No. 685,531. Patented Oct. 29, 1901.

H. A. SEYMOURE.

MACHINE FOR MAKING SHEET METAL OVAL OR CIRCULAR FRAMES.

(Application filed May 15, 1901.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 15.

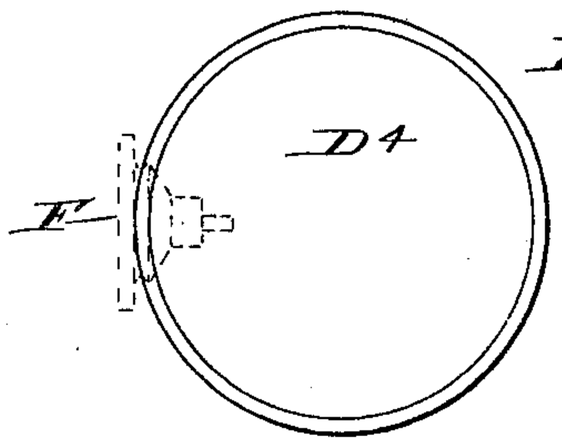


Fig. 13.

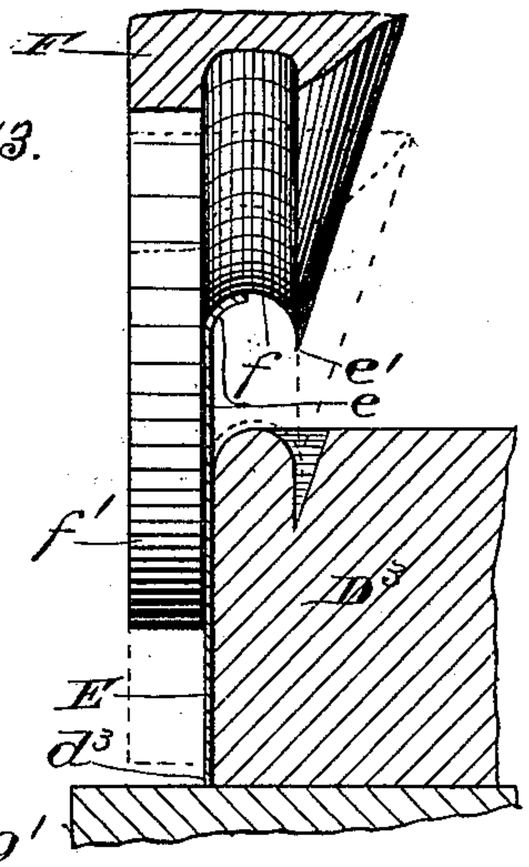


Fig. 1.

