(No Model.) 4 Sheets—Sheet 1.

L. COOK.

BALE TIE MACHINE.

No. 312,821. Patented Feb. 24, 1885.

FIG. 1.

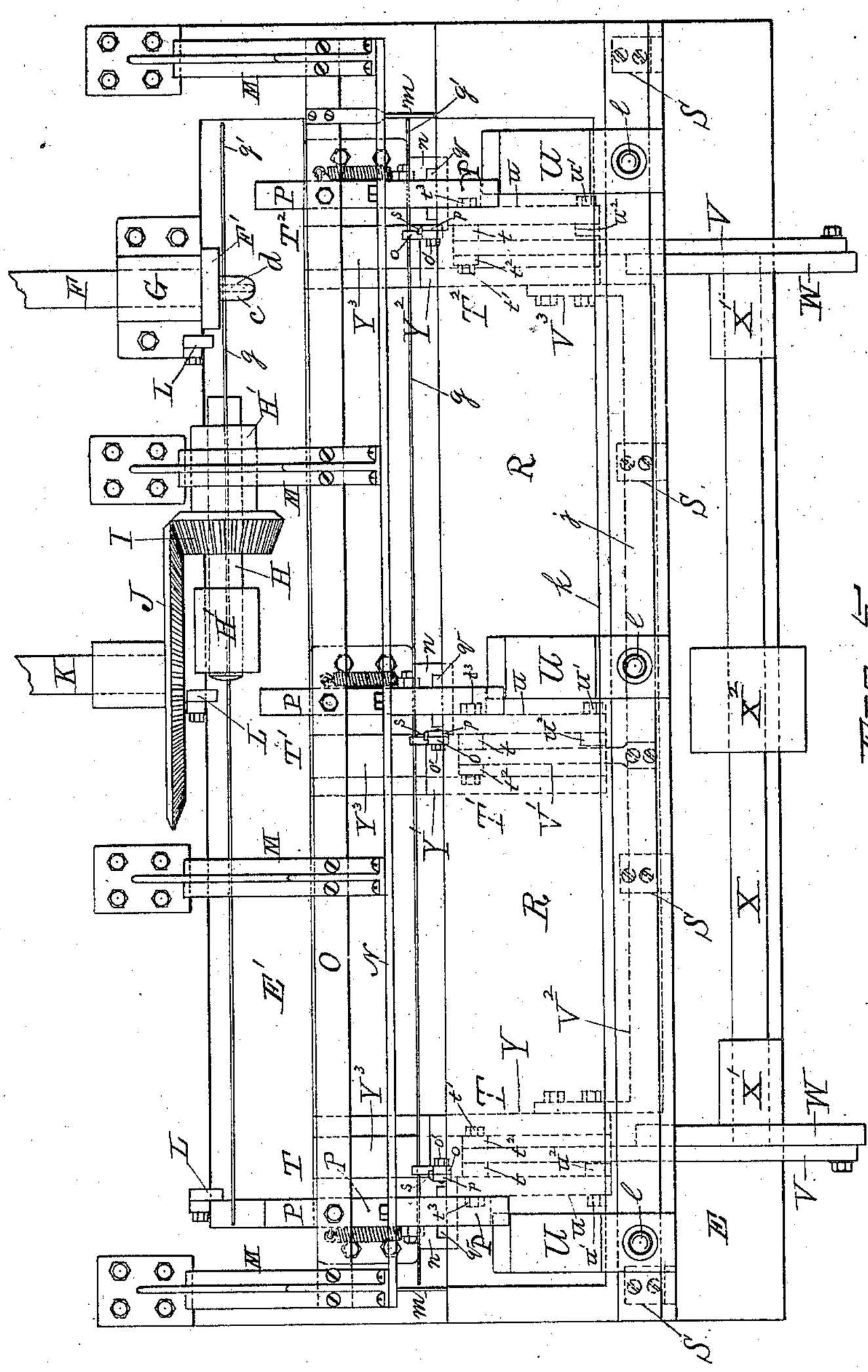

FIG. 5.

