3 Sheets—Sheet 1.

G. B. WHITNEY.

Machines for Making Chains.

No. 197,191. Patented Nov. 13, 1877.

Fig. 1.

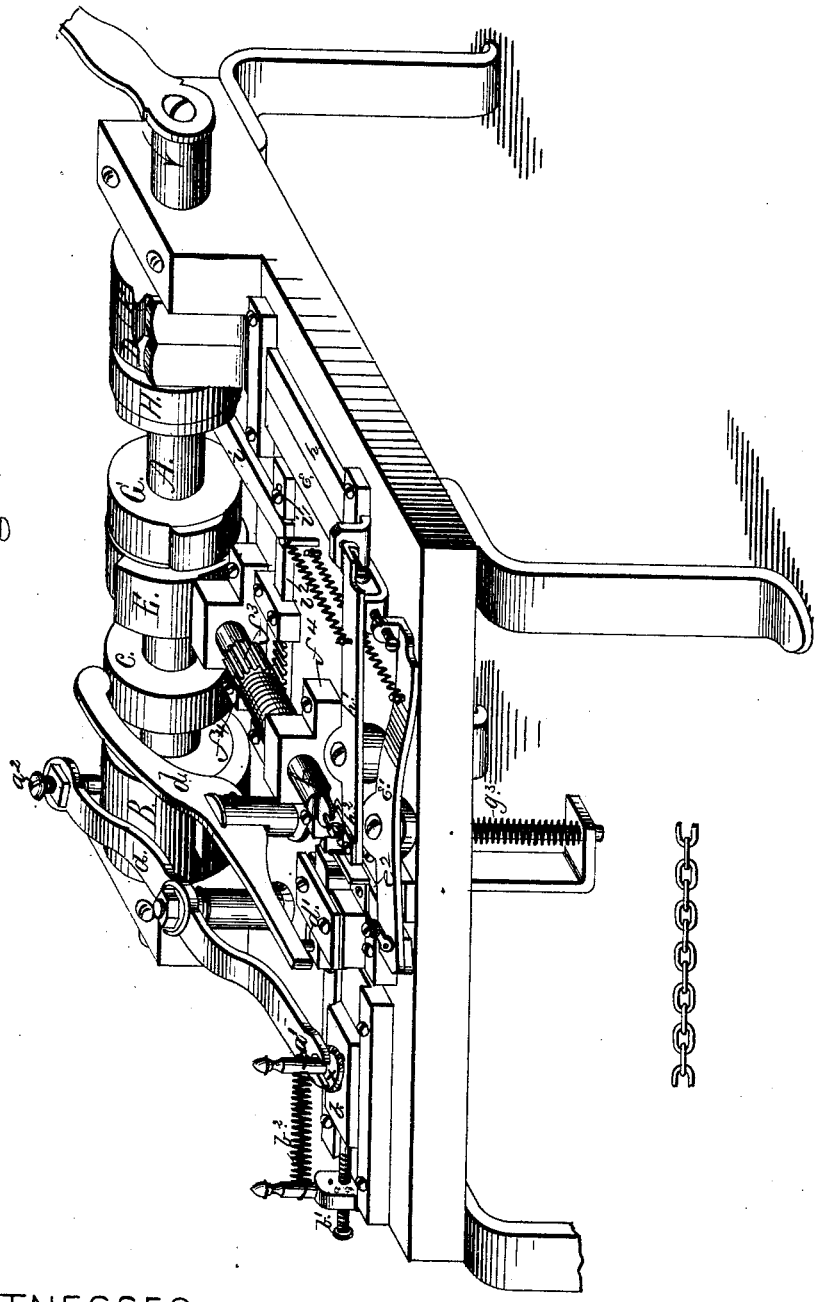

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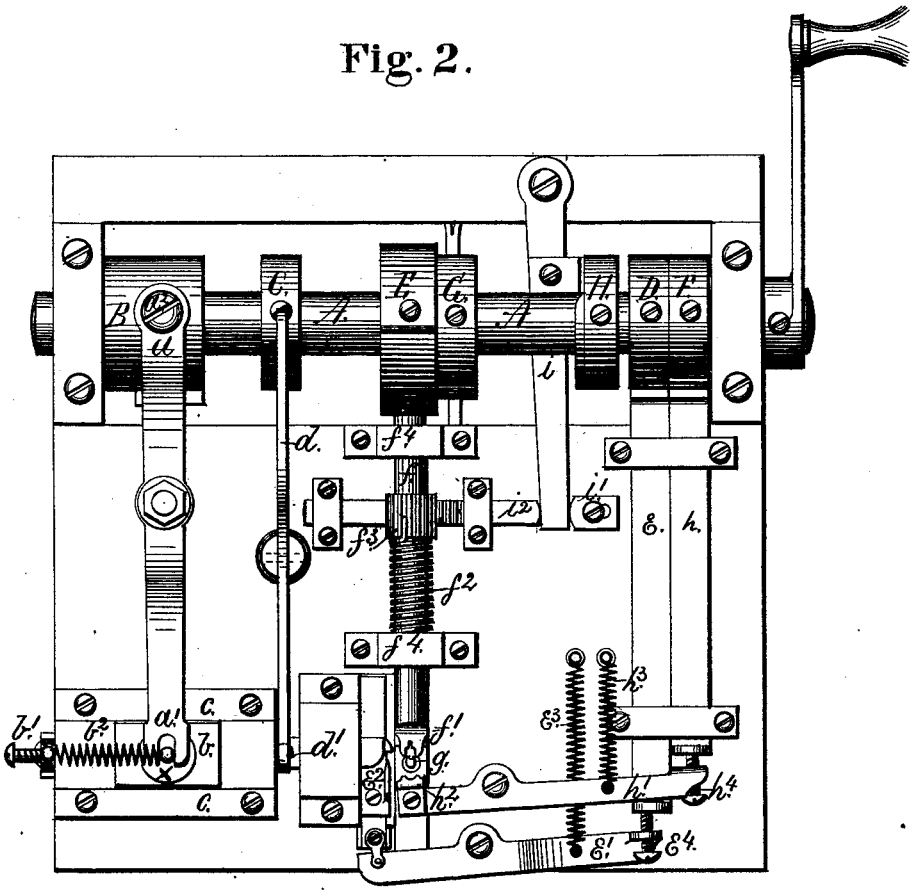
