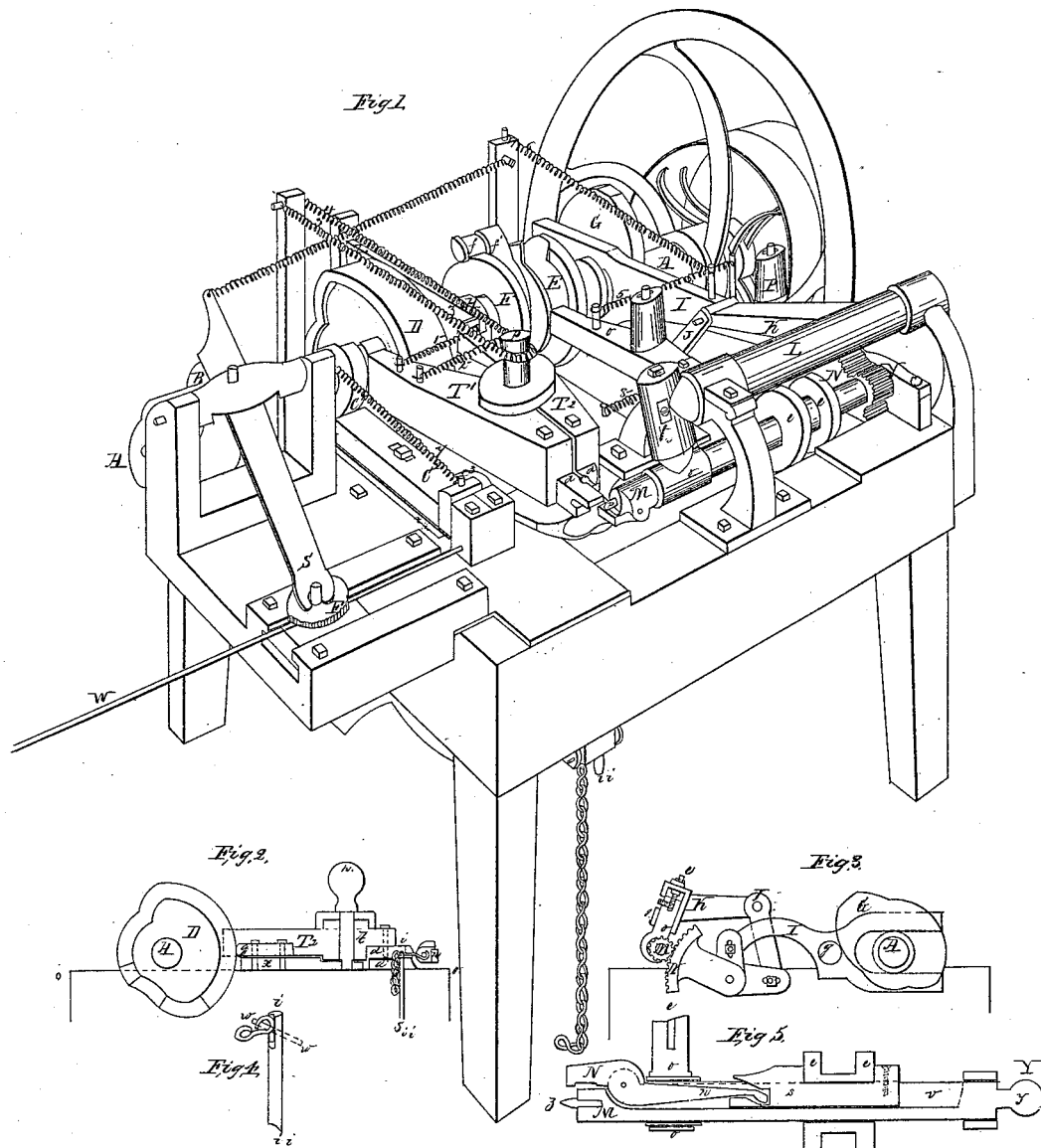


*Atwood & Kellogg.*

*Making Chain,*

*No 7,768,*

*Patented Nov. 12, 1850.*



# UNITED STATES PATENT OFFICE.

CHAS. ATWOOD AND GEO. KELLOGG, OF BIRMINGHAM, CONNECTICUT.

## MACHINE FOR MAKING JACK-CHAINS.

Specification of Letters Patent No. 7,768, dated November 12, 1850.