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(No Model.) 4 Sheets—Sheet 2.

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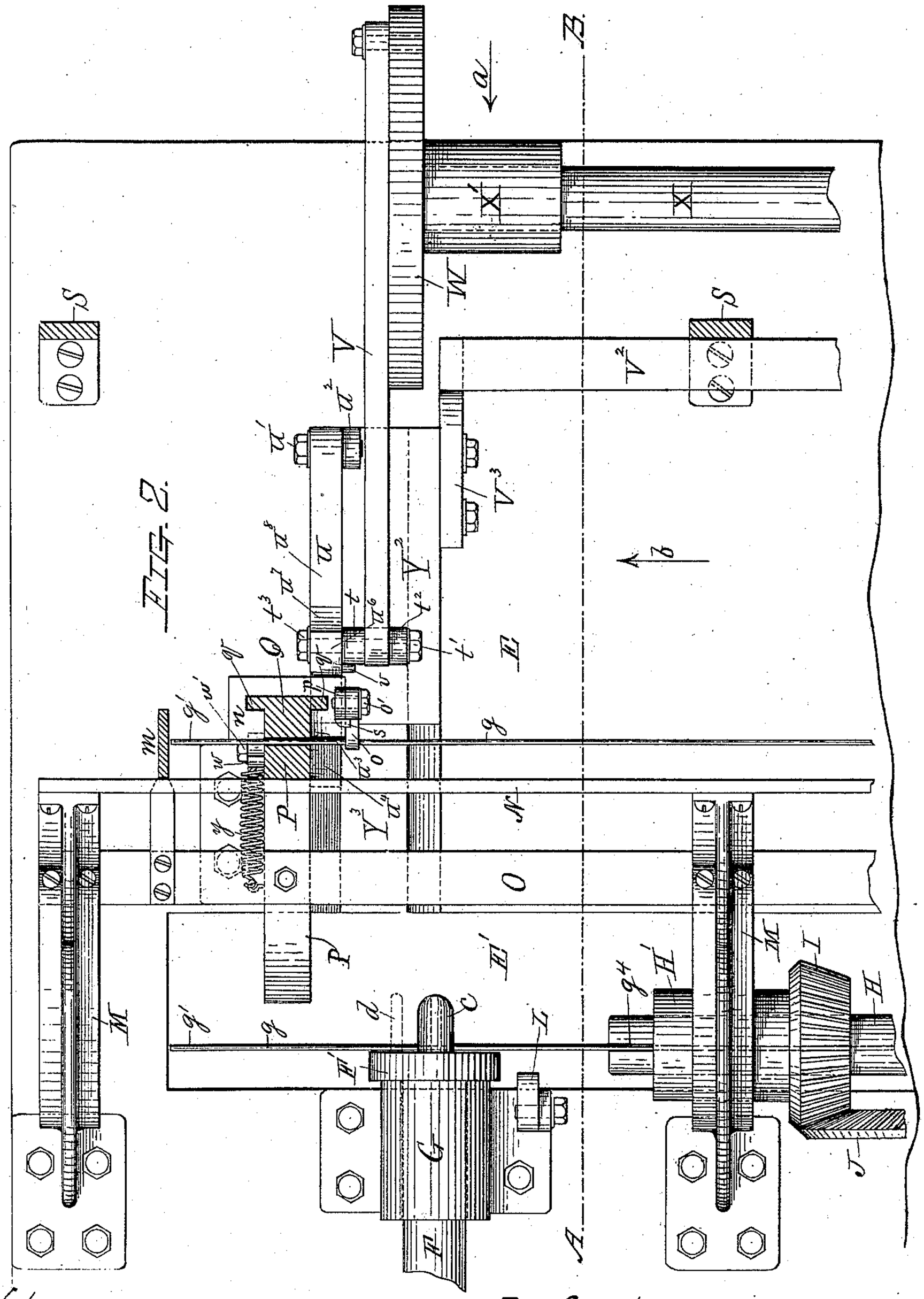

