

No. 627,200.

Patented June 20, 1899.

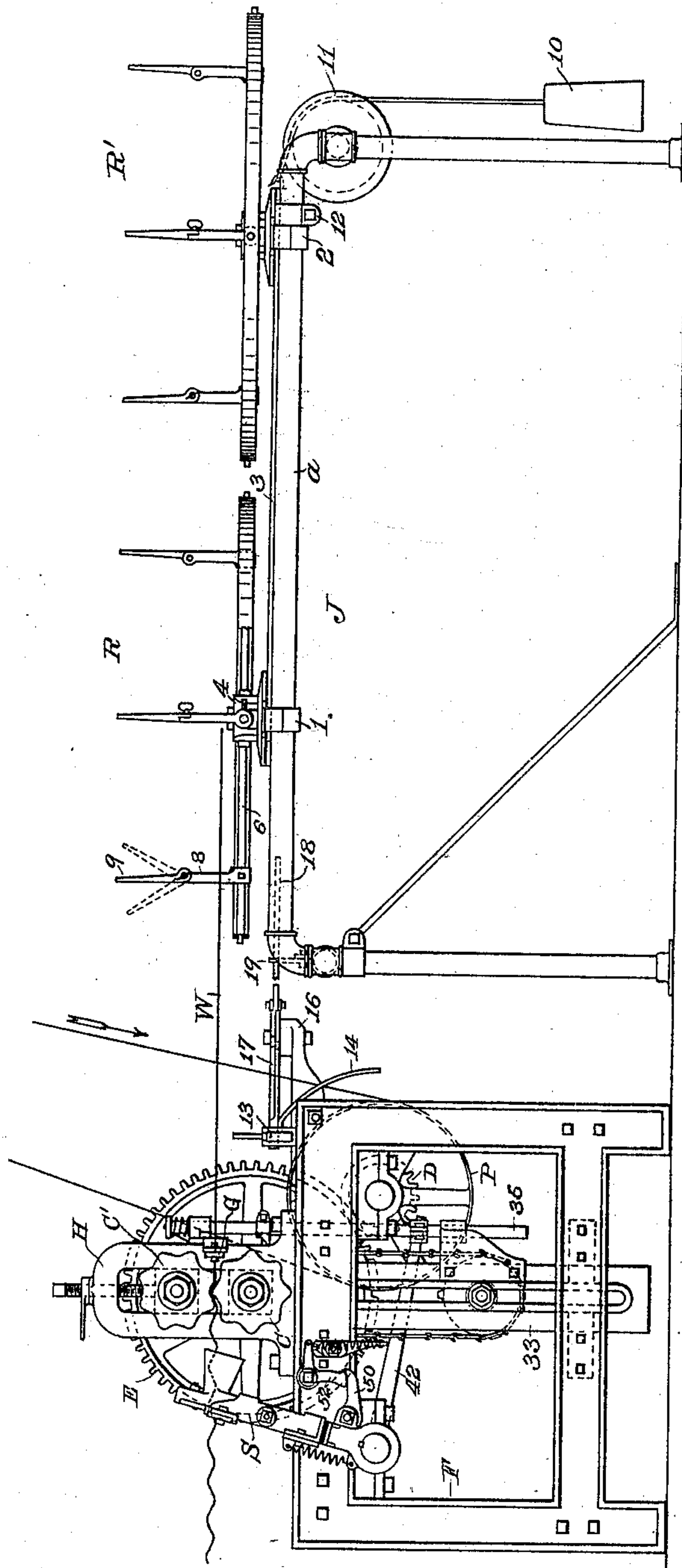
I. J. NERACHER.  
WIRE CRIMPER AND SHEARS.

(Application filed Mar. 15, 1899.)

(No Model.)

3 Sheets—Sheet 1.

Fig. I.



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Fig. II.