*To all whom it may concern:*

Be it known that we, CHARLES ATWOOD and GEORGE KELLOGG, both of Birmingham, (Derby,) in the county of New Haven and State of Connecticut, have jointly invented  
5 a new and useful Machine for Making Jack-Chains from Wire, Cutting the Wire, Bending the Links, and Interlocking them Continuously.

10 To enable other machinists to make and use our invention, we do hereby declare that the following is a full and exact description thereof.

15 The operation of our machine is to take the wire from the whole piece or hank, and feed it in, in suitable lengths successively for a link, and bending, cutting off, and forming a link, and holding it in the machine until the wire for another link is fed in, and thrust through the bow of the first  
20 link and bent, or beginning to be bent, then cut off, and the first bow of the second link bent, interlocking the first link, and holden until the second bow of the second link is bent and formed and drawn back the length  
25 of the second link, which is still holden until another length of wire for the third link is fed in and thrust through the last bow of the second link as before, and so on continuously, dropping one link while the next is forming—each part of the process is performed in quick succession, and so the chain  
30 is made as fast as the links are dropped or released from the machine.

35 The bows of each link are formed by being bent around two suitable shaped pins or studs, generally round ones of cylindric form, but in order to bend a circular bow around a cylindric pin or stud and at the  
40 same time embrace and interlock the wire of the preceding bow, there should be a flute or recess in one of the studs sufficient to receive and nearly bury the wire of the preceding bow, so that the cylindric pin or stud with  
45 the wire in its recess shall still be nearly cylindric, or of the proper form designed for the bow, so that the bow shall be circular, or of the proper form.

50 We have several methods of bending the wire around the stud which forms the first bow of the link—either by dies attached to the jaws of tongs, made to open and shut, and to approach to and recede from the stud pin, shutting as they approach the stud, and  
55 bending the wire around it, and then the stud being withdrawn downward, the dies

recede and still holding the bow (though without the stud in it) until another wire is fed in, as is hereinafter more fully explained, and then the jaws and dies open  
60 and drop, or release this link as finished, the jaws and dies being open in advance and shut to bend the first bow of the next link, as before described.

We have another method of forming the  
65 first bow of the link, which is to make the dies simply to open and shut, without advancing or receding, and in this mode the stud is attached to a movable plate, and with this plate the stud advances and recedes to  
70 and from the dies, advancing, when the dies are open, a little forward of the ends of the open dies, and after the wire is fed in between the stud and the opening between the dies, the stud recedes, as the wire is cut off,  
75 between the open dies, to its central or proper position, carrying the wire and partly bending it by drawing it laterally into this opening, which should be a little greater than the diameter of the stud added to twice  
80 the diameter of the wire, and by closing or shutting the dies around the stud the bending of the first bow of this link is finished, but it is still holden in the dies until the second bow is bent as herein described; in the  
85 meantime the movable plate with the stud retracted below the face of the plate, is moved forward, equal to the length of one link, so that the stud being again protruded just forward of the last bent bow, so that the  
90 end of this bow is just embedded in its recess, and is now ready for another wire to be fed in &c, as before.

After the first bow is bent in either of the foregoing ways, or in any other way substantially the same, the bending of second  
95 or last bow of the link is performed by a spindle or mandrel, set in a line nearly parallel to the plane of the first formed bow, so that it may revolve partly round in a plane  
100 at right angles with the first bow. In the end of this mandrel is a central stud around which the second bow is bent, and near this stud, a little more than the diameter of the wire from it, is a kind of trip, acting like  
105 one jaw of tongs or pliers to grip or press the end of the wire against the stud—to prevent its slipping while bending—and this mandrel with its central stud and its gripping jaw, has three compounded motions.  
110 It is hung so that it can revolve about three-fourths of a circuit and back again, and

roll over toward the first formed bow while it is bending the second, and traverse endwise, approaching the end of the wire to embrace it before it is bent, and relaxing its hold and receding from it after it is bent, and then swinging back to its first position; but while this mandrel is bending or rolling up this bow, it does not proceed horizontally, or on the plane of the first bow, but descendingly, about one-half the diameter of the stud, so as to set the center of the circle of this bow nearly on the plane of the first bow, so that the planes of the two bows shall intersect each other about centrally and at about right angles, in order to form a symmetrical link of this kind. Now, both bows of the link being bent, and the mandrel having receded from the last one, and the link being holden by the first one and the dies having receded, or the stud having advanced one link (for in either way the effect is nearly the same) and the stud being again protruded, as before described, the wire for the next link is fed in and thrust about one-fourth part of its length, through or beyond the last bow, and beyond the stud, and is ready for cutting off and bending as before, and repeating the same process for each link as the chain progresses.

