2 Sheets--Sheet 1.

W. A. BUTLER & W. WELLGE.

Machinery for Making Safety-Pins.

No. 195,978. Patented Oct. 9, 1877.

Fig. 1.

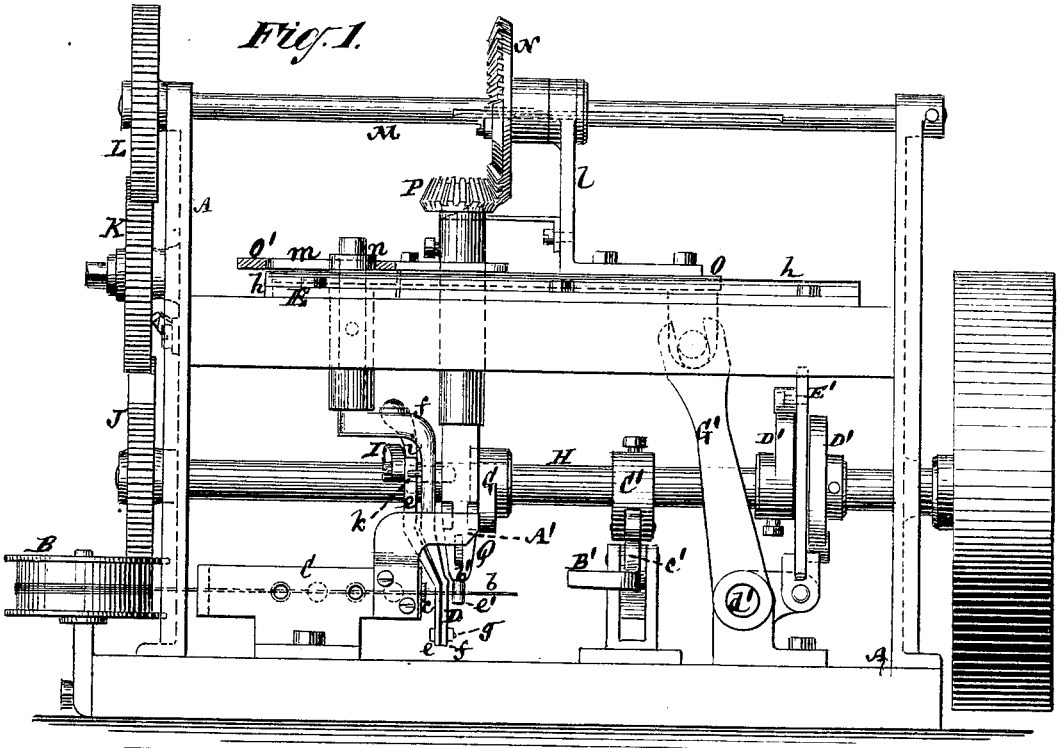
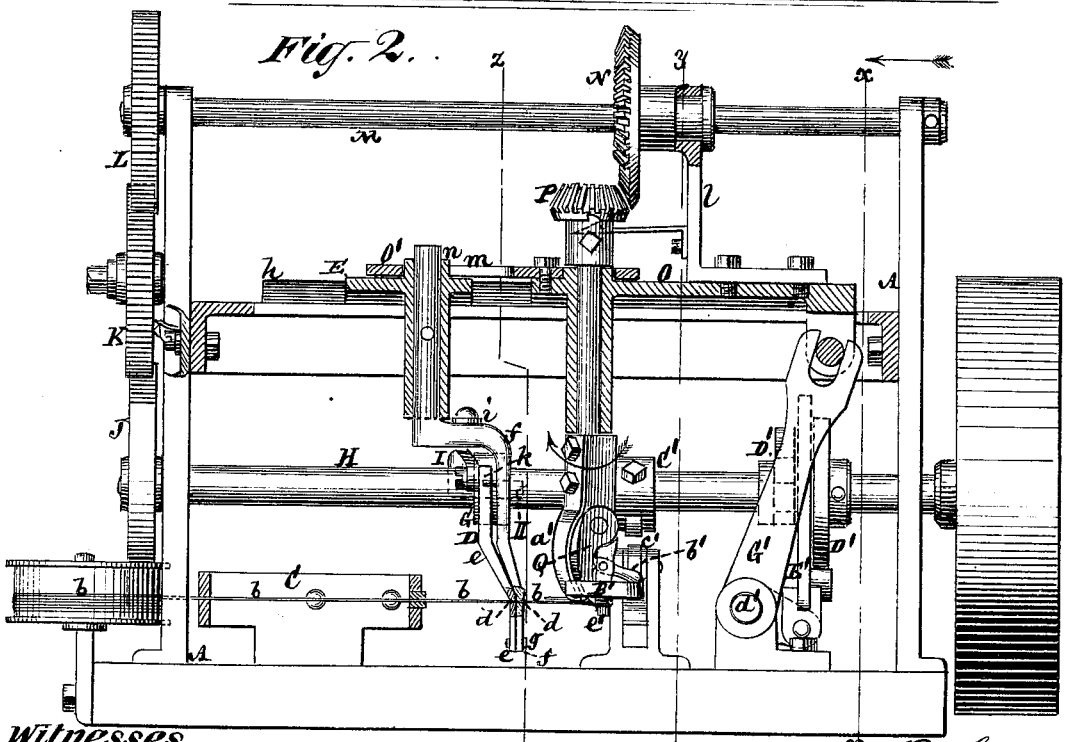


