(No Model)

3 Sheets—Sheet 1.

W. G. ALLEN.

MACHINE FOR SWAGING WIRE.

No. 597,756. Patented Jan. 25, 1898.

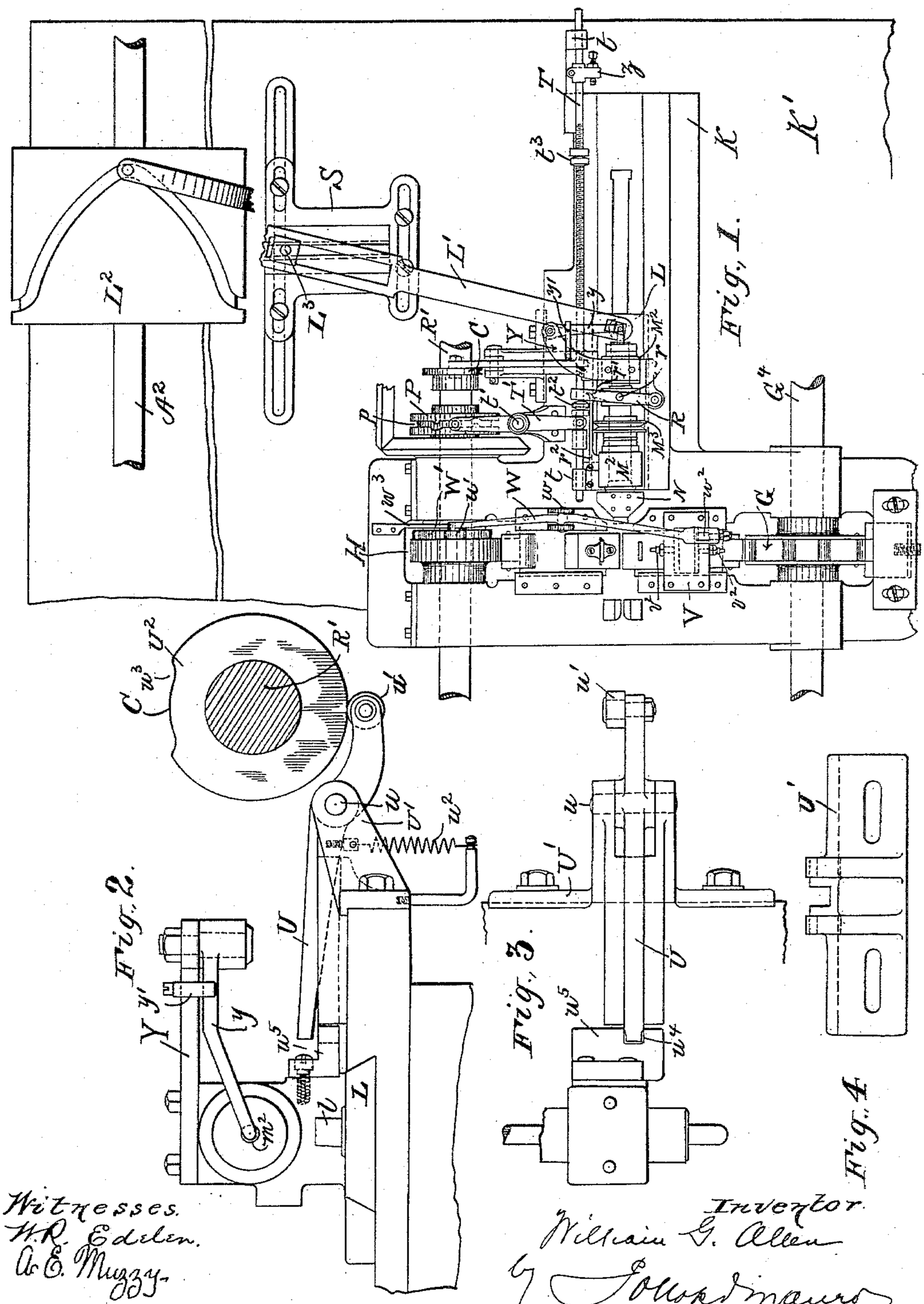

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Witnesses.
H. R. Edelen.
A. E. Muzzy.

