No. 682,551. Patented Sept. 10, 1901.

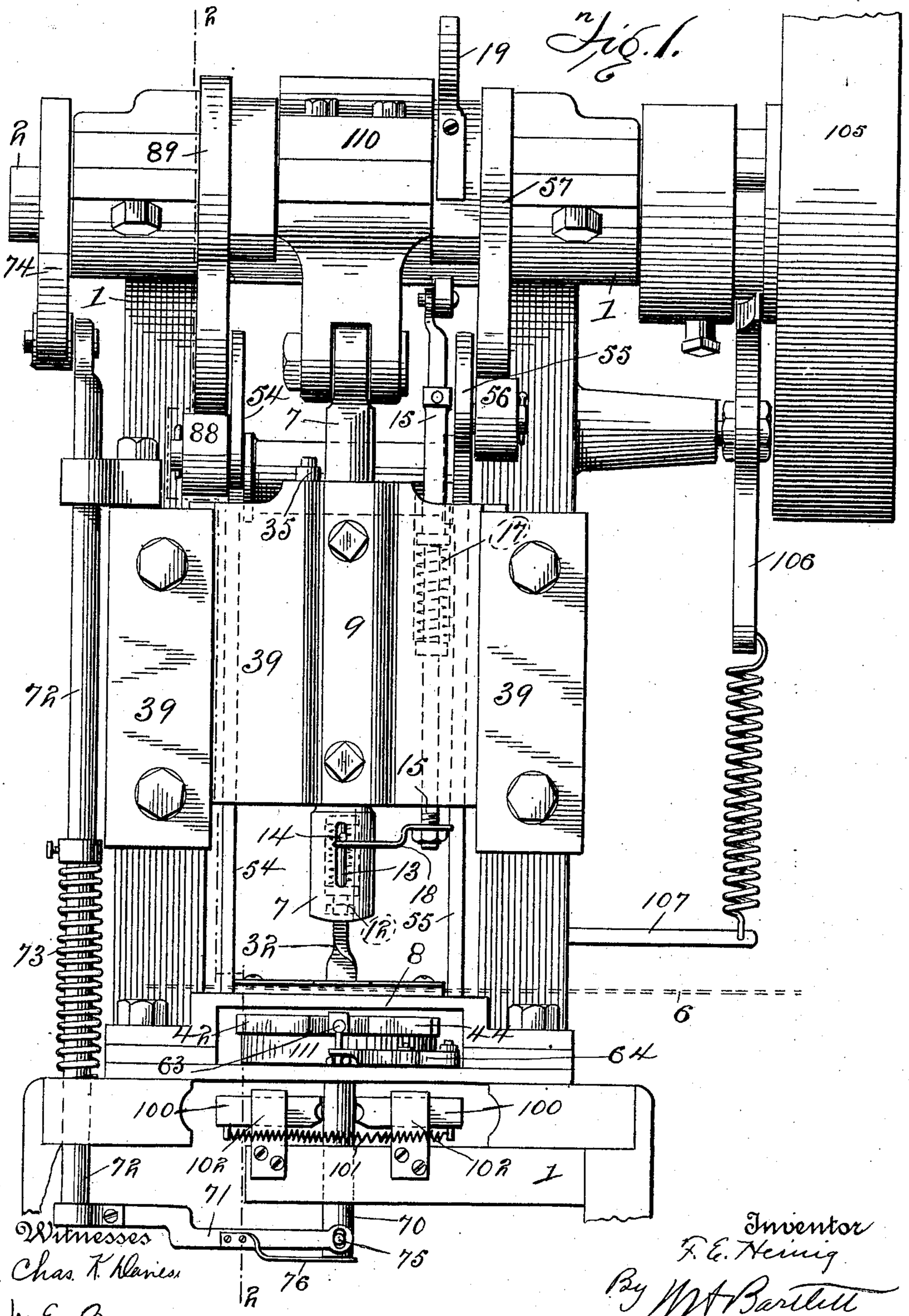
F. E. HEINIG.

