(No Model.) 4 Sheets—Sheet 1.

D. M. REDMOND.

MACHINE FOR MAKING UMBRELLA RIBS.

No. 343,253. Patented June 8, 1886.

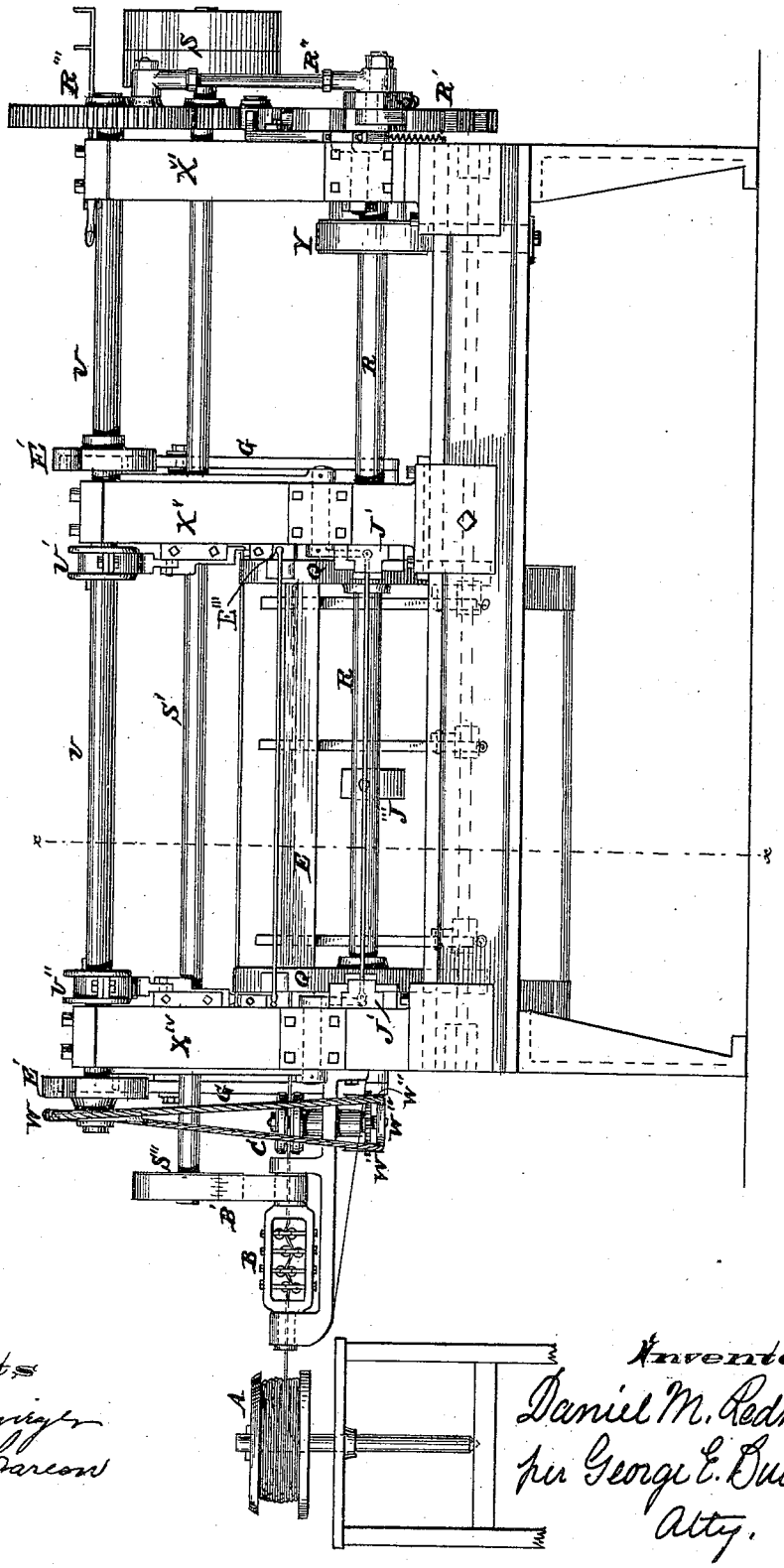

Fig. 1.