Inventor.
William G. Allen
by Edwards & Mauro,
his attorneys.

(No Model.) 3 Sheets—Sheet 2.

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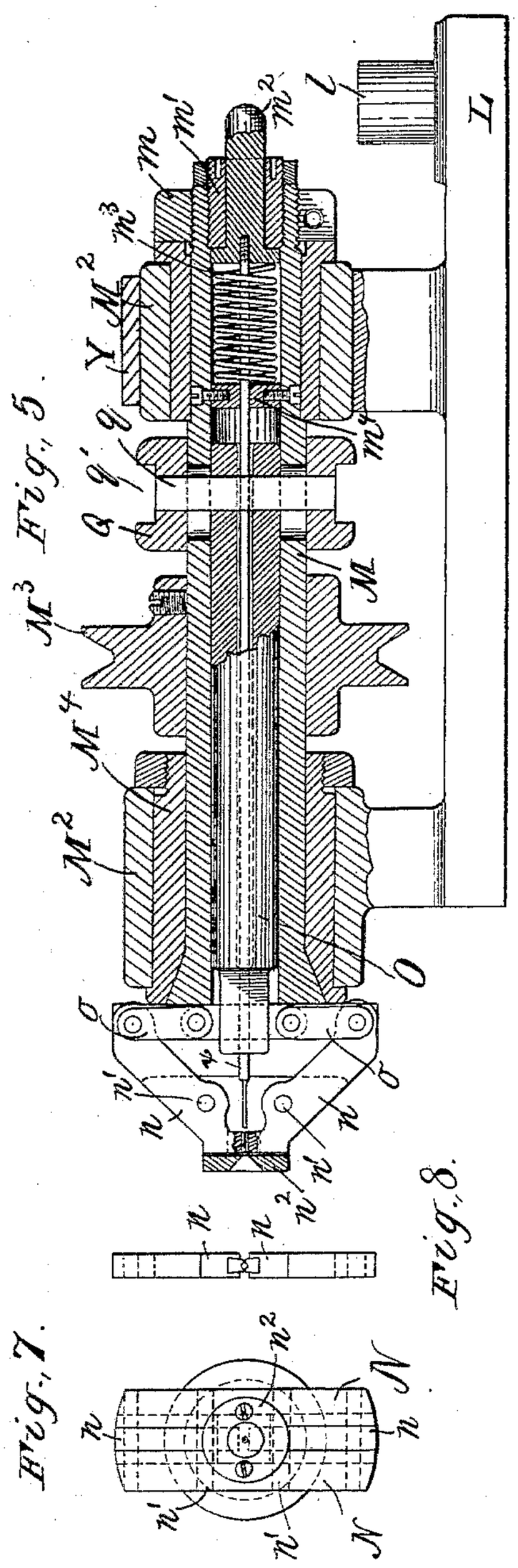

Fig. 5.