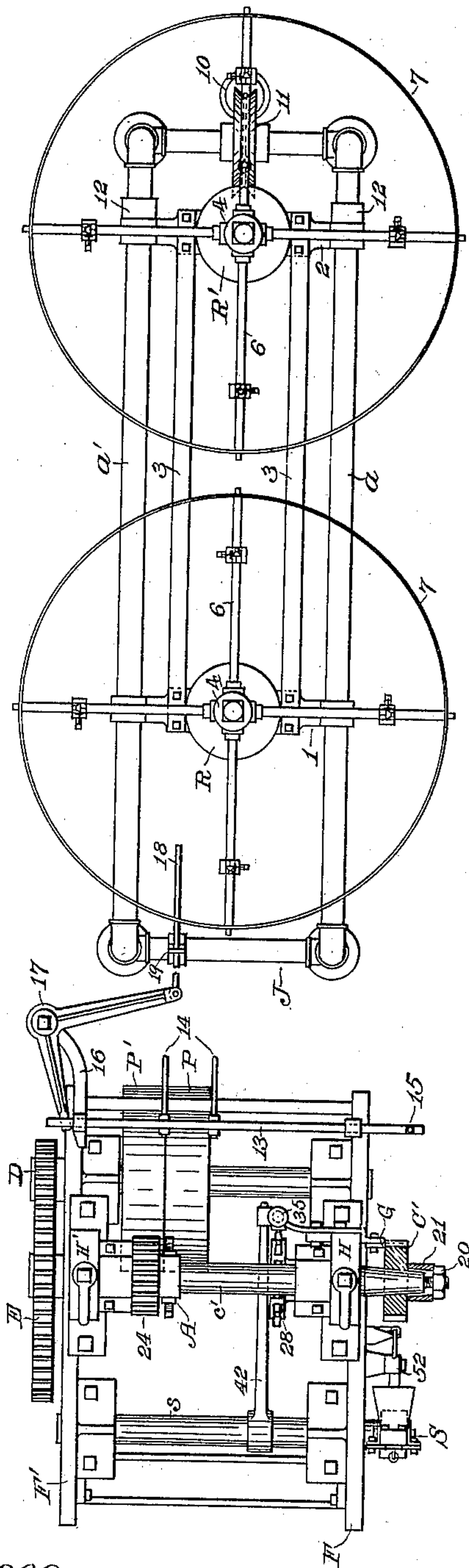
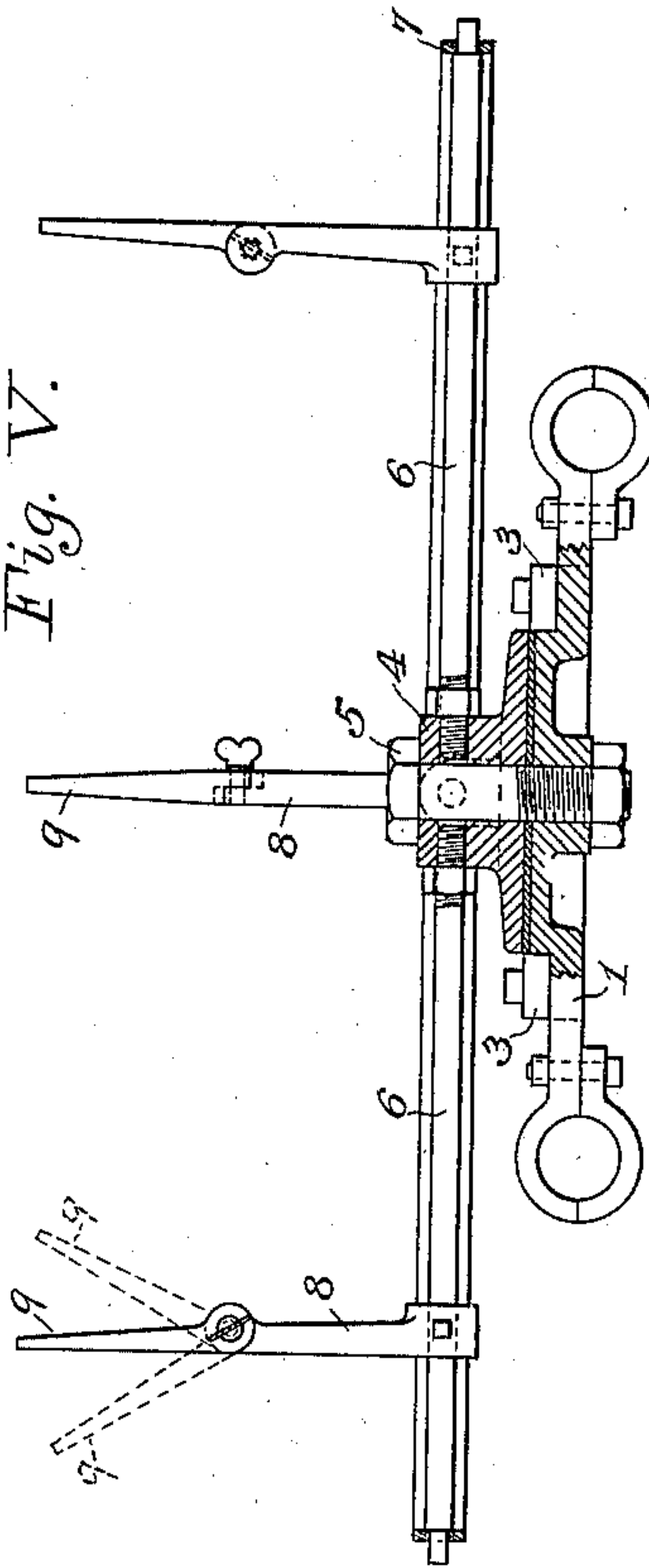