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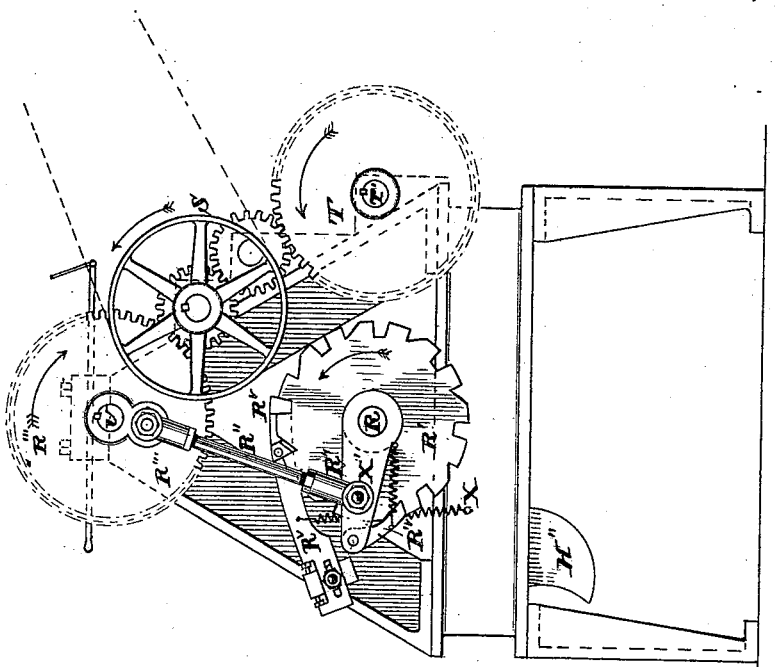