Fig. 2.



Witnesses
John Becker.
Fred. Haynes

William A. Butler
William Wellge
by their Attorneys
Brown & Allen

2 Sheets—Sheet 2.

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Fig. 3.

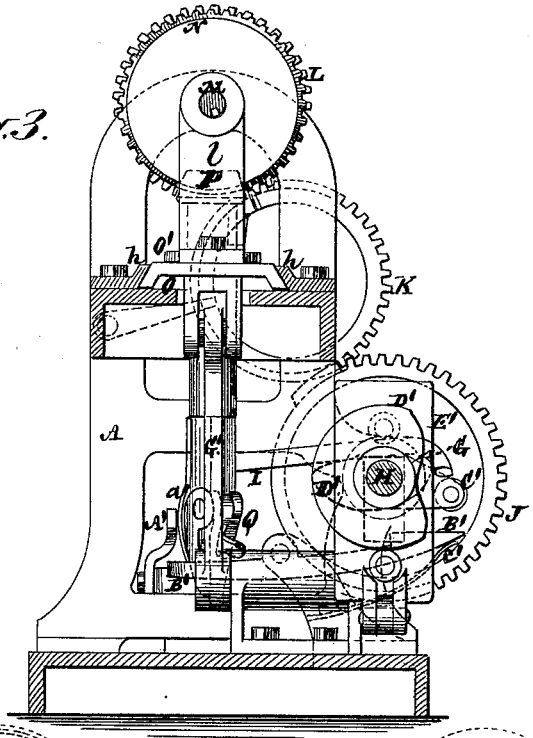


Fig. 4.