Fig. 2.



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3 Sheets—Sheet 3.

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Fig. 3.

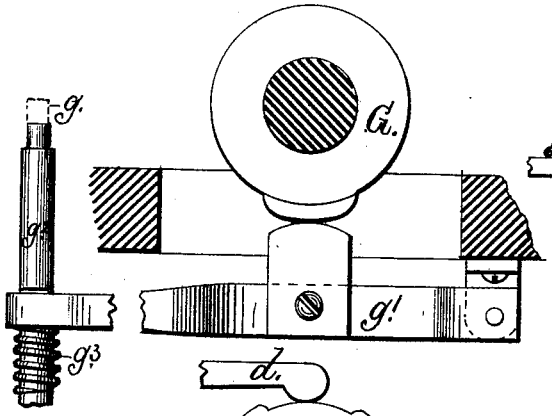


Fig. 4.

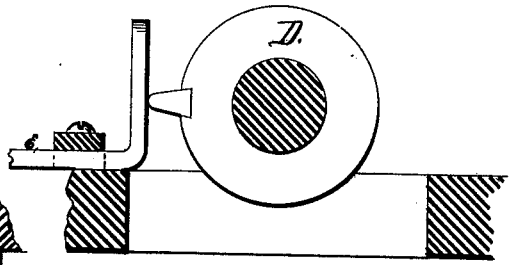


Fig. 5.