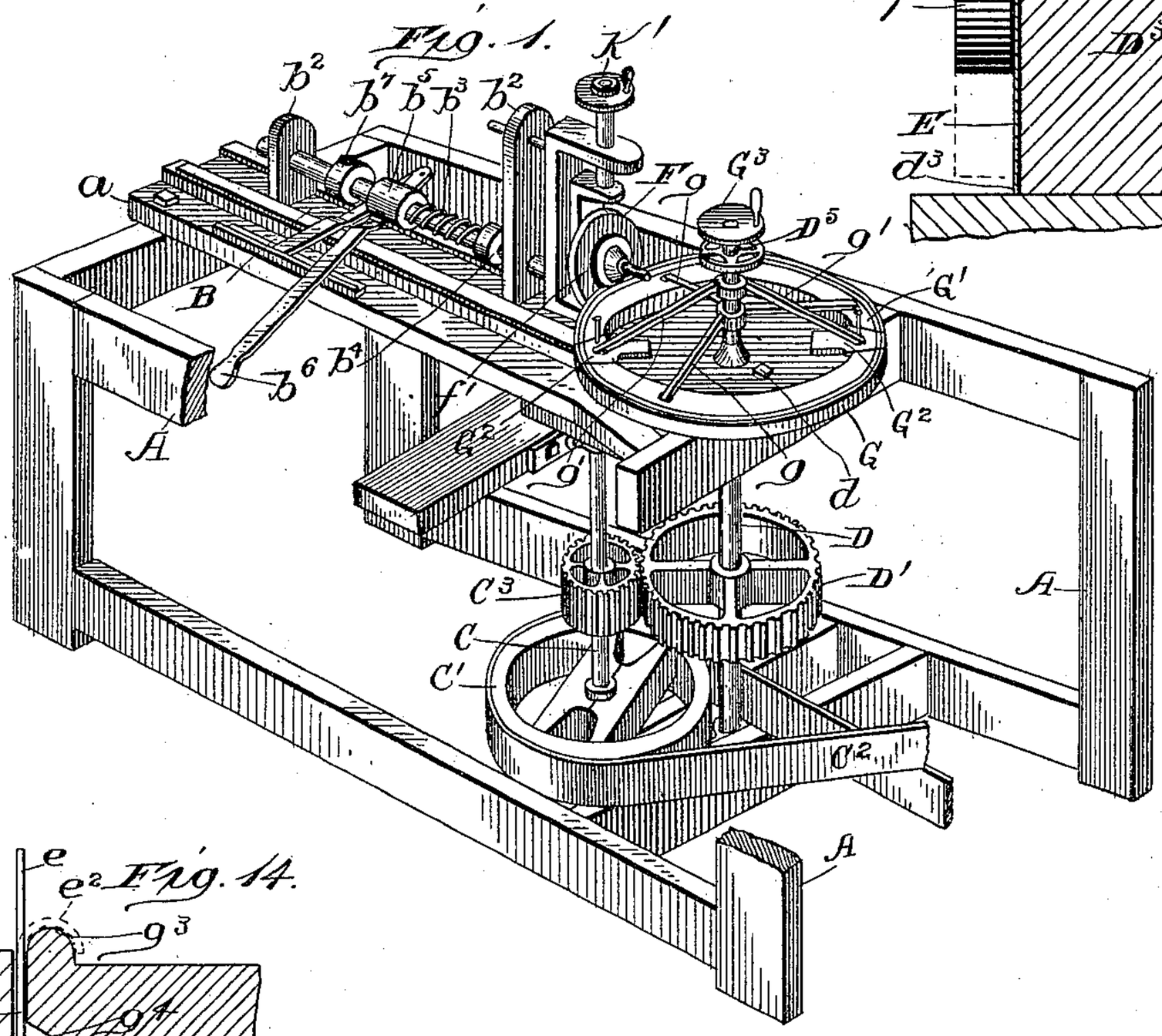
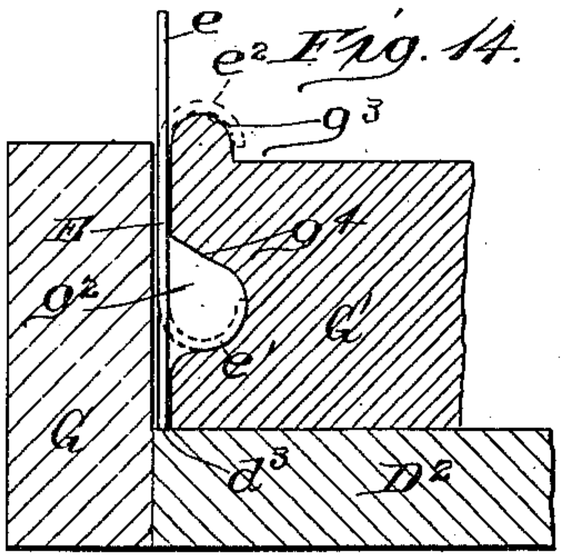


Fig. 14.



Witnesses:

Chas. E. Gorton.

O. A. Adams.

Inventor:

Harry, A. Seymoure.

By Charles Turner Brown,

Atty.

No. 685,531. Patented Oct. 29, 1901.

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(No Model.) 3 Sheets—Sheet 2.

Fig. 2.