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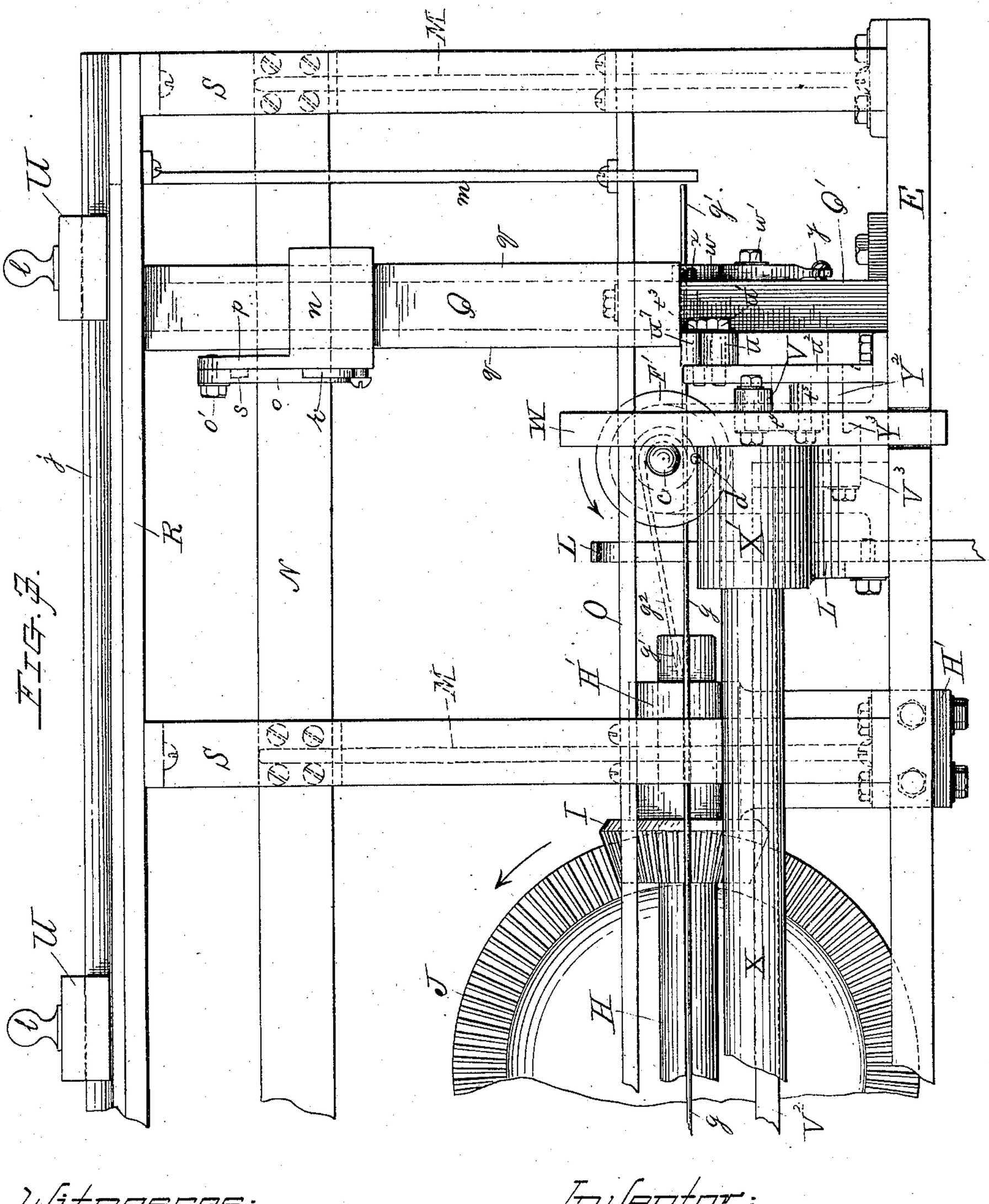