MACHINE FOR MAKING HOLLOW CONES FROM SHEET METAL.

(No Model.) (Application filed May 31, 1901.)

3 Sheets—Sheet 1.

Fig. 1.



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3 Sheets—Sheet 2.

Fig. 7.

Fig. 7a.

Fig. 9.

Fig. 10.

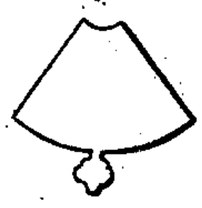

Fig. 8.

Fig. 2a.

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3 Sheets—Sheet 3.

Fig. 6.

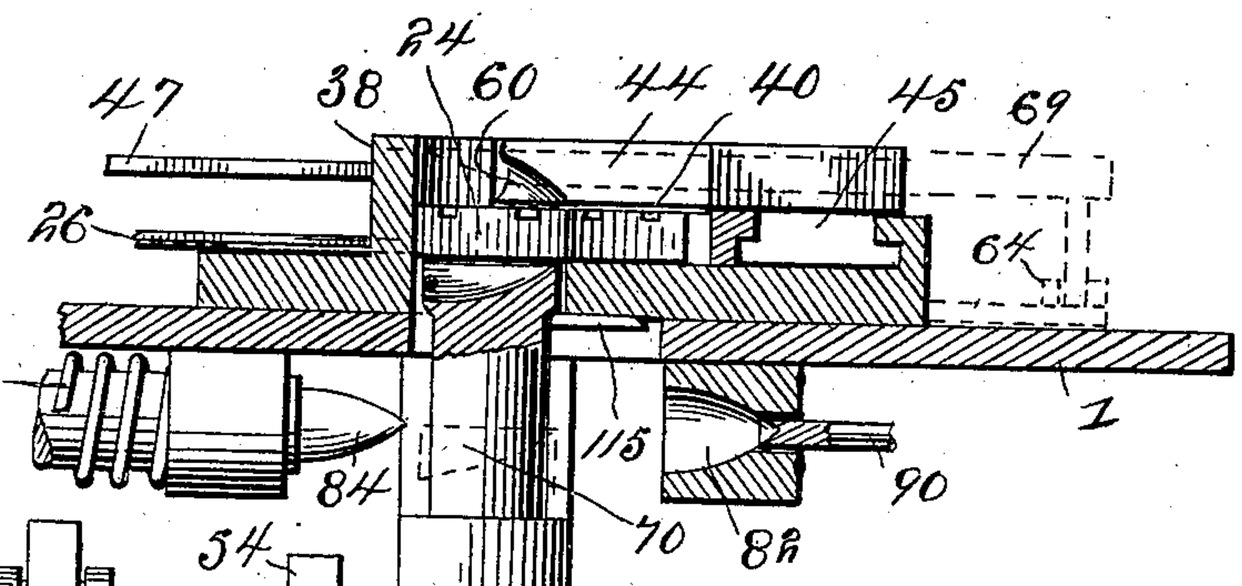

Fig. 3.

