2 Sheets--Sheet 1.

C. M. SPENCER.

Machines for Forming Wire-Loops.

No. 145,250. Patented Dec. 2, 1873.

Fig. 1.

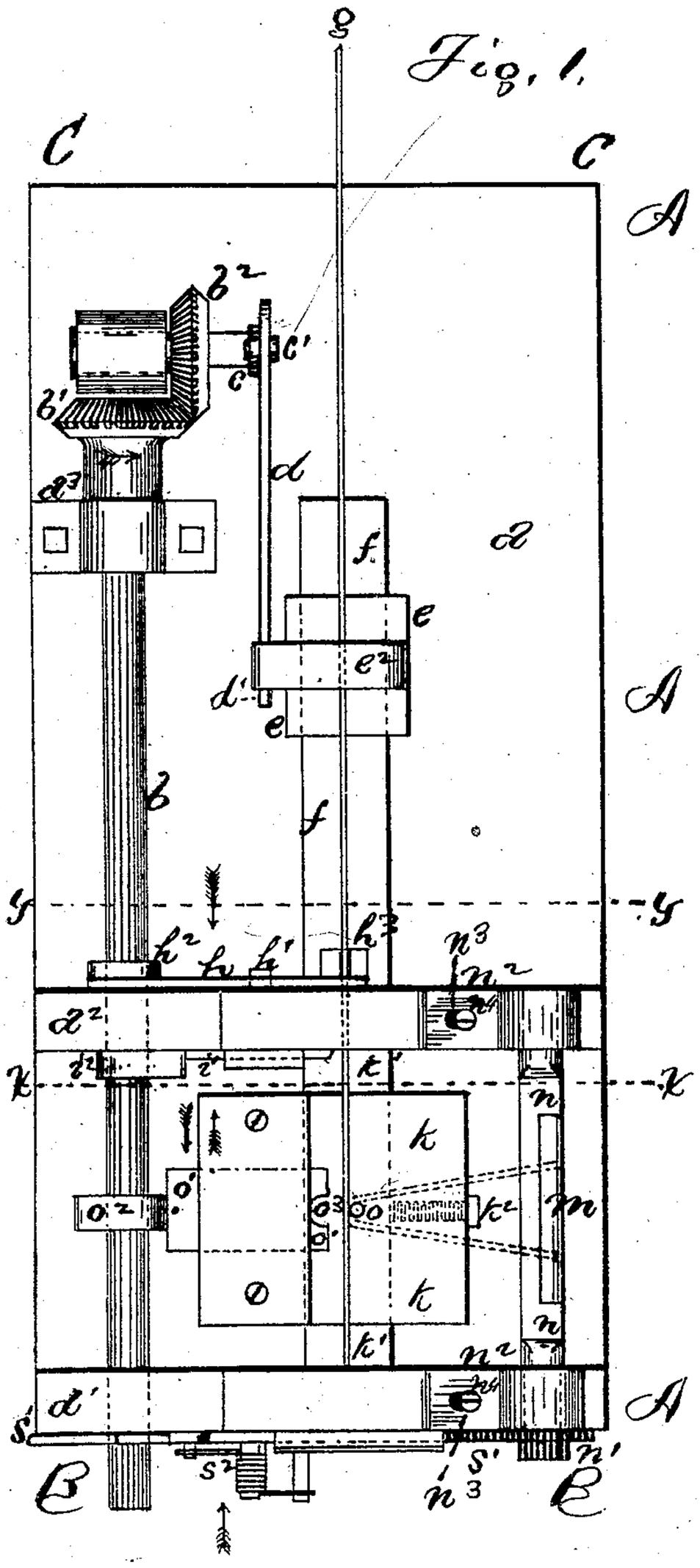
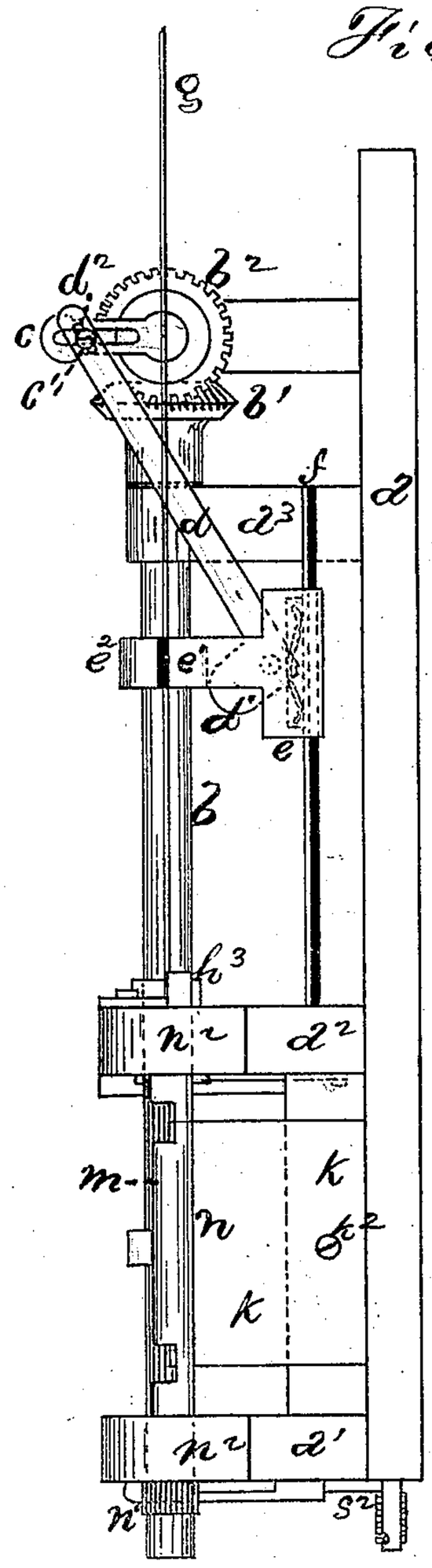