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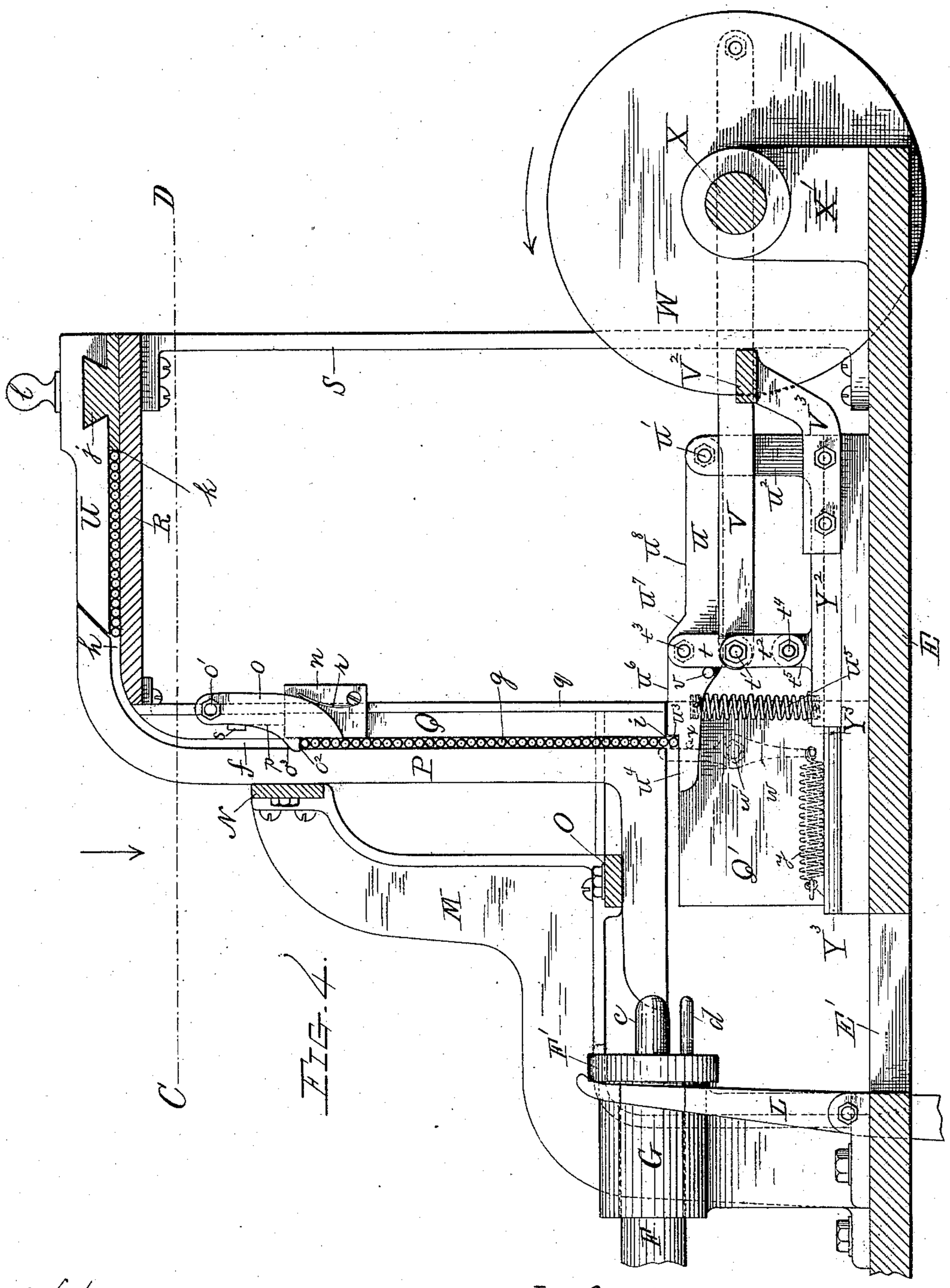

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UNITED STATES PATENT OFFICE.