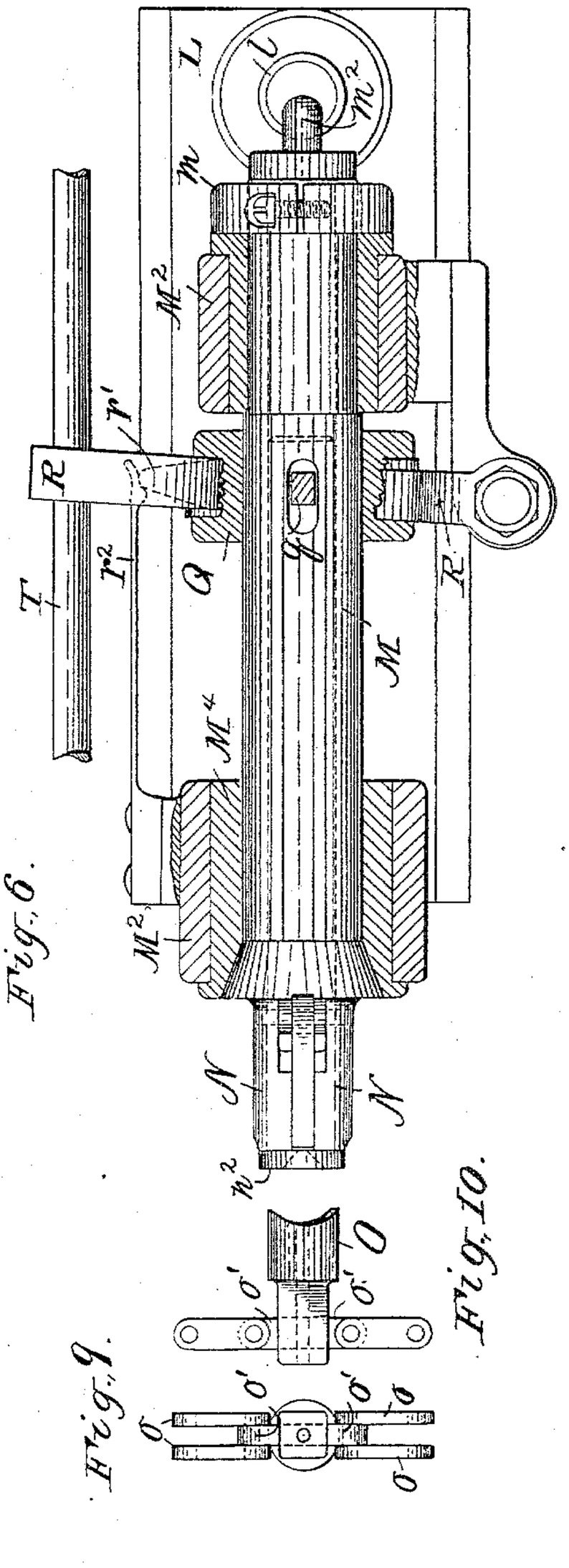

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

Fig. 10.

Witnesses.
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his attorneys.

(No Model.) 3 Sheets—Sheet 3.