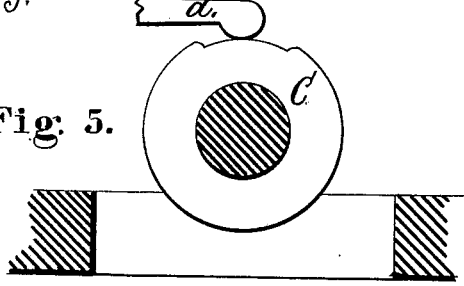


Fig. 6.

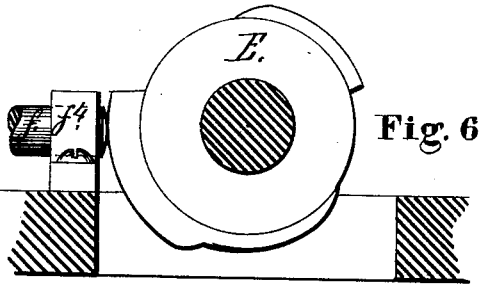


Fig. 9.

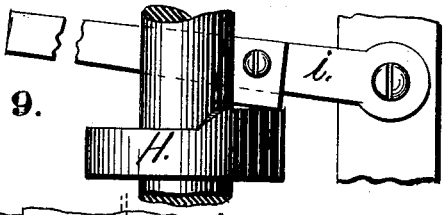
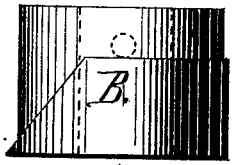


Fig. 8.



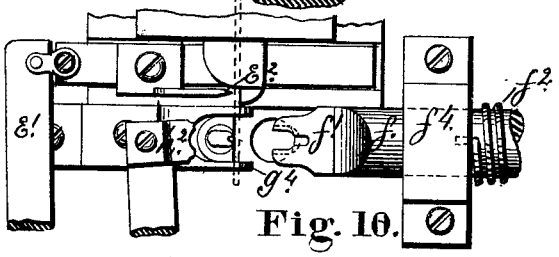
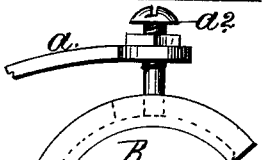


Fig. 10.



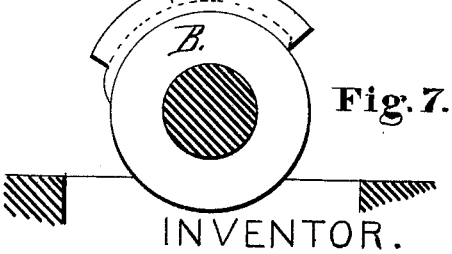


Fig. 7.

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GEORGE B. WHITNEY, OF NORTH ATTLEBOROUGH, MASSACHUSETTS.

IMPROVEMENT IN MACHINES FOR MAKING CHAINS.

Specification forming part of Letters Patent No. **197,191**, dated November 13, 1877; application filed July 2, 1877.

To all whom it may concern:

Be it known that I, GEORGE BARBER WHITNEY, of North Attleborough, in the county of Bristol and State of Massachusetts, have invented new and useful Improvements in Chain-Making Machines; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

Figure 1 is a perspective view of my improved chain-making machine. Fig. 2 is a top view of the same. Fig. 3 is an enlarged view of the cam for depressing the link-former. Fig. 4 is a view of the cam for operating the wire-cutter. Fig. 5 is a view of the cam for operating the wire-holder or clamp. Fig. 6 is a view of the cam for operating the reciprocating and rotating shaft, to which the link forming and holding jaw is secured. Figs. 7 and 8 are views of the cam for operating the wire-feeding mechanism. Fig. 9 is a view of the cam operating the lever, through which the reciprocating shaft in which the link forming and holding jaw is secured is rotated. Fig. 10 is an enlarged top view of the link-forming mechanism.

Similar letters of reference indicate corresponding parts.

This invention has reference to machines for making chains automatically without hand labor; and consists in the arrangement of the various parts by which a chain is made from one continuous coil of wire, and by which each link as it is formed is turned so as to receive the wire for the next link, and thus a continuous length of chain made from one wire, as will be more fully set forth hereinafter.