Fig. 2

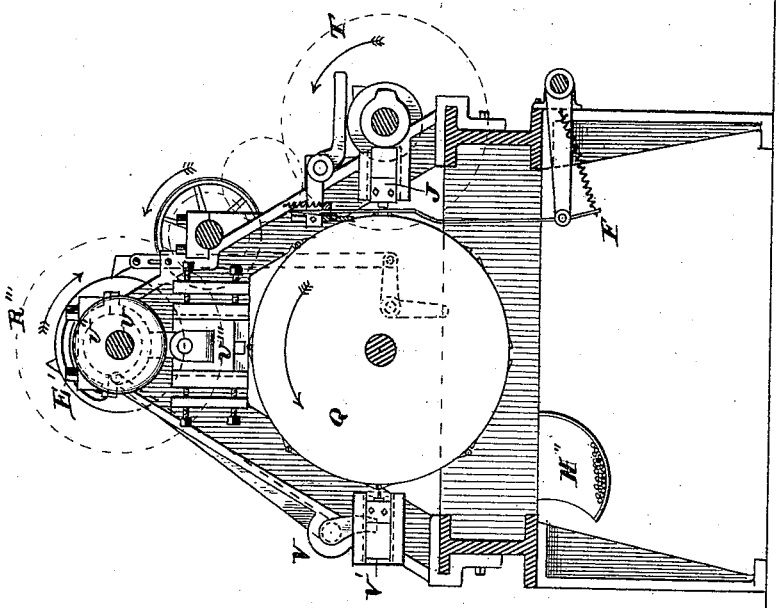

Fig. 3

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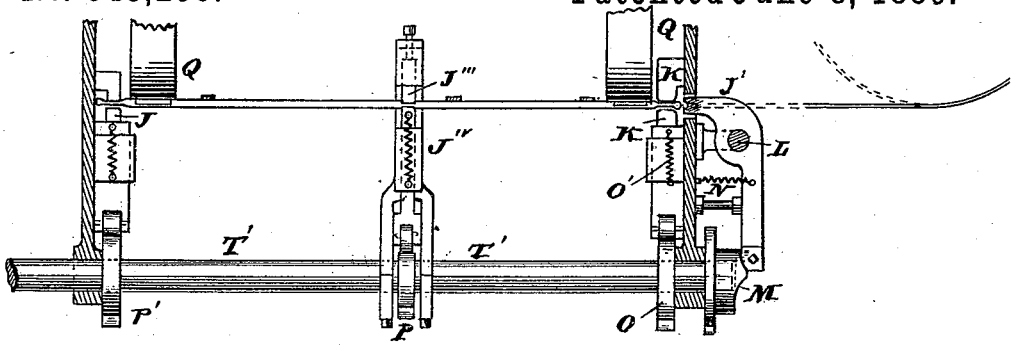


Fig. 4

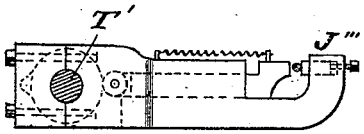


Fig. 7

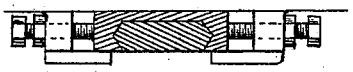


Fig. 8

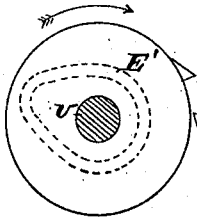


Fig. 5

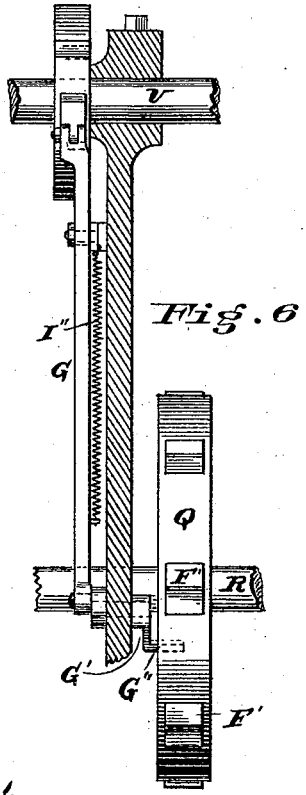


Fig. 6

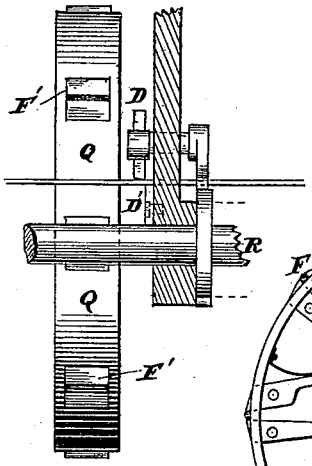
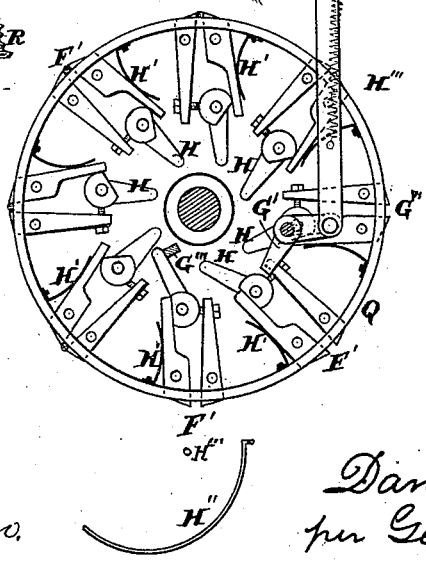


Fig. 9



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MACHINE FOR MAKING UMBRELLA RIBS.

No. 343,253. Patented June 8, 1886.