Fig. V.



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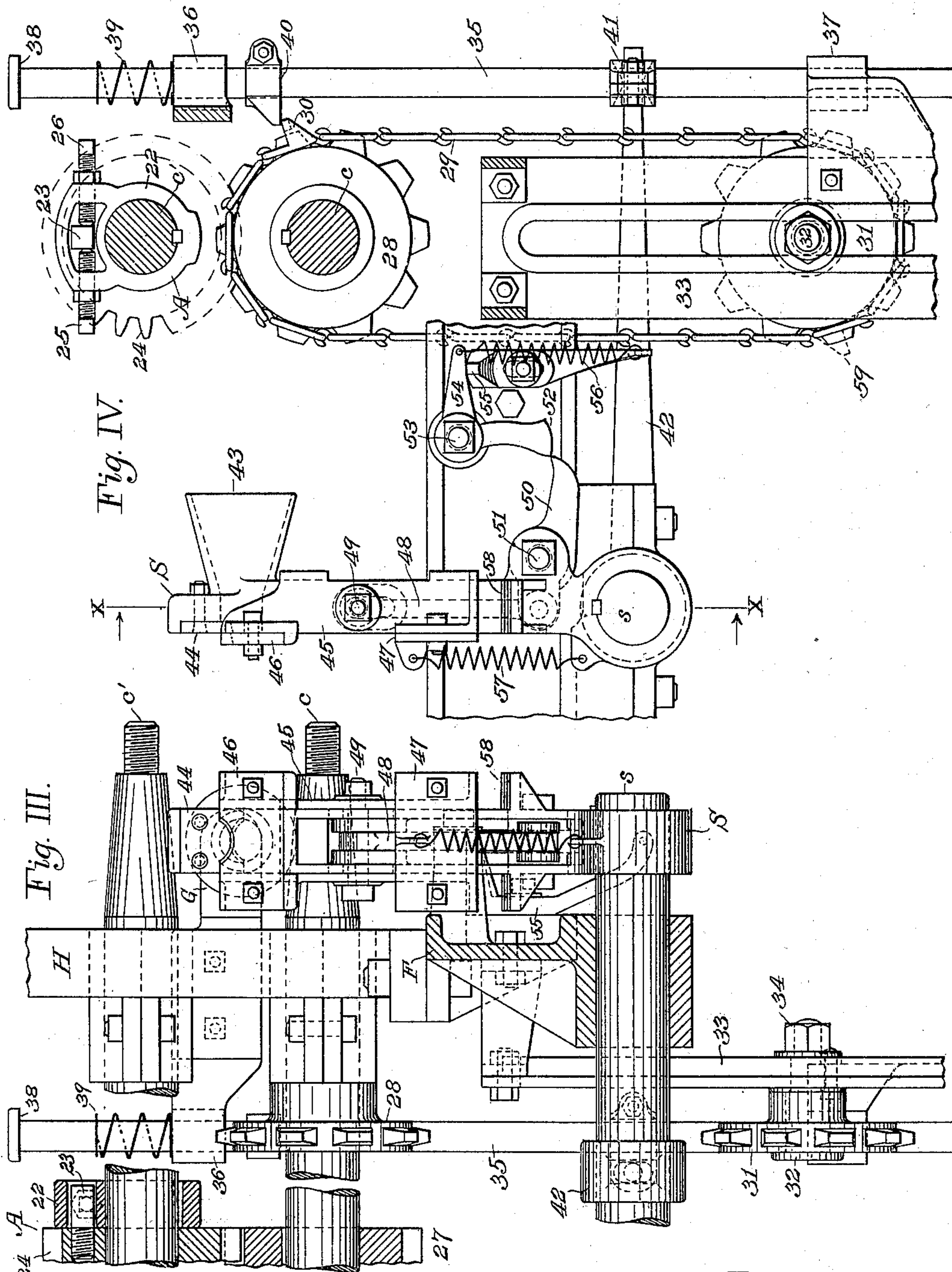
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# UNITED STATES PATENT OFFICE.