Fig. 2.



Witnesses.

John Pollitt

Hamm Freeman

Inventor:

Christopher M. Spencer

By W. E. Simmonds Atty

2 Sheets--Sheet 2.

C. M. SPENCER.

Machines for Forming Wire-Loops.

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Fig. 3.

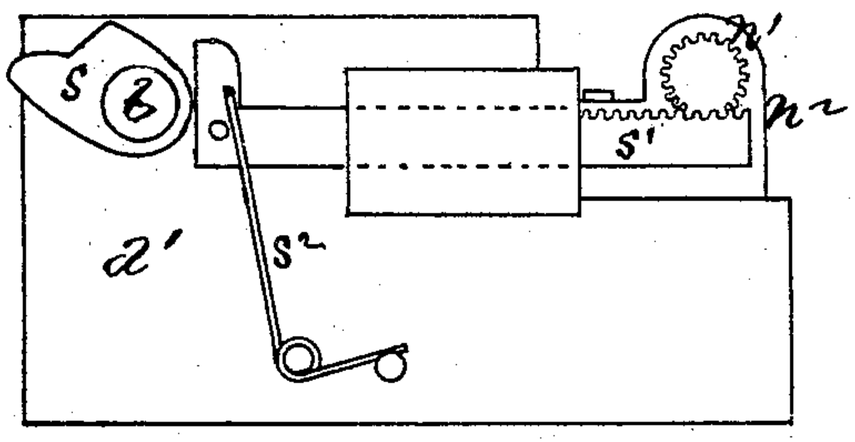


Fig. 4.