Fig. 10

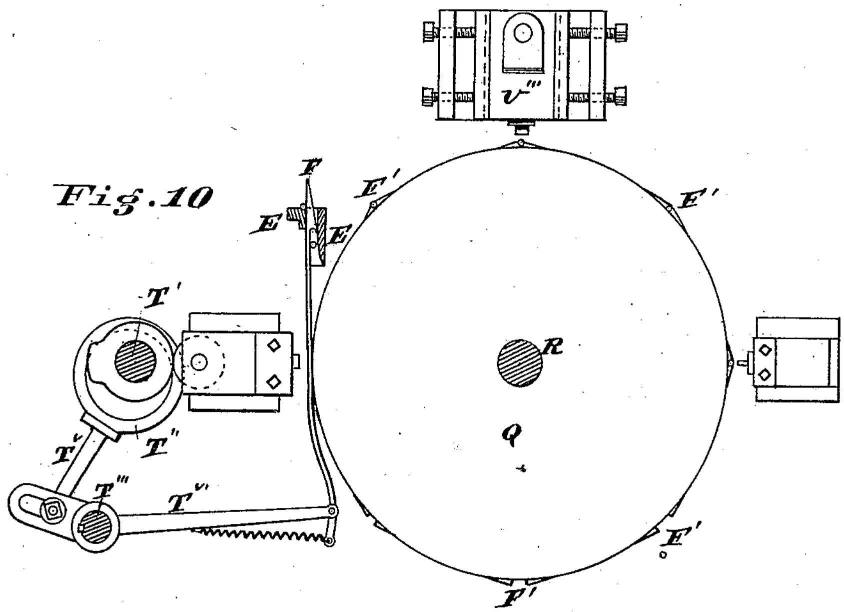


Fig. 14

Fig. 15

Fig. 16

Fig. 17

Fig. 18

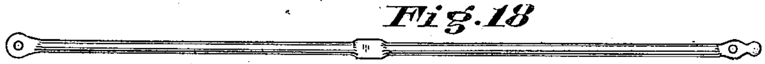
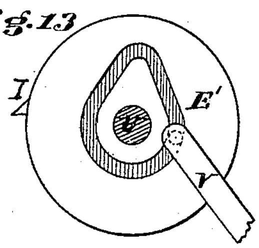


Fig. 13



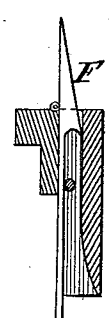


Fig. 12

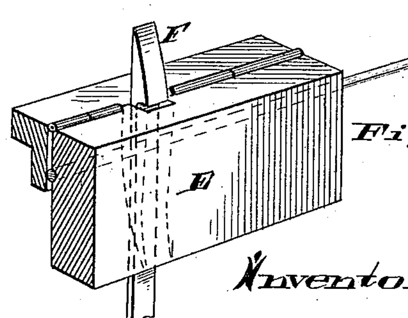


Fig. 11

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UNITED STATES PATENT OFFICE.

DANIEL M. REDMOND, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO JAMES CONAWAY AND JOHN F. CONAWAY, OF SAME PLACE.

MACHINE FOR MAKING UMBRELLA-RIBS.

SPECIFICATION forming part of Letters Patent No. 343,253, dated June 8, 1886.

Application filed May 2, 1881. Renewed April 26, 1886. Serial No. 200,243. (No model.)

To all whom it may concern:

Be it known that I, DANIEL M. REDMOND, of Philadelphia, Pennsylvania, have invented certain new and useful Improvements in Umbrella-Rib Machines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the annexed drawings, making part hereof.

The nature of my invention will appear from the following description and claims.