LEROY COOK, OF WORCESTER, MASSACHUSETTS.

BALE-TIE MACHINE.

SPECIFICATION forming part of Letters Patent No. 312,821, dated February 24, 1885.

Application filed July 21, 1884. (No model.)

To all whom it may concern:

Be it known that I, LEROY COOK, of Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Bale-Tie Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 represents a top or plan view of my aforesaid improved bale-tie machine. Fig. 2 represents, upon an enlarged scale, a horizontal section through a part of my said bale-tie machine, taken at the point indicated by line C D, Fig. 4, showing a plan view of one end of the machine, as hereinafter more fully described. Fig. 3 represents, upon the same enlarged scale as Fig. 2, a front side view of the end of the machine shown in said Fig. 2, looking in the direction indicated by arrow *a*, same figure. Fig. 4 represents, upon the same scale as the last two figures, a vertical section through the machine, taken on line A B, Fig. 2, looking in the direction indicated by arrow *b*, same figure, and Fig. 5 represents a plan view, full size, of the manufactured end of a tie, such as is made by my improved machine, the other end being plain straight wire adapted to be inserted through the loop end in fastening the tie around a compressed body in the usual way.

My invention relates to machines for making wire ties for baling compressed hay, straw, and similar kinds of merchandise; and it consists in the construction and arrangement of mechanism, hereinafter described and claimed, whereby the blank bale-ties (or plain sections of wire of the proper length to form said ties) may be fed laterally into an ordinary bending and twisting machine by a continuous and automatic operation, as hereinafter described, instead of by hand in the usual way. In this instance my said invention is represented in connection with the bending and twisting mechanism of an ordinary machine constructed and arranged for making bale-ties having a single loop or eye at one end, as shown in Fig. 5 of the drawings, with its other end straight and adapted to be inserted through said eye or loop and twisted upon itself by hand in the usual way to fasten the tie over a compressed body, as before stated. I do not limit myself, however, to its use with such a machine, as it may be applied with equal facility and as good results to any other kinds of machines for making bale-ties, my said invention, it will be understood, being confined wholly to the feeding mechanism, hereinafter described, in combination with any machine for bending and twisting the wire to form the bale-ties, as before stated.

To enable those skilled in the art to which my invention belongs to make and use the same, I will proceed to describe it more in detail.

In the drawings, E represents the bed of the machine, upon which are formed or fastened the frame-work, bearings, and other parts which support the operating parts of said machine, hereinafter more fully explained.

The old parts of my improved machine, and which are in common use, consist of the bending-spindle F, which is fitted to turn in suitable bearings, (one of which, G, is shown in the drawings,) and provided with a head, F′, having a central stud or former, *c*, over which the wire is bent, and a finger or pin, *d*, for bending the wire over said former *c*, when the parts are in operation, as hereinafter described. They also consist of the twisting-spindle H, fitted to turn in bearings H′ H′, and provided with a bevel-gear, I, which meshes with another larger bevel-gear, J, mounted on a shaft, K, which is fitted to turn in suitable bearings and driven by any well-known means.

The twisting-spindle H, its bearings H′ H′, and bevel-gear I are each slotted out upon one side in the usual way to admit of the blank ties or sections of wire being inserted in the same upon a line with their centers, as shown in the drawings, prior to the bending and twisting operations hereinafter described. The ties, when finished, are also in this instance removed or pushed from the bending and twisting devices, before described, in the ordinary way, by means of levers L properly hinged, and arranged to operate in unison with the other parts of the machine; but, if preferred, any other well-known devices for accomplishing the same purpose may be adopted in lieu of the above.

Having made clear what constitutes the old parts of my machine, I will proceed to describe my improvements upon the same for

feeding the blank ties or sections of wire into the bending and twisting devices, before described, said sections being cut of the proper length to form the ties, as well as straightened by separate operations, prior to placing the same in my aforesaid machine, as hereinafter described.