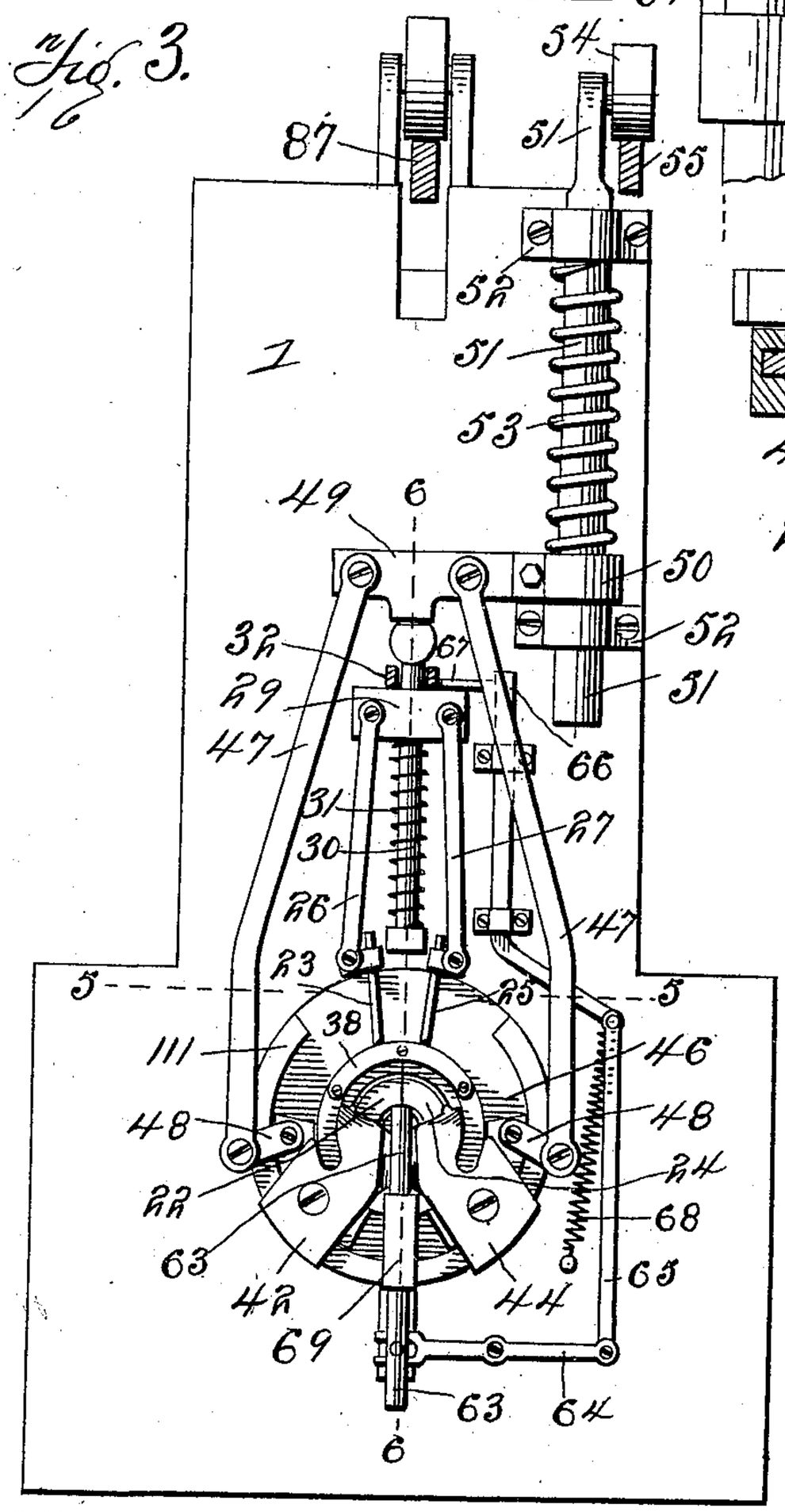

Fig. 5.