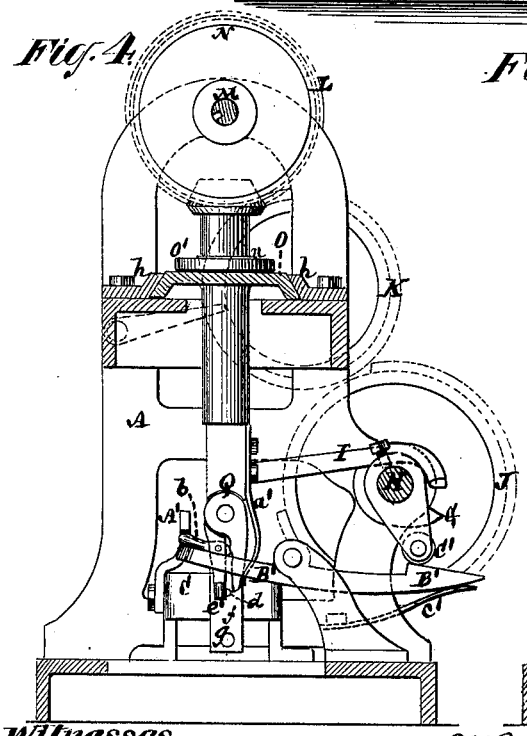
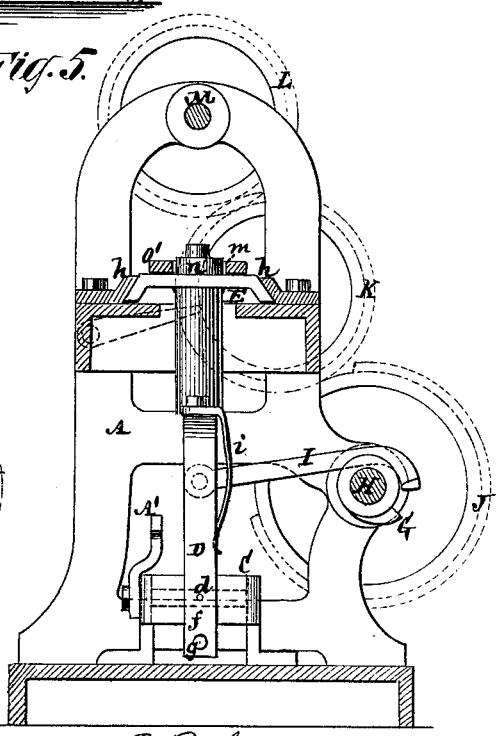


Fig. 5.



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UNITED STATES PATENT OFFICE.

WILLIAM A. BUTLER AND WILLIAM WELLGE, OF NEW YORK, N. Y., ASSIGNORS TO THOMAS L. BUTLER, OF SAME PLACE.

IMPROVEMENT IN MACHINERY FOR MAKING SAFETY-PINS.

Specification forming part of Letters Patent No. **195,978**, dated October 9, 1877; application filed August 28, 1877.

To all whom it may concern:

Be it known that we, WILLIAM A. BUTLER and WILLIAM WELLGE, both of the city and State of New York, have invented certain new and useful Improvements in Machines for Making Spring Safety-Pins, of which the following is a description, reference being had to the accompanying drawing, forming part of this specification.

This invention relates to the manufacture of bifurcated spring safety-pins; and consists in various novel combinations of devices for feeding the wire of which said pins are made, for determining the lengths of said wire to form the pins, for bending and coiling the wire, for subsequently cutting it, and for afterward releasing the bent or bifurcated and coiled spring-pin, substantially as hereinafter described, whereby the several operations above enumerated are very effectually produced, and may be performed in a continuous manner in or by one and the same machine.

The invention also consists in a peculiar and advantageous construction of certain of said devices, and in particular combinations of means for operating certain of them.

In the accompanying drawing, Figure 1 represents a side elevation of a machine constructed in accordance with our invention, and with its working parts in their starting position on the wire. Fig. 2 is a partly-sectional side view, with the parts in position after the wire has been drawn or fed by them the length of one of the legs of a bifurcated spring safety-pin, and as the coil which constitutes the spring has commenced to be formed on the pin. Fig. 3 is a transverse section on the line *x x*, showing the clamp which draws the wire and coils it as being opened to release the pin. Fig. 4 is a transverse section on the line *y y*, and Fig. 5, a further transverse section on the line *z z*.

A is the frame of the machine. Said frame, which is here represented as consisting of an upper bed, lower bed, and end standards, may be of any suitable construction to carry the working parts.

