to the specific construction as shown and described, but to include all such changes and variations as are within the scope of the following claims.

What I claim is—

1. In a machine for weaving wire, the combination of a plurality of pairs of feed-rolls, means for weaving a continuous web of interwoven spiral coils, and means for operating the feed-rolls, whereby intermittent forward movement is imparted to a portion only of the wires.

2. In a machine for weaving wire, the combination of a plurality of pairs of feed-rolls, means for driving the feed-rolls together and means for temporarily stopping one of the pairs of feed-rolls during the operation of the other.

3. In a machine for weaving wire, the combination of a forward pair of feed-rolls, a back pair of feed-rolls, each of said pairs of feed-rolls having clearance-grooves for the wire, and means for driving the feed-rolls together, and for driving one of the pairs while the other pair remains stationary.

4. In a machine for weaving wire, the combination of stationary rolls provided with plain faces and grooves, a back pair of feed-rolls having plain faces and grooves, the grooves of one pair being in alinement with the plain portions of the other pair, and means for driving the back pair of rolls while the front pair remains stationary and for driving both pairs together.

5. In a machine for weaving wire, the combination of a front pair of rolls provided with plain faces and grooves, a back pair of feed-rolls provided with plain faces and grooves, means for weaving a continuous web of interwoven spiral coils, and means for operating the feed-rolls together and for temporarily stopping the forward rolls while the back rolls are in motion.

6. In a machine for weaving wire, the combination of a front pair of rolls provided with plain faces and grooves, a back pair of feed-rolls provided with plain faces and grooves, means for weaving a continuous web of interwoven spiral coils, means for operating the

feed-rolls together and for temporarily stopping the forward rolls while the back rolls are in motion, and an intermittently-actuated shear.

7. In a machine for weaving wire, the combination of a front pair of rolls provided with plain faces and grooves, a back pair of feed-rolls provided with plain faces and grooves, means for weaving a continuous web of interwoven spiral coils, means for operating the feed-rolls together and for temporarily stopping the forward rolls while the back rolls are in motion, an intermittently-actuated shear, and means for actuating the shear-knife during the inaction of the feed-rolls.

8. In a machine for weaving wire, the combination of front feeding-rolls provided with plain faces and clearance-grooves, back feed-rolls provided with plain faces and clearance-grooves, means for weaving a continuous web of interwoven spiral coils, means for driving the feed-rolls together and for temporarily stopping the front feed-rolls during the action of the back feed-rolls, an intermittently-actuated shear, and means for actuating the shear-knife, during the inaction of the feed-rolls.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM J. WRIGHT.

Witnesses:
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C. M. CLARKE.