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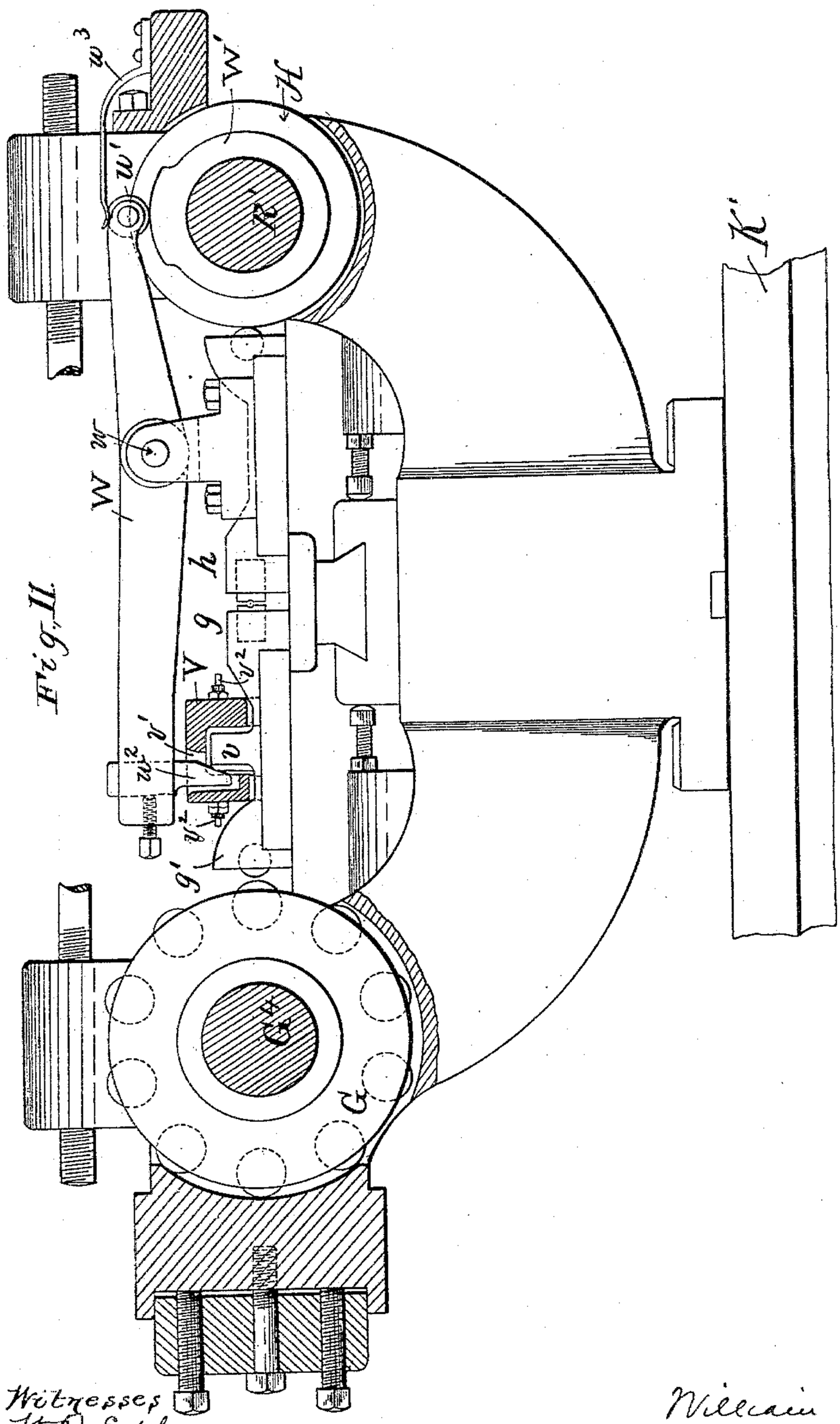

Witnesses,
H. R. Edelin.
A. E. Muzzy.

Inventor.
William G. Allen
by Pollard & Maurs,
his attorneys.

UNITED STATES PATENT OFFICE.

WILLIAM G. ALLEN, OF HARTFORD, CONNECTICUT.

MACHINE FOR SWAGING WIRE.

SPECIFICATION forming part of Letters Patent No. 597,756, dated January 25, 1898.

Application filed July 29, 1897. Serial No. 646,280. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM G. ALLEN, of Hartford, Connecticut, have invented a new and useful Improvement in Machines for Swaging Wire, which improvement is fully set forth in the following specification.

The object of this invention is to increase the durability and efficiency of machines for swaging wire—such, for example, as machines for making wire spokes.

In swaging-machines the rapid and violent strokes on the dies quickly produce wear and damage to various parts of the mechanism. This wear and damage are found to be greatest at the time when there is no stock between the dies, at which time the latter are loose and the strokes of the driving-cam cause great concussion and rapid injury.

The present invention includes means whereby the dies are automatically moved and held out of contact with the driving-cam while they are not acting upon the stock. Thus the wear is confined to the time when the dies are actually operating on the stock and when the wear is at a minimum.

It has been found that the chucks ordinarily used in machines of this description do not grip the slender wire as tightly as is necessary to prevent all slip and insure proper action. The invention embraces an improved chuck which accomplishes this result and is attended with other advantages, as will be fully set forth.