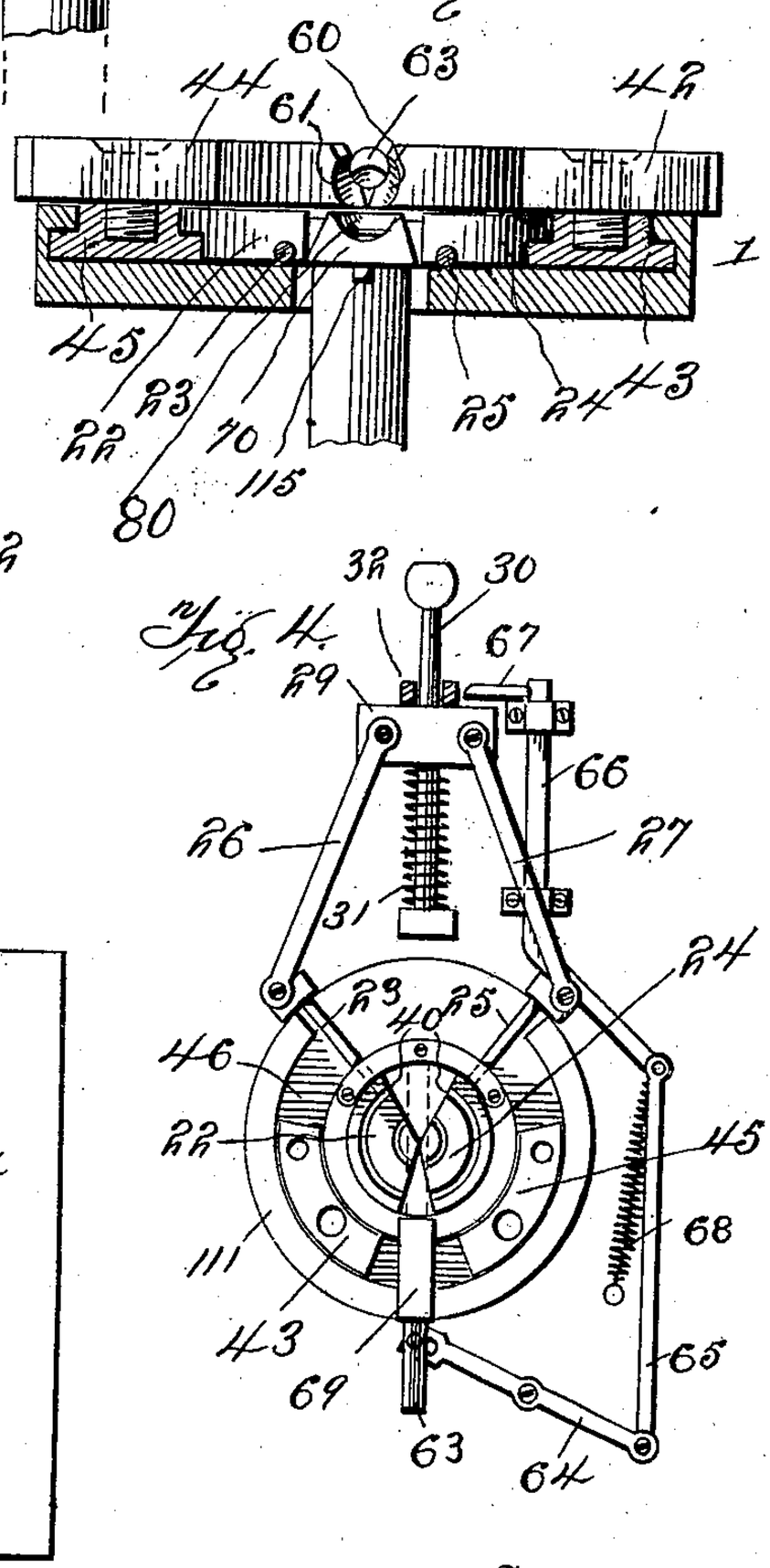

Fig. 4.

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UNITED STATES PATENT OFFICE.

FREDERICK EDWARD HEINIG, OF LOUISVILLE, KENTUCKY, ASSIGNOR TO CURRAN POPE, OF SAME PLACE.

MACHINE FOR MAKING HOLLOW CONES FROM SHEET METAL.

SPECIFICATION forming part of Letters Patent No. 682,551, dated September 10, 1901.

Application filed May 31, 1901. Serial No. 62,585. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK EDWARD HEINIG, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented certain new and useful Improvements in Machines for Making Hollow Cones from Sheet Metal, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to machines for producing metallic tips for attachment to cigars.

