3 Sheets—Sheet 1

# L. M. RUMSEY.

## Chain-Machine.

No. 198,690. Patented Dec. 25, 1877.

FIG. 1.

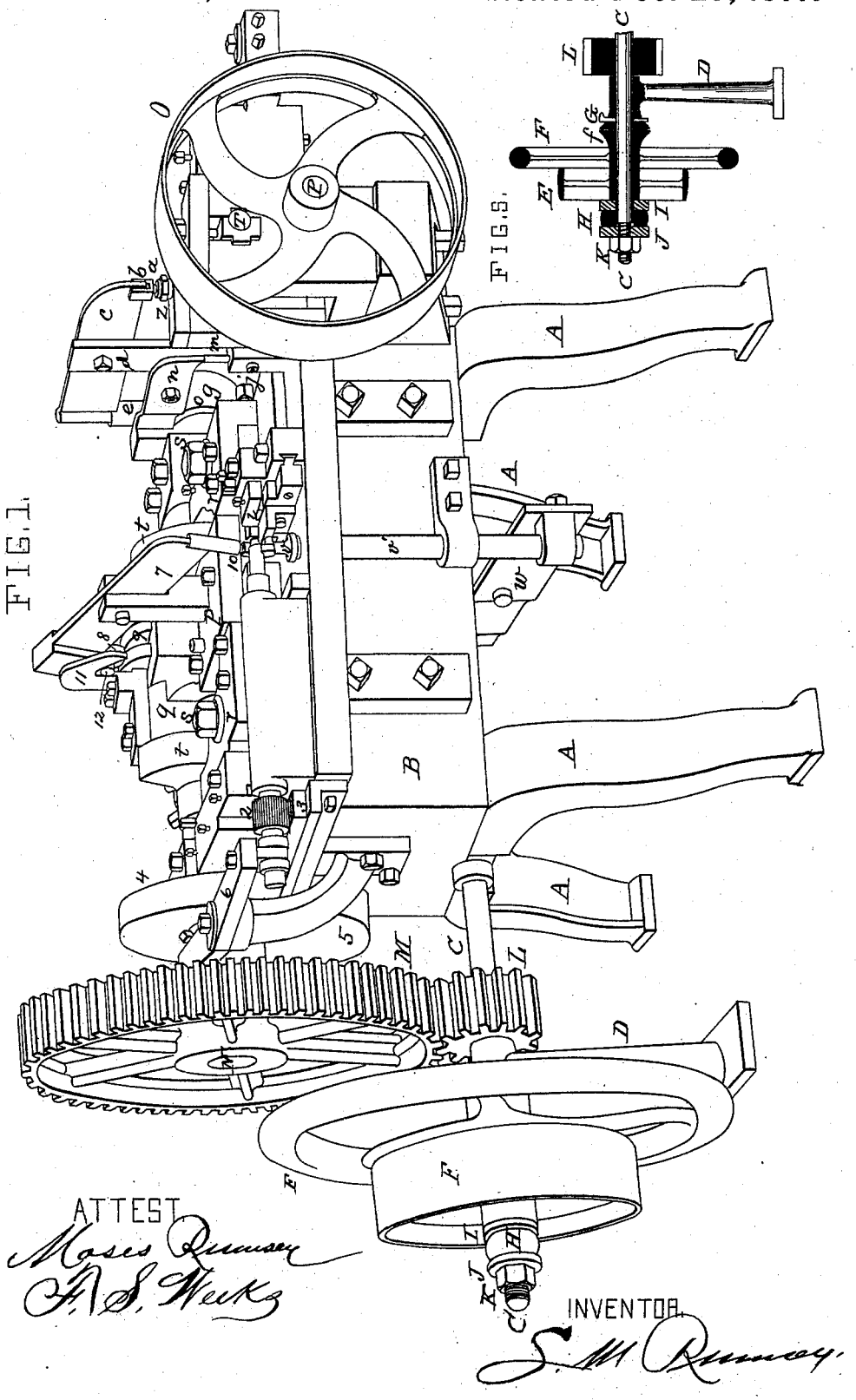

FIG. 3.



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FIG. 2.