Though we have several methods of bending the bows of the links, yet we consider that the dies attached to the jaws of what we call the tongs for bending the first bow, and bending the last bow by the partly revolving mandrel, as before described, to be the best, as being more compact and substantial, and most convenient; and which we will proceed to explain more particularly with the drawings and references hereto annexed, and forming a part of this specification.

We give all the motions of the parts from cams, as follows viz, A to A, in the perspective Figure 1, is the main cam shaft, on which is set a number of different cams which give the various motions to the several parts, which shaft is itself moved by the pulleys and fly-wheel upon it. The cam B, which is partly seen, lifts the end of the spring-lever S, which acts across its fulcrum, so that when the end at the cam is raised, the other end is pressed down upon a disk F, which presses upon the wire W, which passes under it and over a sliding block, in which a pin is set firm, and the disk having a hole through its center, fits loosely on the pin, and the pin has a hole through it in the direction of the wire, and the wire passes through this hole on the level of the sliding block; so that when the disk presses upon the wire, it is holden fast to the slide-block, and can only move with it, and when the pressure on the disk ceases, the wire is loosened, and then the disk and slide-block can move backward without carrying the wire, to take hold of a

new length wire and feed it forward in like manner, and so on successively; the spring being moved edgewise across a pin through its fulcrum; the cam B, gives all these feed motions.

The came C<sup>1</sup> moves the stock c<sup>2</sup>, a very small distance endwise, in which stock is set the small wheel-cutter c<sup>3</sup>, which acts like shears to cut off the wire, at the proper time, after each link is fed in; and the stock and cutter is drawn back immediately after each cut, by the spring marked 7.

The cam D gives the several movements to the tongs T<sup>1</sup>, and T<sup>2</sup>, that is, by forcibly opening their legs, their jaws are forcibly closed, having each its fulcrum at the pin p; and in the part of this cam where their legs are permitted to approach each other, they are made to do so by the springs 1, 2, and by so doing the jaws are opened; and the outer edge of this cam thrusts the tongs forward, and permits them to retreat or recede at the proper times, being ordinarily drawn back by the springs marked 3, 4; but as the springs may not always bring the tongs back, and injury may follow therefrom we place another cam as seen at H, which operates by a slide z, z, which is attached to one leg of the tongs so as to force them to recede at the proper time.

The cam F, by acting against the round stud f, causes the lifter f', to rise and fall, and this lifter acts on a lever under the machine, and moves the stud pin i, i, up and down through a plate under the dies d, d, at the place where the first bow is bent as is hereinafter further explained.

The cam E, has a kind of zigzag channel around it, or acts both ways laterally, to move the end of the lever O, across its fulcrum, the other end of which lever enters between the two shields e, e, of a sliding pulley or collar on the mandrel M, and this collar by slipping endwise of the mandrel moves a small slide embedded in it, in a deep flute or channel, in which channel is also embedded the tail or shank of the plier or nipper jaw n, and the end of the slide is made to act like a wedge under the shank and by raising it, depress the nipper jaw so as to grip the end of the wire against the stud pin in the end of the mandrel at p, to hold and prevent the slipping of the wire while the second bow of the link is bent by the rolling motion of the mandrel, and then sliding the wedge in the contrary direction by the slipping collar or pulley, the nipper jaw relaxes its grip on the wire, and is opened while the mandrel recedes to its first position, leaving the last bow of the link alone. Yet as this cam does not force the end of the lever both ways throughout its whole circuit the spring marked 5, is added to hold it against one side of the channel.

The cam G, acts against a round stud on

the back side of the forked slide I, to move it endwise forward and permit it to return by stages at the proper times, being drawn back by the spring 6, and by so moving endwise and acting on several levers and their connections it gives a reciprocating or back and forward motion to the segment gear N, and of course a partly revolving and returning motion to its pinion on the mandrel M, which has at this end, a spherical pivot which its suitable box under Y, and from the axis of the segment N, a lever extends backward to the connection J, which joins to the lever K, which is an arm in the crank-like shaft L, which gives a swinging motion to the socket-arm I, and to the wrist, or thimble-like box o, which is made so that it may swivel a little, and may be raised or lowered a little in the socket in the arm by the screw e, and holden where it is set, by its binding screw, and in this thimble-box the neck of the mandrel is hung, and thereby made to swing to and from the tongs or dies at the proper times, and permitted also to slip endwise, and to swivel, as the several operations require; the compounded motions of this mandrel and the means by which they are communicated from the cam G, by the slide I, are shown and made still plainer by sectional Fig. 3, in which the same letters refer to the same parts.