A conical metallic tip is described in my Patent No. 603,639, of May 10, 1898.

Figure 1 is a front elevation of a machine for making cones from sheet metal according to this invention. Fig. 2 is a section on line 2 2, Fig. 1. Fig. 3 is a plan of the platform and curving-dies and connections. Fig. 4 is a plan of platform and connections with curving-dies removed. Fig. 5 is a section of curving-dies and lift on line 5 5, Fig. 4. Fig. 6 is an enlarged broken detail section on line 6 6, Fig. 4. Fig. 7 is a plan of tip-blank. Fig. 7^a shows the blank partly folded. Fig. 8 is an elevation of the conical tip. Fig. 9 is an end view thereof. Fig. 10 is a plan of modified blank.

Small hollow cones have heretofore been made from sheet metal by hand or in part by machinery for application to the tips of cigars, as shown and described in my patent referred to. The present invention is a machine for producing such tip-protectors from sheets of metal which have been previously enameled, embossed, or printed.

The numeral 1 designates the frame. This frame is of such size and weight as may be necessary to support the machinery and supports the driving-shaft 2, which is held in suitable bearings, as 3, at the upper part of the frame. The shaft 2 is driven by suitable power and carries as many cams, cranks, or eccentrics as may be necessary to operate the various movable parts of the machine. The sheet metal from which the tips are made is fed in in strips under guard 5, as indicated in dotted lines 6, Fig. 1. A punching-die 7, driven from shaft 2, strikes through an opening in guard 5 and punches a blank from the sheet of metal. The female die 8 has an opening of the same form as the male die 7, and the blank punched from the strip of metal is carried down through the opening of the female die with each fall of the punch 7. The punching-die 7 is guided by slide 9 in ways 39 and is driven by a crank 10, connected to shaft 2 and working in sleeve 110 in usual manner. The metal strip 6 is fed by hand in the machine illustrated and is moved along as the blanks are cut from the strip 6. The punching-face of die 7 is slightly convex, so that the punch cuts first at the middle, and the ends of the blank bend slightly upward as the blank passes through the opening in die 8. The punching-die 7 is hollow and has a presser-foot 12 contained in its central recess. This foot 12 is borne down by a spring 13 in the punch and so tends to approach and clamp the plate 6 in advance of the downward movement of the die 7. A pin 14 from the shaft of the presser-foot 12 extends through a slot in the side of die-punch 7. A plunger 15 is guided in a suitable way in the crosshead 9 and is normally held up by a spring 17. A bar 18 from the plunger 15 extends under the pin 14. Now as spring 17 is considerably stronger than spring 13 the operation of spring 17 will lift the plunger 12 by the engagement of the parts described whenever the springs are free to act independently; but the rotation of shaft 2 carries around the cam 19 and causes it to make engagement with the roller 20 on the plunger 15. This engagement depresses plunger 15 and arm 18 and causes the presser 12 to be unsupported when the said presser closes down under the influence of spring 13 and clamps the blank just before the movement of the punching-die 7 to cut or punch the blank from sheet 6. Thus it will be seen that the presser or clamp 12 is not operated positively in either direction, but the mechanisms by which springs 13 and 17 are controlled are positively actuated. An obstruction to the machine allows either or both springs to yield, so that there is practically no danger of breakage by reason of the presser-foot. When the blank a is struck from the sheet 6, the blank falls onto the rocking floor pieces or sectors 22 24, which are supported in horizontal ways below the die. The presser 12 holds the blank a tightly to these floor-pieces after the punching-die 7