In the drawings, Figure 1, Sheet 1, represents a front view of my machine. In Sheet 2, Fig. 2, is a view of the end opposite the coil end; Fig. 3, a cross-sectional view on the line X X of Fig. 1; in Sheet 3, Fig. 4 a detached view of that section of the machine, which performs the first operation of cutting off the length of the rib and flattening it. Fig. 5 is an end view of the kicking or tightening mechanism, and of one of the carrying-wheels of the series of wheels, upon the peripheries of which series the wires are held to be operated upon. Fig. 6 is a detached end view of one of the said wheels, showing also the "kicker," which closes the jaws of the clamps which hold the wires; Fig. 7, the die for flattening the middle of the rib. Fig. 8 is a cross-section of the die-slide for flattening the butt or hinge end of the rib; Fig. 9, a side view of one of the carrying-wheels and cutting-off mechanism. In Sheet 4, Fig. 10 shows one of the carrying-wheels and the "finger" which carries the wire from the guide-box after it is cut off to be operated upon by the dies; Fig. 11, the guide-plate; Fig. 12, a cross-sectional view of the same, showing the operation of the hook in the guide-plate; Fig. 13, the cam which works the levers for punching and piercing. Fig. 14 is the wire to be operated on; Fig. 15, the wire cut off to the proper length; Fig. 16, the wire flattened in the middle and at the hinge end, and the ball formed at the other; Fig. 17, the wire having its hinge end trimmed for punching, and the flattening of the knob end; Fig. 18, the rib completed, having its flattened parts pierced for use.

A, Fig. 1, is the coil of wire from which the umbrella-ribs are to be manufactured.

B is a straightener to straighten the wire as it passes through to prepare it for subsequent manipulation; B', the belt, which, by means of a pulley, drives the straightener; C, the feed-rollers, which draw the wire through the straightener and feed it to the mechanism, which cuts the wire into lengths suitable for umbrella-ribs.

D, Fig. 9, is the cutter, to cut the wire into suitable lengths.

D' is the die, upon the edge of which the cutting is effected.

E, Figs. 1 and 11, is the guide-plate, along the whole length of which the wire is passed before it is cut off into lengths by cutter D. At the end of this guide is the stop E''', to prevent the wire from travelling too far before it is cut off.

F is a finger or hook, which carries the cut-off section of wire down from the guide-plate E into the jaws of clamps F' of the carrier-wheels Q. The plain cut-off wire rod is first seized by the clamps F' at the point G''''' of Fig. 5, and is carried by this wheel or wheels in their revolution operated upon by the various tools, stamps, and dies until, after a half-revolution of the wheels Q, it is finished and dropped beneath into the box H² a completed umbrella-rib, as will be hereinafter more fully described.

G is the kicker or tightener, which moves the cam to close the jaws of the clamps on the carry-wheels Q.

G' is a bell-crank pivoted at the angle of its two arms, the end of one arm being hinged to the lower end of the kicker or tightener G.

G'' is a sidewise-projecting toe on the inner end of the other arm of the bell-crank G', (see Fig. 6,) by means of which, when the tightener G is thrown down, the short levers H are thrown up, thus spreading the inner ends of the clamps F' by throwing the movable end away from the stationary end, and consequently closing the biting or outer ends of these clamps F', to hold the wire to be operated upon. G''' is a stationary block, which, when these levers H are moved around to it by the revolution of the wheels Q, strikes their inner ends, as shown in Fig. 5, so that the smallest part of the cam of the lever which is struck presents itself to the inner end of the movable jaw of the clamp F', and thus opening the clamp and dropping the finished rib H''' into the receiving-box H''. The bars H

H are inwardly-projecting levers having cam-heads integral, respectively, at their outer or pivoted end. These cam-heads, as described, operate to close the clamps F'.

H' are springs by the pressure of which on the inner end of the movable jaws of the clamps F', when these jaws are relieved from the opposing pressure of the cam, these clamps are opened.

I is a toe attached to the outer face of cam E', (see Fig. 5,) for striking down the tightener G. It operates to strike this tightener when it is brought around by each full revolution of the cam-wheel E', which is located on the main shaft U.