The several features of my invention will be best understood by reference to the accompanying drawings, wherein is illustrated what has been found to be a practically-successful embodiment thereof in a swaging-machine, and wherein—

Figure 1 is a plan view. Fig. 2 is an elevation from the right of Fig. 1 of a portion of the machine. Fig. 3 is a plan of Fig. 2, parts being omitted to show the locking device for the carriage or slide. Fig. 4 is a detail of the bracket, in which the latch for locking the carriage is pivoted. Fig. 5 is a longitudinal vertical section through the chuck for holding the wire during the swaging operation. Fig. 6 is a longitudinal horizontal section of the same. Fig. 7 is an end view of the chuck, looking from the left of Fig. 5. Fig. 8 is an end view of the chuck-jaws. Figs. 9 and 10 are details of the toggle-levers for operating the chuck-jaws, and Fig. 11 is an elevation of the swaging mechanism from the left of Fig. 1.

The invention is illustrated as being applied to swaging mechanism substantially similar to that shown and described in United States Letters Patent No. 563,221, granted to George J. Capewell and myself on the 30th day of June, 1896.

Referring to the drawings, A^2 represents the main driving-shaft, K′ the bed of the machine, and K a frame in which the parts of the swaging mechanism are mounted, said frame being supported by the bed.

R′ and G^4 are shafts for operating the two dies of the swaging mechanism, respectively.

g is the "vibratory" die of the swaging mechanism, carried by slide *g′* and receiving its rapid vibratory movement from a large rotating cam-wheel G of the construction described in the patent referred to.

h is the "adjustable" or "anvil" die, carried by a slide *h′* and moved to adjust its position by means of cam-wheel H on shaft R′.

As thus far described the parts are the same as corresponding parts of the patented machine. The means whereby the dies are automatically moved and held out of contact with the driving-cam G while not acting upon the stock, constituting one of the features of my present invention, will now be described.

v is a lug or projection on the upper face of slide *g′*, extending into the under side of a recessed bridge-piece V, overhanging the slide. An opening *v′* is provided through the top of the bridge-piece V, and adjustable stop-bolts v^2 pass through the sides of the bridge-piece into the interior thereof and act to limit the movement of slide *g′* in either direction by engagement with projection *v*.

A rocking lever W, pivoted at *w*, carries at one end a friction-wheel *w′*, bearing against a cam-wheel W′ on the side of cam-wheel H, and at its other end an adjustable wedge w^2, projecting through the opening *v′* in the top of bridge-piece V and adapted to engage the projection *v*. Wheel *w′* is held in contact with cam W′ by means of a spring w^3, pressing against the top of the lever. In operation when a wire spoke or similar article is being operated upon by the dies the wheel *w′*

rests against the shallow part of cam W'; but as soon as the operation is completed and the work withdrawn from between the dies the elevated portion of the cam comes into operation, tilting lever W and lowering wedge w^2 into engagement with projection v, whereby slide g' is held forward out of position for engagement of cam-wheel G therewith and thereby preventing injury and wear on the faces of the dies, as already explained. This position of the parts is maintained until wheel w' drops off the elevated portion of the cam, when a new length of stock is introduced between the dies and the swaging proceeds.

Coming now to the improved chuck for gripping and drawing the stock between the swaging-dies, L represents a slide or carriage mounted in suitable ways on base-plate K and adapted to be moved longitudinally by lever L', pivoted at L^3 to an adjustable frame S and operated by a cam-groove in the periphery of a drum L^2 on shaft A^2. The end of said lever engages over stud l on the carriage. Hollow spindle or sleeve M is mounted in bearings M^2 M^2 on the carriage and rotated by means of pulley M^3, said bearings having bushings M^4 M^4. At one end spindle M is exteriorly screw-threaded for engagement with a set-nut m and interiorly threaded for engagement of a plug m', which latter is centrally perforated, forming a bearing for a plunger m^2, having a head on its inner end against which presses a coiled spring m^3, said spring bearing at its other end against a disk m^4, secured in the sleeve M.

n n are the jaws of the chuck, pivoted at n' between the forked extensions N of sleeve M and arranged to be operated from a bar O, sliding in sleeve M, by means of a toggle connection consisting of links o o, pivoted on opposite sides of the free ends of jaws n n and to ears o' o' on opposite sides of the projecting end of bar O, as shown, said ears being formed by a link passing through and projecting from opposite sides of an opening through the squared end of the bar.

n^2 is a guide secured to the ends of extensions N N.