INOZENS JOSEPH NERACHER, OF CLEVELAND, OHIO.

## WIRE CRIMPER AND SHEARS.

SPECIFICATION forming part of Letters Patent No. 627,200, dated June 20, 1899.

Application filed March 15, 1899. Serial No. 709,192. (No model.)

*To all whom it may concern:*

Be it known that I, INOZENS JOSEPH NERACHER, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Automatic Wire Crimper and Shears, of which the following is a specification.

My invention relates to machines which are employed for crimping or corrugating wire and cutting it uniformly into such lengths as may be required for wire-cloth or other purposes. Its object is to provide a machine which will crimp and cut off wire, making the pieces of wire uniform in length and in the pitch of the corrugations without any attention on the part of the operator after starting the machine; also, to provide adjustable reels for conveniently receiving and positively retaining coils of wire; and a further object is to provide means for automatically stopping the machine in the event of the wire failing to run freely from the reel. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure I is a side elevation of the entire machine. Fig. II is a plan view of the same. Fig. III is a sectional elevation of a portion of the machine on line *xx* of Fig. IV. Fig. IV is a side elevation of the shearing and adjusting mechanism with the frame broken away. Fig. V is an end view, partly in section, of a reel and its carriage.

The reference-letter W indicates the wire, a coil of which is placed upon the reel R. One or more additional reels, as R', are provided in order that a plurality of wires may be run through the machine, thereby increasing its capacity. The wire passes through a guide G and is drawn between crimping-rolls C and C', mounted upon the overhanging ends of their respective shafts *c* and *c'*, which shafts are journaled in boxes adjustably secured in housings H and H', resting upon and attached to the side plates F and F', which, with suitable cross-braces, form the framework of the machine. The crimped wire after leaving the rolls enters the funnel-shaped guide of the shear-arm S, which directs the wire between the shear-blades, and, as will be hereinafter further explained, when the desired length of wire has passed through the arm is moved forward at substantially the same

speed as the wire, which causes the blades to approach each other and cut off the wire, after which the arm falls back into the position shown in Fig. I.

P is a driving-pulley, and P' a loose pulley, both mounted upon a driving-shaft journaled in the frame and carrying on its rear end a pinion D, which engages with a gear-wheel E on the lower roll-shaft *c*.

The reel-support J, which may conveniently be made of gas-pipe, as shown, consists of two horizontal members *a* and *a'*, attached to a suitable frame, which is firmly fixed and braced to the floor. A sliding frame or reel-carriage is mounted thereon composed of the cross-bars 1 and 2, having friction-disks for the reels and bearings at their ends encircling the parallel members *a* and *a'*, and connecting-bars 3 3. The reels consist of hubs 4, having disks to match those on the cross-bars to which they are rotatably secured by pins 5, and spokes 6, radiating from the hubs, with their outer ends held by a circular band 7 and carrying adjustable arms. These arms are made in two parts, as shown in Fig. V. The lower part 8 is slipped over the spoke and fastened by a set-screw, so that it may be moved to accommodate the varying diameters of the coils of wire, and the upper part 9 is hinged to it by a thumb-screw with the bulge of the hinge on the inside. By loosening the thumb-screw the upper end may be inclined inward, as shown by the dotted lines, which greatly facilitates the placing of the coil upon the reel, and it may then be inclined outward to prevent the wire slipping off from the reel. The pin 5 has a suitable head and is screw-threaded into the cross-bar, with a nut on its lower end. It is evident that by adjusting the pin any desired amount of friction may be produced between the disks to keep the wire taut. A leather ring is usually inserted between the disks.

A weight 10, suspended by a cord passing over a pulley 11 and attached to the reel-carriage, serves to keep the latter normally abutting against the stops 12 on the reel-support.