The parts marked M represent angular frames for supporting the longitudinal bars N and O, which latter in turn support the angular frames P, said parts being fastened together by means of screws or bolts, as shown in the drawings. Upon the opposite side of the frames P from bars N O, at a short distance from said frames P, (see Fig. 4,) are arranged and secured frame parts Q, the lower ends of which are fastened to the bed E, and their upper ends to a horizontal plate or table, R, supported at its forward edge by the standards S, which are fastened to the under side of said table and to the top of bed E. The open space or slot *f* between the frames P Q and table R is made of equal width throughout, and a little wider than the diameter of the wires *g*, thus forming continuous guiding-slots for said wires from the points *h* where the wires enter to the points *i* where they drop out of the slots and are successively fed forward by the feeding devices hereinafter described. In this instance the blank ties or sections of wire *g* are guided through three slots *f*, ranged upon a line with each other, and three feeding-devices, T T′ T², of similar construction and arrangement, and which operate simultaneously, are used for feeding said wires *g* forward, as hereinafter described; but a greater number than the above may be used, if desired.

Upon the top of table R, near its forward or outer edge, is formed or secured a tongue, *j*, over which are fitted two or more grooved sliding guides, U, for holding the wires *g* in position upon said table R, preparatory to feeding them into the slots *f* before described, as shown in Fig. 4 of the drawings. Said guides U are extended back over the table R to just clear the upper ends of the frame parts P, so that they may be moved longitudinally on the tongue *j* the whole length of the machine. When said guides U are moved into line with the frames P Q, continuous guiding-slots are formed to hold in place and guide the wires *g* from the shoulder *k* on table R, which forms the upper ends of said slots, to the points *i*, where the wires leave the slots, as before stated.

For convenience in moving the slides back and forth, as before described, handles *l* may be secured to their upper sides, as shown in the drawings.

In filling the slots *f* with wires, as shown in Fig. 4, the attendant first moves all the slides U to the ends of the machine beyond where the ends of said wires will come when placed in the machine. He then places a suitable number of wires on the table, and with the palms of his hands rolls them back and forth until they all lie straight and in contact with each other, as shown in Fig. 4, when he then moves the slides over them to hold them in position, and finally pushes them all forward by hand into the vertical portion of the slots to be fed to the bending and twisting devices, as hereinafter described. The wires are prevented from moving out of position longitudinally by means of suitable guides, *m*, secured at both ends of the machine in any convenient manner. A downward pressure is produced upon the wires in the vertical portion of the slots *f*, to facilitate their dropping out of the latter when the bottom one is removed by means of weights *n*, provided with swinging latches *o*, hinged at *o′* to the ears or flanges *p*, projecting upward from said said weights *n*. Said latches *o* are provided with notches *o*², which rest upon the top wire, as shown in Fig. 4, and are drawn down by the weights, as aforesaid. The weights are fitted to slide up and down on the frame parts Q, the latter being provided with ribs or flanges *q* upon each side, and the weights with grooves to fit over the same, as shown in Fig. 2 of the drawings, to hold said weights in position. The latches are kept sprung forward in position to rest upon the pile of wires in the slots *f*, by means of the springs *r*, secured to the weight and bearing against the outer sides of said latches.

In order that the latches may not be sprung forward too far by the aforesaid springs *r*, a stop, *s*, is formed upon each of the ears *p*, for said latches to bear against, as shown in Fig. 4.

When the wires on the table R are pushed forward and down, as before described, the bottom wire bears against the curved parts *o*³ of the projections forming the shoulders *o*² of the latches *o*, and springs back the latter out of the way. After the slots have been filled from above, as aforesaid, to about the height shown in Fig. 4, the weights and latches are raised by hand until the notches or shoulders *o*² come above the top wire, thereby allowing the latches to spring forward again, and when the weights are released a pressure is produced upon the wires, as before described. In practice the weights *n* may be raised separately by the attendant, or all together by fastening them to a rod or bar.