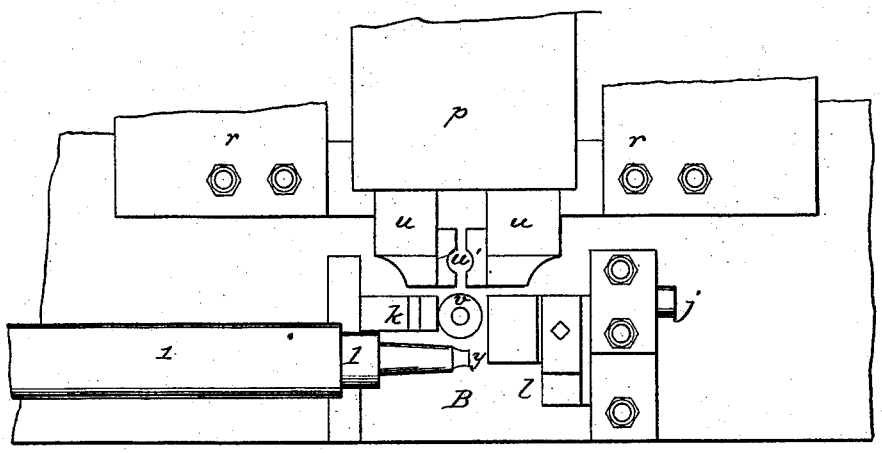



FIG. 3.

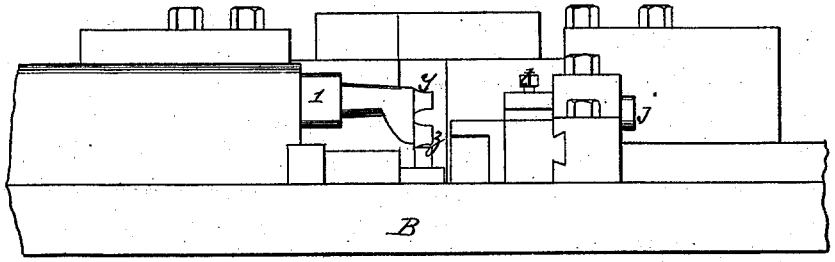
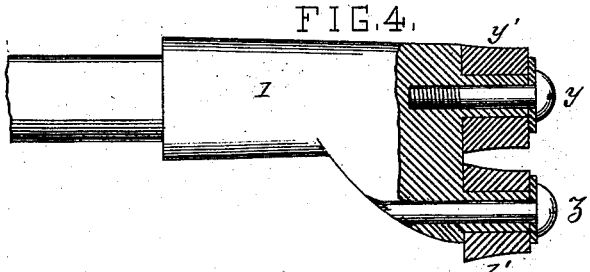



FIG. 4.

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3 Sheets—Sheet 3.

# L. M. RUMSEY.

## Chain-Machine.

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FIG. 6.

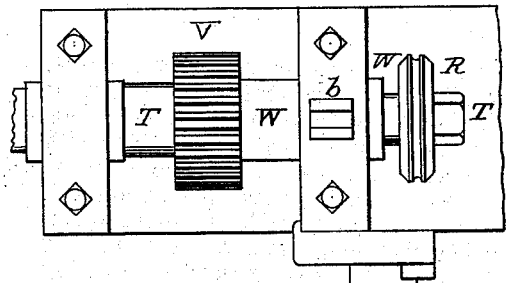
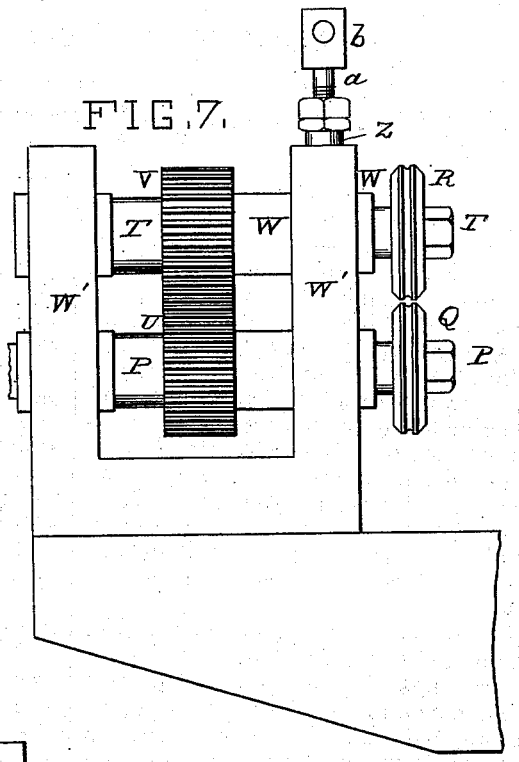



FIG. 7.



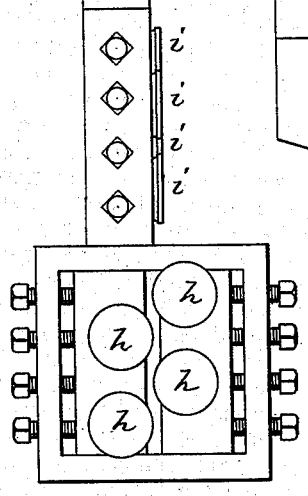




FIG. 9.