There is a cam-like projection on the back side of G, which is not seen in the drawings, which moves the lever in which is the globous box at Y. This lever turns on the fulcrum P, and only slides the mandrel endwise at the proper times—that is, forward just before the nipper jaw embraces the wire, and backward by the spring mark 8, when the last bow of the link has been bent, as before described.

Fig. 2 is a sectional drawing of the tongs to show more plainly their movements, parts, and operations; and is a cutting vertically through between their jaws and legs, and through the fulcrum pin p, on which they act. The line from o to o, is the level of the top of the frame of the machine. x is a section of the sliding bed to which the tongs and their appendages are attached, z, is a section of a friction block fastened to the bed, against which the cam D, acts to move the tongs and bed. T<sup>2</sup> shows one leg, and t, shows one jaw of the tongs, with one die d, fastened to the jaw, and as embracing the stud-pin at i. a', is a section of the plate, through which the stud-pin i, i acts being protruded through and above the face of it, while the first bow of a link is being bent around the stud by the dies, and retracted or withdrawn into the plate before the dies with the bow in them can recede, as before indicated.

Fig. 4, represents a stud, or stud-pin with its recess, and the last bow of a link in the

recess; and the dotted lines from W to W, show how a length of wire is fed in and thrust through the last preceding bow, and ready to be bent into the first bow of the succeeding link, and so continuously interlocking the links, as before described.

Fig. 5, shows a central bisection of the mandrel M, with its central stud or pin p, with its deep flute or channel r, and its spherical pivot y. And its small slide s, the end of which acts like a wedge to raise the shank n, of the nipper or plier jaw N, causing it to grip the wire against the stud p, and causing it to relax and open the jaw when moved in the contrary direction. This slide is moved endwise by the slipping collar or pulley with shields e, e, and o, o, shows the section of the thimble box in which the neck of the mandrel may revolve, and by which it may be moved laterally, and through which it may slip endwise, &c., as before described.

We have not given any scale of dimensions, though we may say generally that the drawing is about one third the length, and one third of the breadth of an ordinary frame, and the other parts nearly proportional; but we must leave the dimensions mostly to the discretion of the machinist, because they should vary according to the size of wire, and of the chain intended, but the parts should be made fully strong enough.

We have now herein described the whole of our machine, and each part as exactly and particularly as is sufficient to enable any person skilled in like machinery to build and use it; but we do not claim as our invention all the separate parts, because several of them have been known and used heretofore in other analogous combinations of machinery for other purposes; viz, the like feeding apparatus and movement have been used to feed in wire by lengths for pins, for card teeth and for hooks and eyes, and other like purposes; the wheel like cutter and its movements have also been used for purposes like those aforesaid, and we do not claim them. Neither do we claim any particular form of cams, nor any particular and separate motions obtained by them, nor any combination of them for other purposes, except only the peculiar adaptation of them by which we produce the successive and consecutive operations needful to bend and interlock the wire links of what is known as jack chain by one process through the machine as hereinafter claimed. Several parts of the machine may be moved and actuated by other mechanical devices producing similar motions and results, but we prefer to use the series of cams for this purpose combined and arranged as we have described, or in any other manner substantially the same.

What we do claim as our invention and desire to have secured to us by Letters Patent is—

1. The combination of the parts, movements, and operations in one machine, which are required to make jack chains by one process from the straight wire, after it is cut off in suitable lengths, to finished chain, substantially as described.

2. We also claim particularly the stud-pin with a recess in it, substantially as herein described; that is, the use of it as a mandrel around which the bow of a link is bent while the bow of another link is held in the

recess, thereby forming a continuous chain, and irrespective of the mechanical devices by which it is moved or used.

3. We also further claim the partly revolving mandrel with its stud and nipper, and other appendages for bending the last bow of each link, substantially as combined and used in our machine, and constituting part of it.

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Witnesses:

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