The wires are fed forward to the bending and twisting devices one after another at stated intervals by means of the feeding devices T T′ T², before referred to. Said devices are operated by the crank-levers V V V′, and crank-wheels W W, mounted on the horizontal shaft X, turning in suitable bearings, X′ X′. The shaft X may in turn be driven by any suitable and convenient means. In this instance, a pulley, X², is shown on the shaft, which may be connected by belt with any suitable driving mechanism.

The crank-lever V′ at the center of the machine, instead of being connected with a crank-wheel, is attached to a bar, V², having arms V³ at each end, which are fastened to the carriages Y Y² of the outer devices, T T², oper-

ated by the crank-wheels W W, as hereinafter described. The inner ends of the crank-levers V V V′ are hinged at t' to the inner ends of link-sections $t\ t^2$. The upper link-sections t are hinged at their outer ends at t^3 to the hinged levers u, while the lower ones, t^2, are hinged at t^4 to ears t^5, formed upon or secured to the sliding carriages Y Y′ Y². Said carriages are fitted to slide forward and back on the ways Y³, formed or fastened upon the bed E. The outer ends of the levers u are hinged at u' to the upper ends of the standards u^2, extending up from the carriages Y Y′ Y², while the forward ends of said levers are provided with shoulders u^3, which bear against and carry forward the bottom wire, g, (resting on the straight parts u^4,) when the carriages and parts attached thereto are moved forward by the crank-wheels before described. An upward pressure is produced upon the forward ends of the levers u, by means of the spiral springs u^5, for the purpose hereinafter described. Said springs are in this instance held in position in sockets formed in the bottoms of the levers u, and tops of the carriages. The link-sections $t\ t^2$ are held in rigid vertical positions or locked when the pressure is applied upon the same by the crank-levers to push forward the carriages, by means of locking pins or studs v, projecting out from the levers u in front of the link-sections t. Any other suitable means for locking said link-sections, as aforesaid, may be adopted, if preferred. The link-sections being locked, as aforesaid, each revolution of the crank-wheels W W causes the levers u to be moved forward a sufficient distance to carry the bottom wire of the pile of wires g forward between the former c and bending-finger d, nearly or quite up to the head F′ of spindle F. Said spindle then turning in the direction indicated in Fig. 3, bends the wire around the former c and inserts the end g' of said wire in a slot, g^4, made for the purpose in the twisting shaft or spindle H, as shown by dotted lines g^2 in said Fig. 3. After the end of the wire has been inserted in the twisting-spindle, as aforesaid, the latter is made to turn a sufficient number of revolutions to form the twist g^3 in the wire, which operation completes the tie, and it is then pushed out or removed by the lever L, before described, allowing it to drop down through the long opening E′ in bed E into a suitable receptacle placed underneath to receive it. The levers u commence to move back directly after the bending-spindle commences to turn. Therefore by the time said levers u commence to retreat, the bending-pin d and former c have gripped the wire with sufficient force to hold it and prevent its being drawn back out of the device by the aforesaid backward movement of the levers u. When said levers u move forward to carry the bottom wire to the bending and twisting devices, as before described, the wire which comes next to said bottom wire rests on the flat surfaces u^6 of the levers until the inclined surfaces u^7 are reached, when it then slides down onto the flat surfaces u^8. The frame parts Q, being extended down to the bed, form stops for the wires (which extend beyond them) upon one side to prevent their being drawn back when the levers u are moved back. The opposite sides of said wires bear against and are held in position upon that side by swinging levers w, hinged at w' to the parts Q′ of said frame parts Q. The upper ends of the levers w are held in a vertical position against the gage or stop pins x by means of spiral or other suitable springs, y.

The purpose of the spiral springs u^5 is to produce sufficient upward pressure upon the levers u, to hold them in position when the feeding devices are moved back and at the same time admit of said levers being depressed, as hereinafter described.