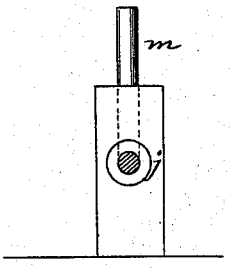
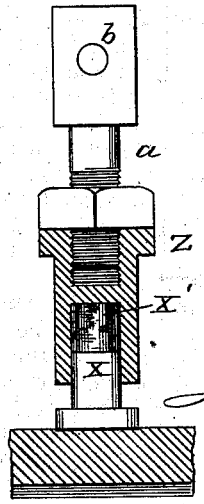



FIG. 8.




ATTEST.

Mason Rumsey
F. S. Wells

INVENTOR.

L. M. Rumsey

# UNITED STATES PATENT OFFICE.

LEWIS M. RUMSEY, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-HALF HIS RIGHT TO MOSES RUMSEY, OF SAME PLACE.

## IMPROVEMENT IN CHAIN-MACHINES.

Specification forming part of Letters Patent No. **198,690,** dated December 25, 1877; application filed November 22, 1877.

*To all whom it may concern:*

Be it known that I, LEWIS M. RUMSEY, of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Machines for Manufacturing Chains for Chain-Pumps, and for other purposes; and I hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification.

My improvement relates to that class of chain-machines which form the first part of the link with jaws that force the wire around a pin, and the last part of the link by means of a bifurcated forming-arm, with an oscillatory motion.

These improvements will first be described, and then pointed out in the claims.

In the drawings, Figure 1 is a perspective view of the machine to which my improvements are applied. Fig. 2 is a sectional top view of the parts directly engaged in forming the link. Fig. 3 is a front view of the same. Fig. 4 is a side view of the forming-arm, part in section. Fig. 5 is an axial section through the friction apparatus. Fig. 6 is a top view of the wire-feeding device. Fig. 7 is a side view of the feed-rolls. Fig. 8 is a sectional view through part of the device for giving vertical movement to the upper feed-roll. Fig. 9 shows the wire-holding device in part.

A A are the legs of the machine, and B the bed or body. C is a counter-shaft, having journal-bearing in the bed and on a pedestal, D. The shaft C has upon it a driving-pulley, E, and fly-wheel F, which are attached together, but which are loose on the shaft C.

The friction-surfaces are forced together by a spring, H, that may be of rubber or spiral metal. One end of the spring bears against the hub of the loose pulley E, or a washer, and the other end of the spring bears against the washer J, and against the washer J screws the nut K.

It will be seen that by means of the nut K the tension of the spring H may be adjusted to regulate the pressure together of the friction-surfaces *f* and G, which form a friction-clutch, by which rotation is communicated to the shaft C from the driving-pulley E.

The purpose of this friction device is to allow the machine to stop on any kink or wrong bend forming in the wire and becoming caught in the machinery, so as to endanger breakage. The frictional surfaces are set together with just sufficient pressure to run the machine when there is no irregularity; but on an accident taking place that would endanger breakage the machine stops, and the driving-belt upon the pulley E carries forward such pulley and the fly-wheel without turning shaft C. The shaft C has upon it a spur-pinion, L, which engages with a spur-wheel, M, upon the main or cam shaft N of the machine.

O is a pulley that has continuous rotation by a belt upon it. Upon the pulley-shaft P is a grooved feed-wheel, Q, over which passes the wire from which the chain-links are formed.

R is a grooved feed-wheel over Q, and whose groove embraces the upper part of the wire. The wheel R is upon a shaft, T. The shafts P and T are connected by spur-wheels U and V, so that the shafts turn simultaneously, but in opposite directions.

The box W, in which the wheel end of the shaft T has bearing, has capacity for vertical movement, so as to allow of the wheel R being forced down upon the wire to cause the forward motion of the same. At other times the friction of the wheels Q R upon the wire is not great enough to draw it through the straightening-rolls, and consequently the wire does not move forward, except when the feed-wheel R is forced down upon it.

I will now describe the device for giving vertical movement to the wheel R. Upon the box W rests a pin, X, whose upper end enters a socket at the lower end of a nut, Z, which nut screws upon a rod, *a*, and has vertical movement in the housing W′. The rod *a* is hinged at *b* to one end of the lever *c*, fulcrumed in the standard *d*, and having at the rear end a shoe, *e*, bearing upon a cam, *g*, upon the cam-shaft N.

It will be observed that the upward movement of the shoe *e* will cause the downward movement of the feed-wheel R.

Within the socket of the nut Z, above the upper end of the pin X, is a rubber or other spring, X′, to allow some movement of the pin X in its socket.

In feeding the wire into the machine against

the stop K it is evident that in case of any inequality in the wire it might be forced against the stop K with sufficient force to bend the wire and foul the machine; or it might not feed at all.

In order to overcome this trouble, which always occurs where iron meets iron, I introduce the spring X′, (see Fig. 8,) which may be of rubber, spiral wire, or any elastic substance. The tension of the spring can be adjusted with the screw *a* and socket-nut Z.