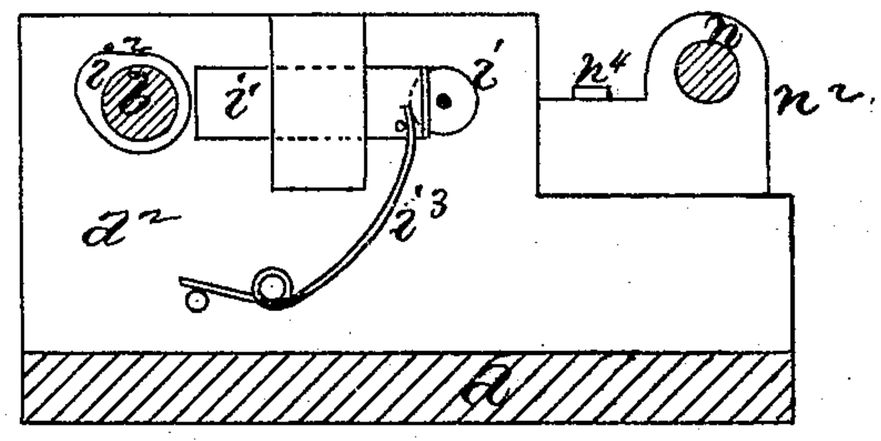


Fig. 5.

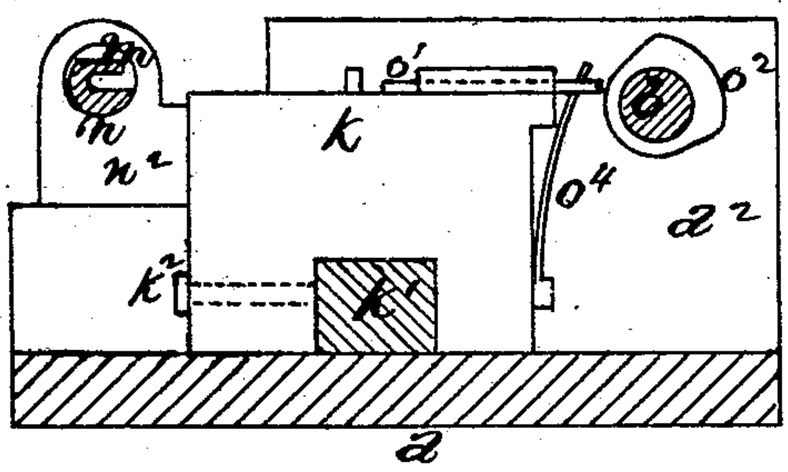


Fig. 6.

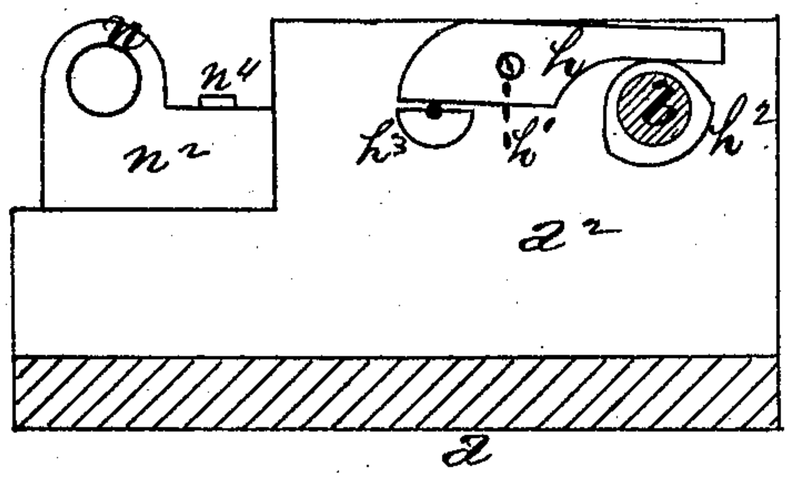


Fig. 8.

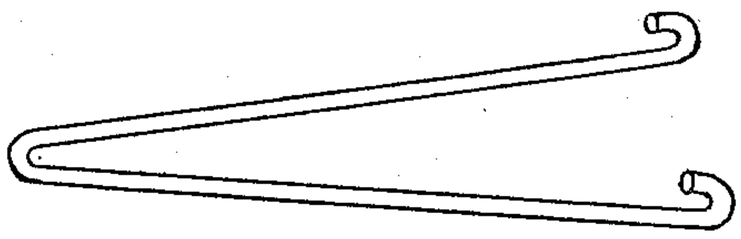
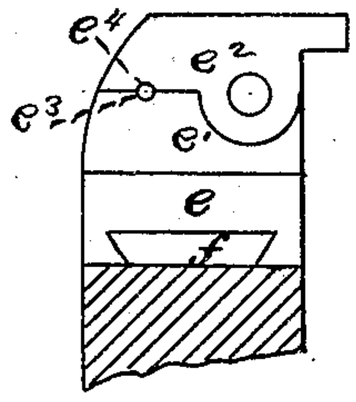


Fig. 7.