I'' is a spiral spring attached to a stationary block at its upper end, and to the tightener G at its lower end, and operates to draw up the tightener after it has been pushed down by the toe I.

J is a die for flattening that end of the rod which is designed to form the joint of the rib.

J' are the dies for upsetting the ball at the other end of the rib.

J''' is the die for flattening the middle of the rib.

K K are holding dies or jaws, to hold the end of the rib while the tip of that end is being upset by the die J'. This die J' is pivoted at L, its lower end being thrown out and the upper end in, consequently, by the cam M. This motion is reversed by means of the spiral spring N, (see Fig. 4,) which draws the lower end of the die in.

O is a cam, which in its revolution throws the clamping-dies K together, and tightens their grasp on the end of the rib.

O' is a spiral spring attached by one of its ends to a stationary block on the frame of the machine and at its other end to the movable part of the die K. Its office is to draw this movable part back again after it has been thrown forward by the action of the cam O.

P is a cam similar to cam O, operating simultaneously therewith, and operates the movable part J'''' of the flattening-die J^4 J^3, so as to throw it toward the stationary part J^3 of this die, thus flattening the middle of the rib. The movable part of this die J^4 is furnished with a spiral spring similar in its functions to the spring O'.

P' is a cam for operating the dies J to flatten the hinge end of the rib, and operates similarly to the last-described cams, the movable part of the die being furnished with a spring similar in its functions to the spiral spring O'. All these cams O, P, and P' are set rigidly upon shafts T'. They are irregularly-shaped wheel-cams, and operate simultaneously with each other upon their respective dies. The cam M is rigidly set upon the end of said shaft, while it is in the shape of a wheel. The cam is upon its side face instead of upon its head, as with the other cams. (See Fig. 4.)

Q Q are the carrying-wheels, furnished with clamps F', the operation of which latter is already described. These wheels are all rigidly set upon a common shaft, R.

R is a ratchet-wheel having V-shaped depressions in its periphery, and is driven by the crank-rod R'' from the gear-wheel R''', which is in turn driven by the main driving-pulley S. The V-shaped depressions in the wheel R' (see Fig. 2) are engaged by the pawl R^{IV}, while the square notches are engaged by the square-ended pawl R^{V} to hold it stationary while the dies and punches are operating upon the rib. There are eight of these square notches in the wheel R', and this wheel makes one-eighth of a revolution between each two halts.

Y is a friction-wheel located on the shaft R, with a tightening or friction band passing over it. The object of this friction-wheel is to prevent motion of the shaft R or wheel R' during the intervals elapsing between the engagements of the said pawls with the teeth of the ratchet.

S' is the main shaft of the machine, which has the main driving-pulley S at one end and pulley S'' at the other end, to drive the straightener B. There is also a gear upon the neck of this shaft adjoining pulley S to drive the gear R''' and the gear-wheel T, which latter is located on shaft T'. This shaft T' operates the eccentric T'' and rock-shaft T''', which in turn by the intermediary of the connecting-rod T^{V} and rocking lever T^{VI}, (see Fig. 10,) operates the finger mechanism F. This shaft T', (see Fig. 4, Sheet 3,) also operates the cams and eccentrics O, P, and P', which in turn, as already described, operate the various dies which flatten the rib in different parts and upset the ball on the end of the rib. The gear-wheel R''' also turns the shaft U. (See Fig. 1, Sheet 1, Figs. 2 and 3, Sheet 2, and Figs 5 and 6, Sheet 3.) Now, this shaft U operates the two eccentrics U' U''. (See Fig. 1.) The eccentric U'' (see dotted lines, Fig. 3) operates the sliding mechanism and die U''', which flattens the tip end of the rib for piercing. The eccentric U' operates a similar sliding mechanism, which is armed with a die to trim off the flattened hinged end of the rib. The cams E' E' are both situated on this shaft U. Each operates a tightener, G, for the clamps of the respective carrying-wheels. The manner in which these cams operate the tightener is shown by the toe I, with which each one is furnished. (See Fig. 5, Sheet 3.) So far as the operation of these tighteners is concerned, these cams only act by the toes I on their peripheries. The cam proper (see Fig. 13, Sheet 4) is only used to drive the rocking lever V, which engages in the slot of the cam at one end, and at the other end operates the slide of the punch V'. Each of the cams E' thus operates also a punching mechanism to pierce holes in the respective ends of the rib.