Z′ is a jam-nut, to hold the rod *a* in its proper place of adjustment in the nut Z. The wire from the coil passes between horizontal straightening-rolls *h* and vertical straightening-rolls *i*. These rolls are adjusted by screws, as shown. The wire passes through eyes *j* as it is fed, and its end impinges against a stop-bar, *k*, which causes the forward motion to cease, the wheel R at the same time being reing relieved from the depressing action of the cam *g*, and allowed to rise. The blank to form the link is cut off by a shear, *l*, when it has reached the proper position, and the wire is held firmly in the eye *j*, while being cut, by a pin, *m*, that is pressed down upon it at such time, the pin being pressed down by a lever, *n*, whose rear end is raised by a cam, *o*, upon shaft N for that purpose. (See Fig. 9.) The moving cutter, by which the blank is cut off, is upon a carriage, P, which is moved backward and forward by a cam, *q*, on the shaft N. To this carriage are pivoted levers *r*, fulcrumed at S, and whose rear ends are forced asunder at the proper time by cams *t* upon the shaft N. Between the fore ends of the levers *r* are jaws *u*, closed by the lever *r*, and opened by a spring between them.

The operation of jaws *u* is as follows: As the carriage moves forward the cutter *l* severs the blank, (which has been thrust through the forward eye of the link last made,) and at the same time the front ends of the jaws come in contact with the blank and bend it around the vertical pin *v*, which is on a level with the jaws and in front of the wire. The jaws still move forward, and as their fore ends get past the pin *v* they are forced together by the cams *t*, so as to make a perfect eye around the pin *v*, the jaws having semicircular recesses *w*′ upon their inner sides, to fit the outside of the eye which they form around the pin *v*. The pin *v* is at the upper end of a bar, *v*′, which has vertical movement in the table or bed B by means of a lever, *w*, to whose forward end it is connected. The lever *w* is actuated by a cam on shaft N, to draw the pin from the eye after the link is formed, to allow the link to be drawn back as the carriage retreats, and carries it backward.

In forming the first eye of the link the portion of metal from which the other eye is formed is bent forward and carried into the fork formed by the pins *y z* upon the end of the former 1, and, as the former 1 turns somewhat more than half of a rotation, the wire is turned around the center fork or pin *y* by the revolving pin *z*, and an eye formed around pin *y*. After the eye has been formed the former is drawn back endwise, to draw the pin *y* from the eye, to allow the link to be carried back with the carriage, and the former turns back into position shown in Figs. 1 to 5.

The former 1 receives its movement by the following means: A portion of the former is provided with cogs 2 engaged by a rack, 3, having endwise reciprocation, operated by a cam, 4, on the shaft N. The reciprocation of the rack causes the oscillation of the former.

The endwise movements of the former are caused by a cam, 5, on the shaft N, which oscillates a lever, 6, the lever having at the free end a yoke or fork that engages in a circumferential groove of the former.

The last eye of the link, as left by the former, is out of line with the other eye, and requires to be bent downward. This setting down is accomplished by a lever, 7, on the carriage *p*.

As the carriage moves backward the rear end of the lever 7 (or a friction-roller, 8, thereon) comes in contact with an incline, 9, and by the raising up of the rear end of the lever causes its fore end 10 to press down upon the eye, for the purpose described. The end 10 of the lever is raised on the forward movement of the carriage by an incline, 11, upon it working on a fixed pin, 12.

As the carriage is about to reach its backward position the wire advances and passes through the eye last made; then, as the jaws *u* are relieved from the action of the cams *t*, they are opened by a spring between them, and the link falls out of the jaws, and is left suspended by its last-formed eye upon the wire from which the next link is to be made.

*y*′ and *z*′ are friction-rolls upon the pins or fork *y z* of the former 1. The purpose of the friction-rolls *y*′ and *z*′ has been fully set forth. It is, in brief, to prevent the abrasion of the wire and of the fork, and to prevent the wire being drawn out of the jaws *u u* while the eye is under formation.

I claim as new and of my invention—

1. In a chain-machine, the frictional driving device having the pulley or other suitable mechanism E, friction-surface *f* and G, spring H, and nut K, in combination with the pin *v*, the jaws *u u*, and the forked arm 1, provided with rollers *y*′ and *z*′, for the purpose set forth.

2. The combination of the pin *v*, the jaws *u u*, and the forked arm 1, provided with the rollers *y*′ and *z*′, for the purpose set forth.

3. The combination of the pin X, spring X′, the socket Z, and the nut Z′ with the feed-rollers, for the purpose set forth.

LEWIS M. RUMSEY.

Witnesses:

SAML. KNIGHT,

F. S. WEEKS.