The wire *b*, of which the pins are to be made, is first wound upon a drum or reel, B, at one end of the base or lower bed of the frame, or said drum having the wire wound upon it introduced to its place on the machine. The outer end of the wire upon the drum is then passed through a straightener, C, which may consist of a frame having alternately-arranged pins on opposite sides of its interior, between the grooved ends of which the wire is drawn by a clamp, as hereinafter described; or said straightener may be of any other suitable construction.

D is a pair of shears arranged in front of the delivery end of the straightener C, and so that as the wire *b* is drawn from the straightener through an eye, *c*, it is passed or continued through a hole, *d*, in both legs *e* and *f* of the shears opposite said eye. The wire *b* is thus introduced to and through the hole *d* in the legs of the shears to an extent or length equal, or thereabout, to the length of one leg of the bifurcated safety-pins to be made, while the shears are in their closest proximity to the eye *c* of the wire-straightener. This adjustment of the wire may be made by hand before starting the machine.

The legs *e* and *f* of the shears are united at their lower ends by a pivot, *g*. The stationary leg *f* is dependent from a longitudinal slide, E, which travels in ways *h h* on the upper bed of the machine. The other or working leg, *e*, is controlled or held out of cutting position—that is, with its aperture *d* in line with or opposite the corresponding aperture *d* in the leg *f*—by means of a spring, *i*, and stop *k*, and is operated, when it is required to effect the cut, by a cam, G, fast on a rotating driving-shaft, H, and arranged to pull upon a bent bar, I, pivoted to said working leg *e*. The apertures *d* in the legs of the shears assist in straightening the wire as the latter is drawn through them, and as they are slid over or along the wire, and the edges of said apertures form the cutters of the wire.

The driving-shaft H has secured on its one end a mutilated spur-wheel, J, which serves to give intermittent rotary motion, through an intermediate wheel, K, to a spur-wheel, L, on one end of an upper shaft, M. On this last-named shaft is a mutilated bevel-wheel, N, which not only turns with said shaft, but is free to slide thereon by means of a feather.

This mutilated wheel N is carried by a bracket, *l*, through which and the eye of the wheel the shaft M passes. Said bracket is seated on and fast to a longitudinal slide, O, which travels in the ways *h h* in rear of the slide E, and which has a stepped upper slotted extension, O′, that projects over the slide E, and receives up through the slot *m* in it a boss or projection, *n*, fast on the slide E.

The mutilated bevel-wheel N intermittently gears with a bevel-pinion, P, fast on the upper end of a clamp, Q, which is dependent from the slide O. This clamp is constructed with lower jaws, one of which is closed by a spring, *a′*, and is opened by an attached catch or cam-lever, *b′*. The opening through the jaw end of the clamp for the wire is in line with the apertures *d* of the shears, and the jaws face the shears when moving toward or in proximity to them, as shown in Fig. 1, also during the greater part of their back-stroke, when they draw on the wire, after which the clamp is rotated about the axis of the pinion P in the slide O, to coil the wire of the pin at the junction of the bifurcated portions of the latter. The clamp Q consequently acts both as a feeder and as a twister of the wire. When moved forward by the slide O—that is, toward the shears—its jaws are open to receive the wire through them, and at the extremity of such stroke are closed by the cam-lever *b′* striking a fixed incline, A′, and liberating the spring *a′*, in order that the jaws may gripe the wire to carry it out or back. A bent lever, B′, actuated by a cam, C′, on the shaft H, as against a spring, *c′*, serves, by its pressure on the cam-lever *b′*, to open the jaws of the clamp after the pin has been bent, coiled, and cut from the wire.

The slide O is moved backward and forward at intervals, as required, by cams D′ D′, arranged to act on a roller-slide, E′, which, in its turn, is connected with a rock-shaft, *d′*, that carries an arm, G′, the outer end of which is connected with the slide O.