W, Fig. 1, Sheet 1, is a pulley, which drives, by means of a belt, feed-rollers C, idler-pulleys W' W'' being used below, over

which this belt passes. The belt also passes around one side of pulley W^{IV} on the shaft of the feed-rollers.

My mechanism is set in a suitable iron frame, as shown in the drawings, the power to drive it being applied to the pulley S.

Various kinds of dies can be set in the die-holders at the option of the operator, and slight changes may be made in the construction of the details of my machine. I have described what I consider the best mechanism to accomplish my purpose. That end of the carrier which is next to the wire-reel is stationary; but the rest of the carrier and all the manipulating parts of the machine are movable backward and forward on the shaft and in the frame, so that various lengths of ribs can be made on the same machine, from seven inches up to thirty-nine inches in length. The parts X^{V} and X^{VI} can be moved toward the stationary part X^{IV} or away from it, so as to accommodate any length of rib which it may be desired to make. The essentially moving part for this purpose, however, is the part X^{V}, since it contains the part which regulates the length of the rib, as described. It slides along on the frame, shafts, and guide-bar.

The first operation of my machine after the wire, Fig. 14, has been inserted is to cut the wire off into the length of the rib, as in Fig. 15. The next operation is that of the first set of dies, which flatten the hinge end and the middle and upset the knob at the other end, as in Fig. 16. The next operation is by the next set of dies to which the rib is carried, which trim off the hinge end and flatten that part of the knob end which is close to the knob, as in Fig. 17. The next operation is by the punching-dies, to which the rib is carried last, which pierce holes in the flattened parts of the hinge end and knob end, as see Fig. 17. The rib is then finished and ready for tempering.

It is of course apparent that my machine can be employed to manipulate and impress various forms upon continuous strips of metal.

The flattening and punching dies may be substituted by disks which will imprint upon the metal strip being treated various ornamental forms or configurations.

What I claim as new is—

1. In an umbrella-rib machine, in combination with dies J^{IV}, the movable carriers Q, furnished with mechanism F′, for automatically carrying the rib from place to place to be operated upon by the stamping-dies, substantially as described.

2. In combination with the movable carriers Q, operating automatically by suitable mechanism, the clamps F′, automatically opened and closed by mechanism G, G′, G^{3}, H, and H′, whereby the wire rod is seized and held firmly during the continuance of the operation of the flattening, knobbing, and piercing, and is then automatically dropped, substantially as described.

3. In a movable carrier, Q, in combination with the tightener G, the toe or driver I, hinged lever G′, levers and cams H, jaws F′, and springs H′, with the pin G^{3}, all operating substantially as and for the purposes described.

4. In an umbrella-rib machine, the combination of the movable carriers Q, the die-holders J J^{3} J′, punches V′, feed mechanism A C, cutter D′, and check or intermittent stop mechanism R′ R″ R‴ R^{IV} R^{V}, all set in a suitable frame, whereby the wire is passed into the machine, cut off into lengths, and flattened, knobbed, trimmed, and pierced, all automatically making a complete umbrella-rib, all the parts combined and operating substantially as described.

5. In an umbrella-rib machine, in combination with carriers Q, suitable holders, F′, to carry the ribs, die-holders at suitable points in the track of the carrier with suitable check or intermittent stop mechanism, all located in a suitable frame, whereby the wire rod can be inserted at one point of the machine and carried from point to point and submitted to the action of the dies, all operated automatically, substantially as described.

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