In the drawings, A is the driving-shaft, by which motion is imparted to all the mechanism forming the machine. B is a cam secured to the shaft A, arranged to operate the lever *a*, a plan and side elevation of the cam being shown in Figs. 7 and 8. This cam in its rotation first raises the lever *a*, and thus depresses the other end, a^1, so as to hold the wire firmly between the disk *x* and the slide *b*. To vary this pressure and regulate the distance according to the size of the wire, the adjusting-screw a^2 is secured to the lever *a*, resting on the cam.

The next motion of the cam feeds the wire to the cutter, and to regulate the length of the wire the screw b^1 is arranged to form an adjustable stop, against which the slide *b* rests, so that any desired length of wire can be fed within the limit of the lateral throw of the cam B. As soon as the wire is fed to the cutter the lever *a* relieves the clamp *x*, which is provided with springs, so as to raise off the wire and slides over the wire, being pulled against the adjustable stop b^1 by the coiled spring b^2. *c c* are ways in which the slide *b* reciprocates.

C is a cam, secured to the shaft A, and operates the hinged lever *d*, one end of which rests on the cam C, and the other on the vise or clamp d', so that as soon as the proper length of wire is delivered, the cam C forces the lever *d* on the clamp d', and firmly secures the wire.

The cam D imparts reciprocating motion to the slide *e*, and through the same to the hinged lever e^1, to the other end of which the cutter e^2, arranged to slide in suitable guides, is secured, and which is held against the slide *e* and cam D by means of the coiled spring e^3, so that when the wire is fed and properly clamped the cutter will separate the length projecting, as is shown enlarged in Fig. 10.

The cam E, in its rotation, forces the shaft *f* outward, and as this shaft is provided with the jaw f^1, of such shape and proportion as will form the outer shape of the link, and as the wire rests in front of the former *g*, of such shape as the interior line of the link, the wire will be bent around the former, and the link thus partially formed.

The cam F operates the slide *h*, and through this the hinged lever h^1, provided on its other end with the clinching-jaw h^2, so that the link partially formed by the jaw f^1 is completed and clinched or closed by the jaw h^2. The hinged lever h^1 is held against the slide *h*, and this against the cam F by the coiled spring h^3. The motion of the jaw h^2 can be accurately adjusted by the screw h^4, and the motion of the cutter e^2 by the adjusting-screw e^4.

G is a cam secured to the shaft A, (shown enlarged in Fig. 3,) arranged to force down the former *g* by means of the hinged lever g^1, operating on the vertical shaft g^2, to the upper

end of which the former g is secured, the whole being held against the cam by the coiled spring g^3.

The cam H, in its rotation, imparts horizontal motion to the hinged lever i, resting in its normal position against the adjustable rest i^1, and operating against the rack-bar i^2, thus imparting partial rotative motion to the shaft f by means of the pinion f^3, secured to the shaft f. The shaft f reciprocates and turns in the bearings f^4, and in its forward motion compresses the coiled spring f^2, which keeps the heel of the shaft f forced against the cam E, so that by the change in the surface of the cam various reciprocating motions are imparted to the shaft f, and by it to the jaw f^1. As the spring f^2 is secured at one end, either to the frame of the machine or the bearing f^4, and the other end to the shaft f, or to the pinion f^3, a torsional strain is exerted on the spring f^2 when the shaft f is rotated by the rack i^2, and, as soon as the cam H will allow, the rack-slide i^2 is forced back by the rotation to its original position of the shaft f.

The operation of the machine is as follows: A suitable coil of wire of the desired dimension and sectional shape is placed near the machine, and arranged so that it can unwind automatically. The end of this wire is passed through or between a suitable friction device, as is usual, to retain the wire and straighten the same. It is now passed between the clamping-disk x and the slide b, and through the clamp d' to the cutter e^2. The machine may now be started, and the desired length of wire to form the link will be fed by the clamp b, operated through the lever $a\,a^1$ by the cam B. This wire is firmly held as soon as delivered by the clamp d', operated, through the hinged lever d, by the cam C. The cam D operates the cutter e^2 through the slide e and hinged lever e^1, which cutter now cuts off the required length of wire, which is held in the proper position on the spring-fork g^4, and, the former g being in position, the shaft f advances, and the end of the jaw f^1 bends the wire around the former g, and allows it to enter a recess in the jaw f^1. By this forward motion of the jaw f^1 the fork g^4 yields sufficiently to pass under the jaw. The cam F at this moment brings the jaw h^2 against the end of the wire of the partially-formed link, and closes the same around the former g, thus completing the first link.