retires. The floor-pieces 22 24 are in the form of sectors of a disk or short cylinder. Spreader-rods 23 and 25 are connected to the edges of the sectors, and also by links 26 and 27 these rods are connected to horizontally-reciprocating cross-head 29. The sectors are borne in a curved casing or guideway 111. The cross-head 29 is guided on the guide-rod 30 and is pressed in one direction by spring 31. A lever 32, operated from cam-slot 33, presses the cross-head 29 backward and forward, and by the connections shown and enumerated, this rocks the sectors 22 and 24, so as to open them apart at the proper time. The roll 34 at the end of rigid arm 35 causes the lever 32 to move at the proper time. Arm 35 is connected to cross-head 9 and rises and falls therewith, thus insuring the spreading of sectors 22 24 apart from each other at the proper instant to pass the cone down between them, as will be explained. When the blank falls onto the sectors or floor-pieces 22 24, the floor-pieces are closed toward each other under the presser-foot 12, and the blank is held between these pieces and the presser-foot. A guard-strip 38 guides the floor-pieces. In the upper faces of the floor-pieces 22 and 24 there are annular grooves 40, for a purpose hereinafter stated.

The crimping or bending jaws or dies 42 and 44 are connected rigidly to curved slide-pieces 43 and 45, and these slide-pieces reciprocate in an annular track 46. Links 47 pivotally connect to rigid strips 48 on the slides, and these links 47 are also pivoted to the reciprocating head 49. Head 49 is on an arm 50, which is connected to draw-bar 51. Draw-bar 51 slides in suitable ways, as 52, on the frame 1, and bar 51 is pressed toward the front of the machine by spring 53. A roller or abutment 54 on the draw-bar engages lever 55, and the upper end of lever 55 carries a roller 56, having engagement with cam 57 on the main shaft 2. The cam 57 is of such form as to give the proper time and motion to jaws or dies 42 and 44 in one direction, the spring 53 serving to move them in the other direction. On the lower surface of jaws 42 and 44 there are segments of rings which project into the annular grooves 40 in the upper faces of the sectors 22 and 24. This projection of the jaws into said grooves prevents the edges of the blanks *a* from turning down or getting between the floor-sectors and the jaws, no matter how thin the metal of the blank may be. As the blank *a* rests on the floor-pieces 22 and 24 after the lifting of die or punch 7, the jaws 42 and 44, operated by the mechanism described, close toward each other and against the ends of the blank *a*. As the lower face of die or punch 7 is a little convex, the edges of the blank turn slightly upward, and the curved edges 60 61 of the jaws enter under the edges of the blank. The presser-foot 12 holds down the middle of the blank, and as the jaws swing toward each other, guided by their blocks 43 45 in the curved way 46, the ends of the blank roll upward. The curve 61 in one of the jaws is smaller than the curve 60 in the other jaw, and one end of the blank is curved to turn inside the other. As the ends of the blank turn upward, the presser 12 retires and the blank rolls upon itself into the form of a cone, one edge of the metal slightly overlapping the other. As the presser 12 retires, the holding-finger 63, extending from the front of the machine, advances over the cone now forming. This finger 63 is moved horizontally by lever 64, which is actuated by link 65, and this link is moved in one direction by bar 66, which has a pin 67 projecting in front of cross-head 29. The movement of cross-head 29 to close the sectors 22 24 serves to retire finger 63. When free to do so, the spring 68, which is connected to link 65 and to the frame, serves to draw the finger 63 over the cone on the sectoral floors or on the carrier. The end of finger 63, which moves over the cone, is concave on its lower surface. The finger 63 moves in a guideway 69. When the jaws 42 and 44 have completed their work of coiling the blank into the form of a cone, these jaws retire in reverse direction to their line of advance. At the proper instant of time, just before the opening of the coiling-jaws, the floor-pieces 22 and 24 spread apart far enough to permit the carrier 70 to rise and support the blank or cone. The finger 63 prevents the cone from rising and presses it down upon said carrier. The carrier 70 is raised and depressed by means of arm 71, connected to draw-rod 72. This rod is lifted by spring 73 and depressed by connection with cam 74, which cam is driven by the main shaft 2. The carrier 70 is connected to arm 71 by a pin 75 entering a slot in the arm. A spring 76 on the arm extends under the carrier. This gives a slightly-yielding connection between the carrier and arm and prevents the carrier from being held with such rigidity as to clog or break the mechanism. The carrier moves vertically in guideway 78. The upper end of the carrier has a curved recess 80, into which the cone enters as the floor-sectors 22 24 swing aside, the pin 63 preventing the escape of the cone. A slight detent or projection at the large end of the recess in the carrier keeps the cone from sliding off. The carrier 70 lowers the cone until it is in line with the cupping-die 82. Then the cupping-punch 84 advances into the open end of the cone and carries the cone along with it into the cup 82, so that the cone is neatly rounded and compressed, and thus smoothly finished. The punch or male cupping-pie 84 reciprocates in ways 85, being pressed in one direction by spring 86 and moved in the other direction by lever 87, which lever bears a roller 88, on which cam 89 acts. The form of cam 89 thus determines the movement of the punch or die 84 and can