In the operation of the machine, supposing the parts to be in the position represented in Fig. 1, with the jaws of the clamp Q closed on the protruding portion of the wire *b* by the previous passage of the cam-lever *b′* under the fixed incline A′, then the first action which takes place will be a retiring one on part of the clamp Q by the slide O, which carries it. In thus retiring, or during the first portion of its retiring movement, as also in previously advancing, the clamp is restrained from rotating by the mutilated wheel J being out of gear with the wheel K, and it simply serves to draw the wire farther through the straightener C, and through the apertures *d* in the shears, which also serve to straighten the wire. Such draft of the wire during the entire back movement of the clamp should be equal, or thereabout, to the length of one of the bifurcations of the safety-pin, so that after each pin is cut off there will always be a sufficient length of wire protruding beyond the straightener to form the leg or bifurcation of a succeeding pin. So soon, however, as the clamp Q, in its back movement, performs half of its travel, or thereabout, in that direction, the slide O acts, by or through the front end wall of the slot *m*, on the boss *n*, and draws the slide E back along with it. This puts the shears in cutting position on the wire. The mutilated wheel J also comes into gear with the wheel K, and sets in motion the shaft M, which, by means of the mutilated bevel-wheel N and pinion P, rotates the clamp Q two full turns, or nearly so, to form the coil at the junction of the bifurcated portions of the pin, said clamp then drawing additional wire to allow for the coil.

The wire is coiled by being twisted around and on a small former or mandrel, *e′*, on the lower end of the clamp. The mutilated portion of the wheel N then comes into position to arrest the further rotation of the clamp, and the cam G then acts on the shears to cut the pin from the wire, after which the clamp may be further slightly rotated to bring the cam-lever or catch *b′* over the end of the lever B′, in order that the cam C′ may then operate on the lever B′, to actuate the catch *b′* and open the jaws of the clamp, which allows the pin to drop out of the clamp and from off the mandrel or former *e′*. The slide O is then projected forward again to return the combined clamp and twister Q to its normal position again, and renewed gripe or hold on the wire which protrudes from the straightener; also to return the shears D to their normal position by the rear wall of the slot *m* striking the boss *n* on the slide E. The working parts of the machine are then in a position again to make another pin, and the hereinbefore-described operations are repeated in rapid succession, the machine making a large number of pins within a very short time—say sixty (more or less) in a minute.

After the pins are taken from the machine they are pointed and otherwise finished.

Although the machine has here been described exclusively with reference to the manufacture of safety-pins, it is equally applicable to the manufacture of other pins having coiled heads.

We claim—

1. A machine for making bifurcated-spring coil safety and other pins, in which are combined and organized for operation in relation with each other a wire-straightener, a wire feeding or drawing, bending, and coiling clamp, and a shears for cutting the pin from the wire, substantially as specified.

2. The wire feeding or drawing clamp Q, having an intermittently-reciprocating motion in direction of the length of the wire as it passes into the machine, and constructed to also rotate about an axis perpendicular, or thereabout, to its reciprocating line of travel, substantially as and for the purposes herein set forth.

3. The combination of the intermittently-

reciprocating shears D with the intermittently reciprocating and rotating clamp Q, essentially as described.

4. The combination, with the intermittently reciprocating and rotating clamp Q, of the spring a', applied to the working jaw of said clamp, the catch or cam-lever b', and the fixed incline A′, substantially as specified.

5. The combination of the lever b' with the clamp Q, the spring a', and the cam-lever or catch b', essentially as and for the purpose specified.

6. The combination of the slide O and its extension O′, having a slot, m, in it, the intermittently reciprocating and rotating clamp Q, the intermittently-reciprocating shears D, and its attached slide E, having a boss or projection, n, substantially as described.

7. The combination of the mutilated wheel J on the shaft H, the wheels K L, the upper shaft M, the mutilated sliding bevel-wheel N, the bevel-pinion P, the slides O E, the clamp Q, and the shears D, essentially as described.

In testimony whereof we hereunto sign our names in the presence of two subscribing witnesses.

WILLIAM A. BUTLER.
WILLIAM WELLGE.

Witnesses:
JOHN JUNGERMANN,
H. C. HARDING.