The former g is now drawn down by the lever g^1, operated upon by the cam G. The jaw and link are drawn back until clear of the yielding fork g^4. The rack i^2, operated by the cam H through the lever i, now rotates the shaft f, the jaw f^1, and the link one-fourth turn. The shaft, jaw, and link advance, so that the now vertical link enters the slot in the former g, and the cam B, operating the feeding device, pushes the wire through the link previously made, where it is held by the projecting ends of the fork g^4. The cam E now allows the shaft f to recede by the pressure of the coiled spring, and the link, being held by the wire for the new link and the fork g^4, is disengaged from the recess in the jaw f^1. The cam H now releases the lever i and rack i^2, and the torsional strain on the spring f^2 turns the shaft f and places the jaw f^1 into the original position, in which it advances and forms the second link, which is closed by the jaw h^2. The former g descends, the jaw f^1 and link recede, turn one-fourth, and present the second link, through which the wire is passed. The second link is withdrawn, and the next link formed and closed, thus continuing the operation, and forming a continuous chain made up of round, oval, or other shaped links, in which successive links are set in opposite directions, and a cable or other similar chain formed and made from one continuous length of wire, around one and the same former, and by the same set of jaws, producing a chain perfect in all its links, and more uniform than can be made by hand, requiring no hand-labor and but little supervision.

Chains of any desired length or shape of link, and any desired size or section of wire or rods, can be thus cheaply and perfectly made on properly constructed and proportioned machines, varying from the lighest jewelry-chains, made of precious metal, to cable-chains of considerable size.

Heavy iron chains can be made by a proper machine of this construction, and the links welded after the same are formed, and the cutter can be arranged to so cut the wire or rods as to facilitate the process of welding.

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

1. In a chain-making machine, the combination, with intermittent feed and clamping mechanism, of two reciprocating jaws, a reciprocating former located between said jaws, and a cutter, substantially as described.

2. In a chain-making machine, the combination, with intermittent feed and clamping mechanism, of two reciprocating jaws, a reciprocating former located between said jaws, a cutter arranged to cut desired length of blank, and a yielding fork, substantially as described.

3. In a chain-making machine, the combination, with a reciprocating former and a yielding fork adapted to hold the blank against the former, of two reciprocating jaws, one of which has a rotary movement, substantially as described.

4. In a chain-making machine, the combination, with an intermittent feed mechanism and cutter, a reciprocating former, and means for holding the blank in contact therewith, of two reciprocating jaws, working on opposite sides of the former, one of said jaws arranged and adapted to force the blank partly around the former, and when the blank is closed by the opposite jaw to withdraw the link, partly rotate the same, and carry it forward, to allow the following blank to pass through the finished link, substantially as described.

5. The combination, with the driving-shaft and cam secured thereto, of the reciprocating shaft, provided with the jaw f^1, and means, substantially as described, for imparting partial rotation to the reciprocating shaft, substantially as described.

6. In a chain-making machine, the combination, with the cutter e^2, former g, and jaw h^2, of the reciprocating and rotating jaw f^1 and means, substantially as shown and described, whereby a continuous chain is made from a coil of wire, substantially as described.

7. In a chain-making machine, the combination, with a reciprocating former, of two reciprocating jaws, and means, substantially as described, whereby one of said jaws forces the blank partially around the former, and after the opposite jaw has closed the link said jaw removes the link from the former, partly rotates the link, and returns the same to allow the next blank to be inserted in said link, substantially as described.

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