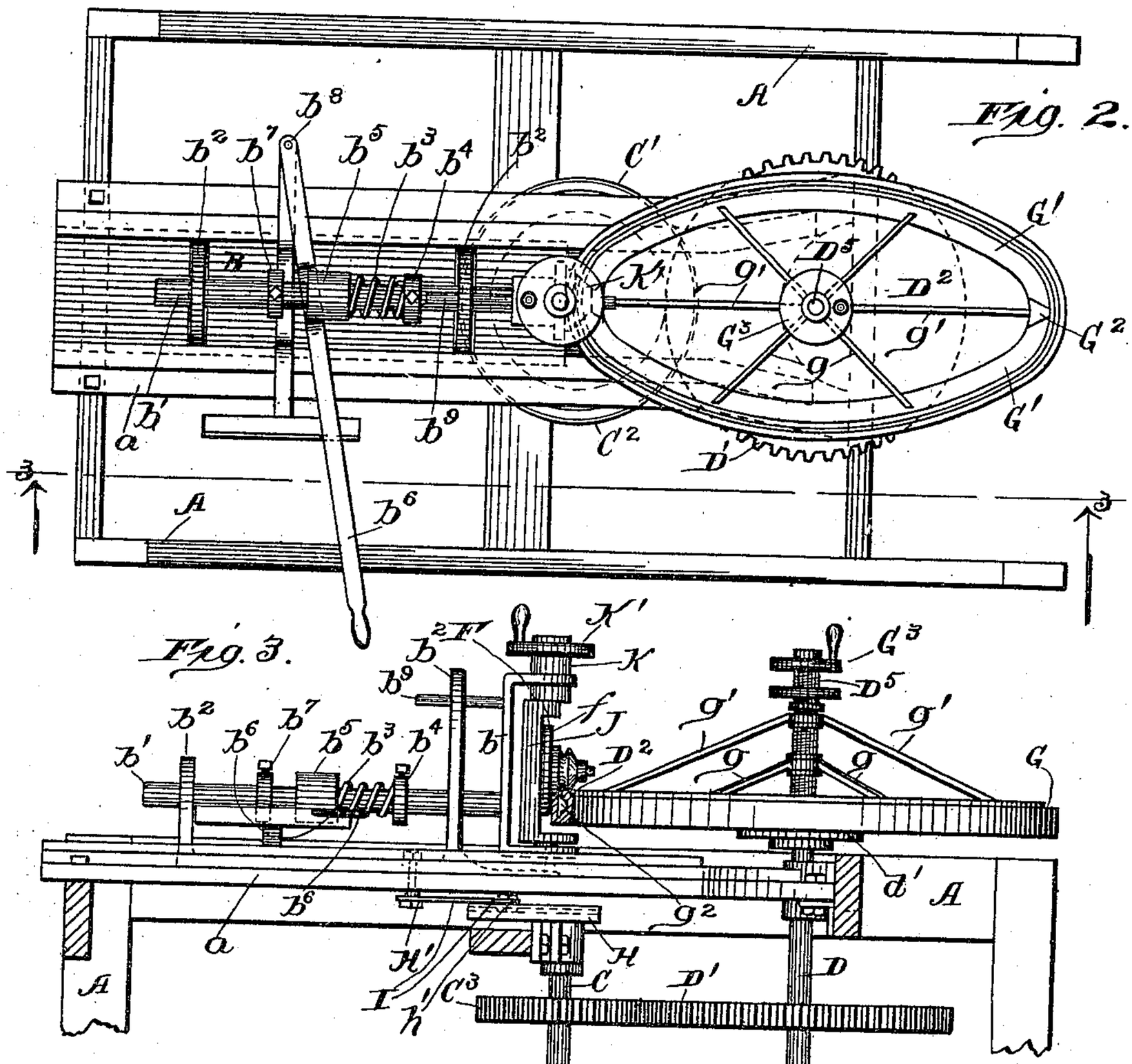


Fig. 3.

Fig. 4.