be arranged to give the needed movement in either or both directions. The cup 82 has an ejector-finger 90, which is worked by draw-rod 91 to push out the cone from cup 82, should the finished cone stay in the die or cup 82. The draw-rod 91 is connected to a head 92 on the punch 84. This head by engagement with pins 95 on the draw-rod causes the ejector-finger to advance and recede in advance of the cupping-punch 84, or the ejector-finger may move in one direction under the impulse of a spring, as 99.

The holding-clamps 100 are used when it is needful to clamp the cone on the carrier for the entrance of the cupping-die. These clamps are slides held in guides 102 on the frame and drawn together automatically by a spring 101. The clamps have beveled edges, which engage the carrier as the latter rises, and the lifting of the carrier thus spreads the clamps. Should the cone be within the holding-clamps as the cupping-die recedes, the ejector will press the cone out of the clamps and it falls completed into a receptacle.

As the cones are made from a thin metal, which is enameled and sometimes printed or embossed on its outer surface, it is desirable that the operations be such as not to deface the surface. This I have found is successfully done by the machine constructed as described.

The operation has been generally indicated above. The power is communicated by driving-pulley 105, which is thrown into gear by clutch 106, connected to hand or foot lever 107 in a manner quite common with cutting or stamping machines. The plate 6 is fed to proper position under die 7, and the machine is then thrown into gear to operate the cutting-die. The blank is cut from the plate and is held on the floor-sectors 22 24 while the coiling-jaws bend it into a cone. Fig. 7 shows the general form of the blank, although this varies with the taper and length of the cone desired. Fig. 7ª shows the blank partly curved into a cone, one side being on a larger curve than the other. Figs. 8 and 9 show, respectively, the side and open end of the cone. After the cone is coiled it passes down with the carrier, the floor opening for the purpose, is cupped in the cupping-dies, which give it a true and even finish, and is then dropped from the machine.

In some instances I make the tip-protector or cone with an extension, as indicated by the blank in Fig. 10. The extension may be any ornamental figure, or the trade-mark of the cigar-manufacturer. The machine illustrated will operate on blanks of this character, the cutting-die being changed to correspond. If the extension of the blank is considerable, space must be allowed in the machine for the movement of such blanks and tips; but the operating mechanism need not be changed.

While I have described levers, cams, &c., as moving the operative parts of the machine, I do not generally in my claims limit to special mechanisms, since other mechanisms are in many instances the equivalents of what I have described.

The blanks may be cut in a separate machine and fed into the female die or coiling-jaws; but this is a much more expensive operation.

What I claim is—

1. In a machine for forming sheet-metal cones, the combination of cutting-dies, by which the blank is formed, a presser for retaining the blank, and coiling-jaws which advance in an annular path against the ends of the blank, to coil the same in conical form.