The upper ends of the holding-levers w are pushed forward by the bottom wire when carried forward, as before described, but as soon as said wire has passed by over the end of said levers they are sprung back to hold the next wire by means of the springs y, before described.

In moving back the levers u after the bending and twisting operations, when the inclined or slanting parts u^7 come in contact with the wire, (held between the levers w and frame parts Q, as before described,) said levers u are forced down, so as to allow them to pass by the wire, by the links $t\ t^2$ and springs u^5 contracting, said link parts being drawn back by the crank-levers V V V′ in drawing back the feeding devices, as also before described.

Any similar devices whereby the levers u may be adjusted up and down and for holding the bottom wire in position other than those described and shown, may be adopted, if preferred, without departing from the principle of my invention.

My feeding device may be used in connection with two or more bending and twisting devices for making other kinds of ties than that shown in the drawings, if desired, without departing from the principle of my invention.

It will readily be seen from the foregoing description that much time may be saved in the manufacture of bale-ties by the application of my invention to an ordinary bale-tie bending and twisting machine, the usual method being to feed the wires forward by hand longitudinally to said bending and twisting machine, while by my method they are fed laterally, and each succeeding wire to be operated upon is only a few inches from the bending and twisting devices, thereby occupying but little time to feed it into said devices. Then again, the operation of feeding the wires forward being performed automatically, one attendant may easily tend two or more machines, the only labor required of him being to keep the slots f filled with wires g, as before described.

The ties may not only be manufactured faster by the use of my improvements, but made

more perfectly by being fed forward automatically, and consequently with greater precision, than if the same were done by hand in the usual way.

Having described my improvements in bale-tie machines, what I claim therein as new and of my invention, and desire to secure by Letters Patent, is—

1. In a machine for making bale-ties automatically, means for guiding forward the blank ties laterally or sidewise, yielding means for holding each succeeding bottom blank tie in position preparatory to its being fed forward, and means for pushing or feeding forward the bottom blank ties laterally or sidewise as they leave the guiding-slots, with means for bending and twisting one or both ends of said blank ties to form the finished bale-ties, substantially as shown and described.

2. The combination of the bending and twisting devices of a bale-tie machine with the hinged levers *u*, means for operating the same, and yielding means for holding the bottom blank tie in position preparatory to being fed forward, substantially as shown and described.

3. The combination of the hinged levers *u*, means for operating said levers *u*, and yielding means for holding the blank ties in position preparatory to being fed forward, with means for guiding and feeding said blank ties through suitable slots to the point at which said levers *u* take the bottom wire to feed it forward to the bending and twisting devices, substantially as shown and described.

4. The combination of the bending and twisting devices of a bale-tie machine with the levers *u*, provided with shoulders u^3, and means for forcing up their forward ends, carriages Y Y′ Y^2, working on suitable ways on bed E and provided with standards u^2, link parts $t\,t^2$, and means for locking the same when the feeding devices are moved forward, crank-levers V V V′, and means for operating the same forward and back, and pivots t^3, t', t^5, and u', substantially as and for the purposes set forth.

5. The combination of the levers *u*, means for operating said levers *u*, the frame parts P, and frame parts Q, provided with the base parts Q′ and stop-pins *x*, with the hinged levers *w* and springs *y*, substantially as and for the purpose set forth.

6. The combination of the frame parts P and frame parts Q, provided with the ribs *q*, with weights *n*, provided with springs *r* and ears *p*, which latter are in turn provided with stops *s*, and hinged latches *o*, provided with shoulders o^2 and curved parts o^3, substantially as and for the purpose set forth.

7. The combination of the parts P and U with the parts Q and R, placed at a short distance apart from each other, so as to form the guiding-slots *f*, and the gage *m*, substantially as and for the purpose set forth.

8. The combination of the table R, provided with tongue *j*, shoulder *k*, and suitable supports, with the sliding parts U, substantially as and for the purpose set forth.

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