A belt-shifter is provided consisting of a bar 13, of a rectangular cross-section, extending across the machine and held loosely in suitable bearings and having the usual prongs 14 to engage the oncoming side of the belt



and a stop and handle 15. Pivoted on a bracket 16, fastened to the frame, is an elbow-lever 17, one arm engaging with the shifter-bar and the other arm extending forward, as shown in Fig. II, and having hinged to it a rod 18, lying approximately parallel to the side members of the reel-stand and held in position by a bearing 19. This device renders the belt-shifter automatic, for should either of the wires fail to run freely from its reel the reel-carriage would be drawn forward, overcoming the resistance of the weight 10 until having come into contact with the rod 18 the belt is shifted onto the loose pulley, stopping the machine. In practice it has been found that the reel-carriage is often drawn forward because of kinks in the wire; but it usually frees itself, allowing the carriage to slide back against the stops before reaching the belt-shifter.

The crimping-rolls C and C' are bored tapering to fit the conical ends of the shafts c and c' and are forced onto the cones by nuts 20, screw-threaded on the ends of the shafts, having loose collars 21 between them and the rolls. As it would be very difficult to set the rolls by this method in proper position relatively to each other, an adjuster A is employed. A collar 22, Fig. IV, is firmly keyed to the shaft c'. A square pin 23 projects from the toothed gear-wheel 24 into an aperture in the collar. The wheel 24 is loose on the shaft. Thus the shaft may be rotated the required amount and locked by means of set-screws 25 and 26, screw-threaded in the collar, extending into the aperture and bearing against opposite sides of the pin. The gear-wheel 24 engages and is driven by a similar wheel 27, keyed to the shaft c.

On the shaft c is keyed a sprocket-wheel 28, over which runs a detachable link chain 29, which carries one or more links provided with brackets or steps 30. The lower bight of the chain is kept in proper position and tension by a sprocket-wheel 31, running loosely on a pin 32, which has a smaller extension inserted in a vertical slot in an upright plate 33 and clamped to the same by a nut 34. The plate 33 is secured by means of brackets and bolts to the frame of the machine. A rod or (preferably) a tube 35 is fitted to slide vertically in bearings 36 and 37 and has a shoulder 38 on its upper end to engage the cushion-spring 39. The tube carries a clamp-collar 40, having a bracket or step designed to engage the step 30 on the chain and also another clamp-collar 41, provided with an extension in which is a flared aperture to receive the end of lever 42. Both the lever 42 and the shear-arm S are keyed to the shaft s, which has suitable bearings in the frame. The shear-arm S, Figs. III and IV, is provided near the top with a flaring aperture 43, so that the crimped wire may pass through it unobstructed in every position of its travel. Bolted to the arm over the rear of the aperture is a hardened-steel shear-blade 44. Fitted over the arm is a chan-

nel-shaped slide 45, having flanges at the top, to which is fitted and bolted the outer shear-blade 46, which, with the plate 47 bolted to similar flanges at the bottom, serves to hold the slide in position on the arm. The arm is cored out to receive a connecting-rod 48, the upper end of which operates the slide by means of the bolt 49 passing through slots in the arm. The lower end of the rod is hinged to a trip-lever 50, fulcrumed at 51, between lugs on the arm. The outer end of the trip-lever bears against the face of a swinging cam 52, fulcrumed to the frame at 53 and provided with an arm 54, which in its normal position rests upon a stop 55, bolted through a slot for adjustment to the frame. A spiral spring 56 holds the arm 54 against the stop.

In Fig. I the shear-arm is shown in its position of rest. The cutting edges of the shear-blades are concave, as shown in Fig. III, for the purpose of allowing free passage for the wire in their open or rest position. The sprocket-wheel 28 revolves until the step on the chain engages with the step on the tube 35, when the latter is raised, carrying up the end of the lever 42, which rotates the shear-arm in the same direction and at substantially the same speed as the movement of the wire. The fulcrum of the trip-lever 50 is carried upward and forward, while the end of the trip-lever follows the curve of the cam 52, both of which movements combine to raise the lower shear-blade rapidly at first and then gradually slower until the wire is cut off, when the trip-lever slips past the cam, allowing the slide 45, assisted by the spring 57, to drop down onto the cushions 58, after which the step on the chain being carried over the curve of the sprocket-wheel slips past the step on the tube, which then drops down by gravity, bringing the shear-arm back into its position of rest, the swinging cam 52 being forced aside by the trip-lever as it falls back.

It is obvious that by varying the number of links in the sprocket-chain different lengths of crimped wire may be cut off and additional step-links, as shown at 59, may be employed, if necessary.