2. In a machine for forming sheet-metal cones, the combination of the male cutting-die having a convex face whereby the blank is slightly concaved, means for holding the blank, and coiling-jaws having curved edges and moving in an annular path under the ends of the blank, substantially as described.

3. In a machine for forming sheet-metal cones, the combination with the cutting-die, of swinging floor-sectors which close under the die, and a presser acting to retain the blank on these sectors as the die retires.

4. In a machine for forming sheet-metal cones, a cutting-die, swinging floor-sectors which receive the blank from the die, and coiling-jaws moving in an annular path against the ends of the blank while resting on said floor-sectors.

5. In a machine of the character described, the combination of floor-sectors moving in an annular path and having annular grooves in their faces, and bending-jaws moving in an annular path over said sectors and having ribs entering the said floor-grooves, substantially as described.

6. In a machine as described, floor-sectors moving in an annular path, and a carrier reciprocating vertically below and between the floor-sectors to receive the work therefrom.

7. The combination of the annularly-moving floor-sectors, the vertically-reciprocating carrier, and the annularly-moving jaws passing over the floor-sectors.

8. The combination of the swinging floor-sectors, the swinging coiling-jaws, the vertically-reciprocating carrier, and the blank-holding presser, combined and coöperating as set forth.

9. In a machine as described, an annular guideway, floor-sectors moving in said guideway, coiling-jaws moving in the same guideway over the floor-sectors, and means for separately moving the floor-pieces and jaws in their annular path, all combined.

10. In a machine as described, the cutting-dies, annularly-moving floor-sectors, the vertically-moving presser, and a horizontally-moving holding-finger acting to replace the presser, all combined.

11. In a machine as described, the floor-

sectors moving in annular guides, the coiling-jaws moving in annular guides above the floor-sectors, and a holding-finger moving horizontally over the work between the jaws, all combined.

12. In a machine for forming sheet-metal cones, a vertically-reciprocating carrier, coiling-jaws moving in an annular path to engage the ends of a blank on the carrier, and means for holding the blank down to the carrier, all combined.

13. In a machine as described, the annularly-moving floor-sectors, spring-actuated mechanism acting to close said sectors toward each other, and positively-driven mechanism acting to spread the sectors apart in their annular path, all combined.

14. The floor-sectors moving in annular guides, spreader-rods connected to said sectors, links connected to the spreader-rods and to a reciprocating cross-head, and means for moving the cross-head in both directions, all combined.

15. The vertically-reciprocating cutting-die, a presser-foot moving in a recess in the die, a spring acting to depress the presser-foot, a spring of superior power acting to lift the presser-foot, and positively-driven mechanism operating at intervals to overcome the superior spring, all combined.

16. The combination of a vertically-moving cutting-die with a convex face, acting to cut and slightly bend the blank, means for holding the blank, and annularly-moving coiling-jaws engaging the ends of the blank, to roll the same into a hollow cone, substantially as described.

17. The combination of the annularly-moving coiling-dies, means for holding the blank while said jaws operate, a reciprocating carrier by which the coiled piece is carried from the coiling-jaws, and cupping-dies acting on the coiled piece, all combined.

18. The vertically-reciprocating carrier, horizontally-moving cupping-punch and its coacting cup, and an ejector connected to the punch and operating to expel the work from the cup, all combined.

19. The combination of the vertically-reciprocating carrier, the horizontally-moving holding-clamps, and the cupping-dies acting to take the cone from said clamps, substantially as described.

20. The combination with the coiling-jaws, of the vertically-reciprocating carrier, means for moving the same vertically, and a yielding connection whereby the carrier gives slightly in case of obstruction, substantially as described.

21. The vertically-reciprocating carrier, means for placing the cone thereon, and the holding-clamps having inclines engaged by the carrier, whereby the clamps are spread, all in combination.

In testimony whereof I affix my signature in presence of two witnesses.

FREDERICK EDWARD HEINIG.

Witnesses:

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