In the position indicated in Fig. 5 the jaws of the chuck are closed as in the act of gripping the stock, the links o o of the toggle connection assuming a vertical position. The opening of the jaws for the purpose of releasing the stock is effected by a longitudinal movement of the bar O, (to the left in Fig. 5,) whereby the upper ends of the jaws are drawn toward each other, as will be clearly understood, and the gripping-faces of the jaws moved farther away from each other. The longitudinal movement of the bar O for the purpose here referred to is effected by a cam-groove p in the periphery of a wheel P on shaft R' by connections which I will now describe.

Q is a collar sliding on sleeve M and having a pin q, passing through longitudinal slots in the sleeve and fitting tightly in a transverse opening in bar O. Collar Q has a peripheral groove q', into which projects a pin r on a lever R, pivoted at one side of the carriage and having its free end extended into the path of suitable stops hereinafter referred to. On its under side lever R has a tooth r', (see Figs. 1 and 6,) adapted to be engaged by a spring-catch r^2 to hold the chuck-jaws either in an open or a closed position.

T is a rod mounted to have a limited sliding movement in bearings t t on frame K', said reciprocation being imparted to the rod by a lever T', pivoted at t', engaging at one end between fixed collars on the rod and at its other end carrying a pin projecting into the cam-groove p of wheel P.

t^2 and t^3 are stops on rod T in the path of lever R, stop t^2 for effecting the closure of the chuck-jaws being fixed, and stop t^3 for effecting the opening of the chuck-jaws being adjustable on the rod by engagement with a screw-thread formed thereon, the point at which it is desired to open the chuck to release the stock being dependent upon the length of the stock, which may be variable.

The closing of the jaws against the stock is effected by a quick jerky movement transmitted thereto from an offset in groove p of wheel P by the means described. It is of importance that the carriage at this time be held in an absolutely-fixed position, as any slight movement thereof may have the effect of causing too short a grip being taken on the stock. To prevent this, means are provided for momentarily locking the carriage, such means consisting of a latch U, pivoted at u to a bracket U', adjustably secured to frame K'. The latch has at one end a roller u', held in contact with the periphery of a disk U^2 on shaft R' through the action of a spring u^2. Disk U^2 has a depression u^3 in its peripheral surface, into which the roller u' drops during the rotation of the disk, thereby lowering the free end of lever U into engagement with a recess u^4, formed in the edge of a block u^5, secured to the carriage, thereby locking the latter so long as the roller runs in the depression.

Referring now to the means for ejecting the work from the chuck after the swaging has been completed, x is a rod extending from plunger m^2, Fig. 5, at one end of sleeve M, through spring m^3, a perforation in disk m^4, a longitudinal central opening through bar O and parts associated therewith, its free end terminating (in the normal position of the rod) close to the chuck-jaws.

Y is an overhanging support on carriage L, to the outer end of which is pivoted an arm y, the free end of which extends to a position in front of the projecting end of plunger m^2. The swinging movement of arm y is limited by a stop y', secured to support Y.

z is a stop of rod T, adapted to make contact with arm y as the carriage reaches the limit of its travel, causing the arm to press

the plunger inward against the tension of spring m^3, sliding rod x forward, so that its outer end passes between the chuck-jaws and ejects the work. In its position of rest the forward end of rod x acts as an adjustable stop to determine the length of stock introduced between the chuck-jaws, the adjustment being effected by screwing the plug m' in or out.