Witnesses.

John Pollitt

Harrison B. Freeman

Inventor:

Christopher M. Spencer

By W. E. Simmons

Atty

UNITED STATES PATENT OFFICE.

CHRISTOPHER M. SPENCER, OF HARTFORD, CONNECTICUT.

IMPROVEMENT IN MACHINES FOR FORMING WIRE LOOPS.

Specification forming part of Letters Patent No. **145,250**, dated December 2, 1873; application filed August 2, 1873.

To all whom it may concern:

Be it known that I, CHRISTOPHER M. SPENCER, of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Wire-Working Machines, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a top or plan view of the machine embodying my improvements aforesaid. Fig. 2 is a side view or elevation of the machine—the side A A. Fig. 3 is an end elevation of the machine—the end B. Fig. 4 is a view in cross-section on the line *x x*, looking toward the end C. Fig. 5 is a view in cross-section on the line *x x*, looking toward the end B. Fig. 6 is a view in cross-section on the line *y y*, looking toward the end B. Fig. 7 is a detached side view—or, with reference to the whole machine, an end view from the end C—of the reciprocating wire-clamp made use of. Fig. 8 is an enlarged perspective view of the product of the machine.

This machine is for producing from common wire the V-shaped figures shown in Fig. 8, with hooked ends. These figures are used in the construction of wire mattresses, so called. Some of the parts of the machine—as, for instance, the reciprocating clamp—are applicable to other uses.

The letter *a* indicates the base-plate of the machine, on which are the standards a^1 a^2 a^3, in which is hung the main shaft *b*, with a bevel-gear, b^1, meshing into and driving the bevel-gear b^2, to the side of which is fixed the crank-arm *c*, bearing a crank-pin, *c'*, which is adjustable toward and from the center, on which the crank-arm turns, so that the length of throw given to the reciprocating clamp—about to be described—can be regulated within proper limits at pleasure. The letter *d* indicates a pitman or connecting-rod, one end pivoted on the crank-pin *c'*, and the other end jointed or pivoted to the base *e* of the reciprocating clamp, which travels back and forth on the traveling bar *f*, being held thereto by dovetail ways. From the base *e* rises the anvil e^1, and to this is pivoted the clamping-head e^2. Corresponding semicircular slots e^3 e^4 are cut in the opposing faces of the anvil and head, forming, when closed together, a round, or nearly round, hole, through which runs the wire *g*, off which the V-shaped links are to be cut and bent. On the end of the pitman *d* is a cam, d^1, which, when the opposite end of the pitman passes below the center on which the crank-arm turns, presses up on the under side of the heel end of the head e^2, and presses down the toe end, so that the wire *g* is tightly grasped between the anvil e^1 and the head e^2. At the time that the wire is thus clamped, the clamping device is at or near the outer end of its play, and has started inward toward the end B. It carries the wire along with it, and feeds it forward just the right length to make one of the V-shaped links.

As once before stated, the length of this feed can be regulated by the adjustment of the crank-pin on the crank-arm.

The moment that the outward end of the pitman passes above the center of the crank-arm, the cam d^1 releases the hold of the head on the wire, and on the outward stroke of the reciprocating clamp the wire *g* remains stationary. The moment that the wire *g* arrives at the end of one of its inward feed movements, the punching-lever *h*, pivoted on the pin h^1, and actuated by the cam h^2 on the main shaft *b*, comes down upon it, pinching the wire between the lever and the bed h^3, and thus holding the wire so that it cannot move endwise at all. The wire is thus held till the reciprocating clamp is ready to take hold again, when the cam h^2 allows the lever *h* to loosen its hold on the wire.