The shear-arm being moved at substantially the same speed as the wire while the latter is being cut off prevents any tendency to bend the wire, and several wires may be cut at once as accurately in length as one.

Various modifications can be made in the details of my invention without departing from the principles thereof.

Having described its application as above, what I claim as new, and desire to secure by Letters Patent, is—

1. A wire crimper and shears consisting of the combination, with crimping-rolls and suitable driving mechanism therefor, of a sliding reel-carriage held in its normal position by a weight and adapted to be pulled forward by the wire in case the latter fails to release itself from a reel, a belt-shifting device arranged to be operated thereby, a swinging



arm carrying shear-blades and provided with means for operating said blades, and mechanism capable of adjustment for different lengths of wire adapted to rotate said shear-arm in the same direction and at approximately the same speed as the movement of the wire and return it to its normal position after the wire is cut off, substantially as set forth.

2. In a wire crimper and shears, the combination, with crimping-rolls and suitable driving mechanism therefor, of a swinging arm carrying shear-blades and provided with means for operating said blades, and mechanism capable of adjustment for different lengths of wire adapted to rotate said shear-arm in the same direction and at approximately the same speed as the movement of the wire and return it to its normal position after the wire is cut off, substantially as set forth.

3. In a wire crimper and shears, the combination, with crimping-rolls and suitable driving mechanism therefor, of an arm secured to a horizontal shaft journaled in the frame and provided with an aperture terminating in a funnel-shaped guide near its upper end, means capable of adjustment for different lengths of wire for rotating the shaft through the requisite angle, a shear-plate fastened to the arm over the upper edge of the aperture, a slide fitted to the arm carrying a shear-blade adapted to slide over the plate on the arm, a trip-lever fulcrumed to the arm and connected with the slide, a swinging cam pivoted to the frame and adapted to engage the trip-lever until the arm approaches the end of its travel, and a stop on the frame to prevent the cam swinging toward the arm, substantially as set forth.

4. The combination, with crimping-rolls and suitable driving mechanism therefor, of a horizontal shaft journaled in the frame and carrying an arm provided with a shear-blade in line with the rolls, a shear-blade arranged to slide upon the arm and a suitable lever and cam for actuating the same, a sprocket-wheel mounted on one of the roll-shafts, a detachable link chain running over said sprocket-wheel and containing a link having a bracket projecting laterally, an adjustable sprocket-wheel adapted to run in the lower bight of the chain and keep the same in proper tension, a rod arranged to reciprocate vertically

in suitable bearings and provided with a lateral projection to engage the chain-bracket, and a lever-arm secured to the shear-arm shaft and actuated by the vertical rod, substantially as set forth.

5. The combination of roll-shafts journaled in suitable bearings and one of which is revolved by suitable mechanism, crimping-rolls bored to fit conical ends of the shafts, means for forcing and retaining the rolls on the shafts, a toothed gear-wheel firmly secured to one of the shafts, a similar gear-wheel mounted loosely on the second shaft and adapted to engage the said gear-wheel and provided with a stud projecting laterally, a collar firmly secured to the second shaft and having an aperture to receive the stud, and set-screws threaded in the collar with their ends projecting into the aperture so as to bear on opposite sides of the stud, substantially as set forth.

6. The combination with rolls and suitable driving mechanism therefor actuated by a belt adapted to run on tight and loose pulleys, of a reel-carriage arranged to reciprocate upon a support firmly attached to the floor and held in its normal position by a weight, a shifter-bar provided with prongs to engage the belt, an elbow-lever pivoted on the frame of the machine one arm of which engages the shifter-bar, and a rod hinged at one end to the second arm of the elbow-lever and its other end extending toward the reel-carriage and adapted to be pushed endwise by said carriage, substantially as set forth.

7. A reel for holding a coil of wire consisting of a suitable support provided with a friction-disk, a hub rotatably secured to the support by a pin and carrying a friction-disk to match the disk on the support, means for adjusting the amount of friction between the disks, spokes radiating from the hub and suitably braced, arms adjustably secured to the spokes provided with a hinge-joint with the bulge of the hinge extending inward, and means for clamping said joint, substantially as set forth.

In testimony whereof I affix my signature, in the presence of two witnesses, at Cleveland, Ohio, March 13, 1899.

I. JOSEPH NERACHER.

Witnesses:

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