The operation of the machine is as follows: A length of stock to be swaged is passed between the swaging-dies and between the jaws $n\,n$ of the chuck until its end abuts against the end of rod x, which has been adjusted to the proper position in accordance with the length of the stock, as already described. At this instant, the carriage being locked by latch U, an offset in groove p of wheel P imparts a quick movement to lever T', reciprocating bar T and swinging lever R to the right, Fig. 1, moving bar O in a corresponding direction and closing the jaws tightly against the stock, in which position spring-catch r^2 rests on the left-hand side of tooth r' on lever R, Fig. 1. The roller w' now drops into the shallow part of cam W', lifting wedge w^2 out of engagement with projection v and permitting cam-wheel G to vibrate slide g'. At the same time latch U is lifted out of engagement with slot w^4, and the movement of the carriage by cam-wheel L^2 and lever L' commences. This movement of the carriage continues until lever R arrives in front of stop t^3, at which instant a second offset in groove p of wheel P comes into operation to quickly reciprocate rod T to the left, operating the parts to open the chuck-jaws, as will be clearly understood. At about the same time lever y strikes against stop z, imparting a longitudinal movement to rod x and ejecting the finished article, which at this time rests loosely between the open jaws. The return movement of the carriage now begins, the chuck-jaws being held open by spring-catch r^2, engaging on the right-hand side of tooth r'.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a swaging-machine, the combination with the dies, and a driving-cam for imparting a vibratory movement to one of the dies, of means for automatically moving the vibratory die to, and positively holding it in, an inoperative position with reference to the driving-cam, substantially as described.

2. In a swaging-machine, the combination with the dies, a slide on which one of the dies is mounted, and a driving-cam for imparting a vibratory movement to said slide, a projection on the slide, a rocking lever, a chuck or projection on said lever, and means for automatically rocking the lever to engage the chuck with the projection on the slide for moving and holding the latter out of operative relation with the driving-cam during periods when there is no stock between the dies, substantially as described.

3. In a chuck, the combination with a sleeve, chuck-jaws pivoted at one end of said sleeve, a bar sliding in the sleeve, toggle-joints connecting the free ends of the chuck-jaws with the bar, and means for reciprocating the bar, substantially as described.

4. In a rotary chuck the combination with a sleeve, of a bar sliding in said sleeve, jaws pivoted to the end of the sleeve and extending to positions about the end of the bar, pivoted links connecting the end of the bar to the jaws forming toggle-joints, and means for imparting a longitudinal sliding movement to the bar to open and close the jaws, substantially as described.

5. The combination with a longitudinally-movable carriage and means for moving the same, of chuck-jaws movable on the carriage, means for operating the chuck-jaws to grip and release the stock, an adjustable stop for the stock in the rear of the jaws, and means for automatically moving said stop at a predetermined point in the travel of the carriage to eject the stock from between the jaws, substantially as described.

6. The combination with a longitudinally-movable carriage and means for moving the same, a sleeve mounted in bearings on the carriage, means for rotating the sleeve, chuck-jaws pivoted to one end of the sleeve, a bar sliding in the sleeve and connected at its outer end to the chuck-jaws by suitable toggle-joints, means for reciprocating the bar to open and close the jaws, a plug in the other end of the sleeve, a plunger sliding in and projecting from an opening through the plug, a spring pressing against the inner end of the plunger, a rod secured at one end to the plunger and extending through a central perforation in the chuck-operating bar, terminating at a point in proximity to the chuck-jaws and acting as a stop for the stock fed thereto, and means for automatically reciprocating the plunger and rod at a predetermined point in the travel of the carriage whereby the latter acts as an ejector for discharging the stock from the chuck, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

WILLIAM G. ALLEN.

Witnesses:
LEWIS SPERRY,
EMELYN PETHERBRIDGE.