In order to give this cam ample time to operate, and in order to prevent all danger of the reciprocating clamp's operation on the wire too soon, and before the lever *h* has fully operated, a little "lost motion" is given to the pitman *d* by making the hole d^2, through which the crank-pin runs, a slot lengthwise in the pitman. This lost motion occurs at the two points which are commonly known as "dead-centers" in steam-engines.

When a proper length of wire has been fed through the bushing *i*, and the wire has been grasped by the lever *h*, the chisel i^1, operated by the cam i^2 upon the main shaft, moves forward and cuts off a piece of wire of the right length for one of the V-shaped links. The back

motion of the chisel is given by the spring i^3. This piece of wire thus severed now lies on the bending-table k, passing by the pin o. The swage-slide o^1, actuated by the cam o^2 on the main shaft, now moves forward, and the wire is bent, between the semicircular cut-away o^3 and the pin o, into the shape indicated by the dotted parallel lines. The back motion of the slide o^1 is given by a spring, o^4. When the wire is bent, as indicated in dotted lines, the two ends thereof move under the former m, which is on the rock-shaft n. On the main shaft b is the cam s, actuating the rack s^1—the backward movement of the rack given by the spring s^2—the teeth of which rack mesh into and actuate the pinion n^1 and the rock-shaft n. The shape of the cam s is such that, at the proper time and when the two ends of the wire have swung under the former m, it causes the rock-shaft to make a partial revolution, causing the former m to bend the two ends of the wire into small hoops, as seen in Fig. 8. The rock-shaft then makes a short return movement, bringing the former into position pointing straight downward, in which position the former remains a second or two, giving the now complete link a chance to drop off and down out of the way, when the rock-shaft returns to the position shown in the drawing, ready for another operation.

I have now traced the progress of the wire from the coil through this machine, and shown how it is finally delivered in the V-shaped links with hooked ends, the whole being done automatically.

I have already described how the reciprocating clamp is made to have a longer or shorter throw for larger or smaller links by the adjustment of the crank-pin on the crank-arm. For the same purpose the rock-shaft n is made adjustable toward or from the pin o by means of adjustable journal-boxes n^2 n^2, which are secured to the standards a^1 a^2 by headed screw-pins n^4 running through the slots n^3 n^3 into the respective standards. For the same purpose the bed or table k is made adjustable back and forth endwise of the machine on the adjusting-bar k^1, the bed or table being secured at any desired point by the screw k^2 running through the side of the table and bearing against the bar k^1.

I claim as my invention, and desire to secure Letters Patent on—

1. The combination of the crank c, pitman d, bearing the cam d^1, and the reciprocating clamp, composed of the base e, anvil e^1, and pivoted head e^2, the whole constructed, arranged, and designed for operation and use, substantially as described.

2. The combination of the crank c, crank-pin c^1, and pitman d, having the slot d^2 for lost motion, and bearing the cam d^1, with the reciprocating clamp, composed of base e, anvil e^1, and pivoted head e^2, the whole constructed, arranged, and designed for operation and use, substantially as described.

3. The combination of the crank c, pitman d, bearing the cam d^1, the reciprocating clamp, composed of the base e, anvil e^1, and pivoted head e^2, the cam h^2, lever h, and bed h^3, all constructed and operating substantially as set forth.

4. The combination of the crank c, pitman d, bearing the cam d^1, the clamp-base e, anvil e^1, pivoted head e^2, cam h^2, lever h, bed h^3, cam i^2, and chisel i^1, all constructed and operating substantially as set forth.

5. The combination of the cam o^2, swage-slide o^1, having the cut-away o^3, and the pin o.

6. The combination of the cam o^2, swage-slide o^1, having the cut-away o^3, the pin o, the table k, and rock-shaft n, provided with the former m, all constructed and operating substantially as set forth.

7. The combination of the cam s, shaped as shown, the rack s^1, the pinion n^1, and the rock-shaft n, bearing the former m.

CHRISTOPHER M. SPENCER.

Witnesses:

WM. E. SIMONDS,

JOHN POLLITT.