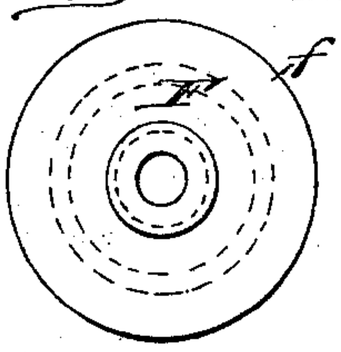


Fig. 5.

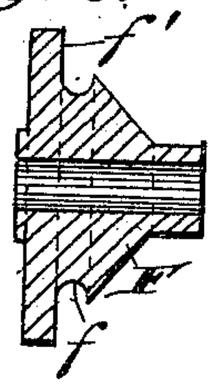


Fig. 6.

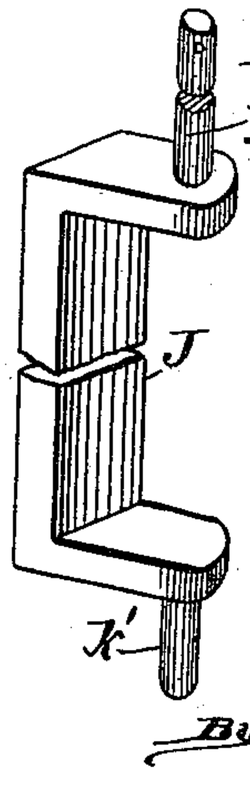
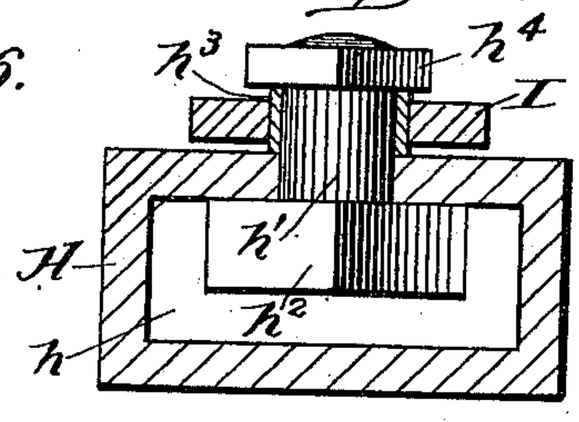


Fig. 12.



Witnesses:

Chas. E. Gorton.

C. A. Adams.

Inventor:

Harry A. Seymoure

By Charles Turner Brown,

Atty.

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(Application filed May 15, 1901.)

(No Model.) 3 Sheets—Sheet 3.

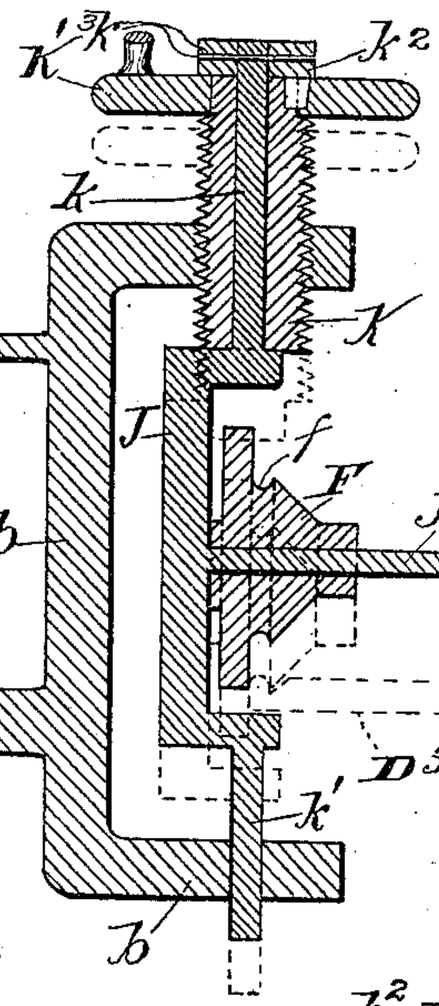
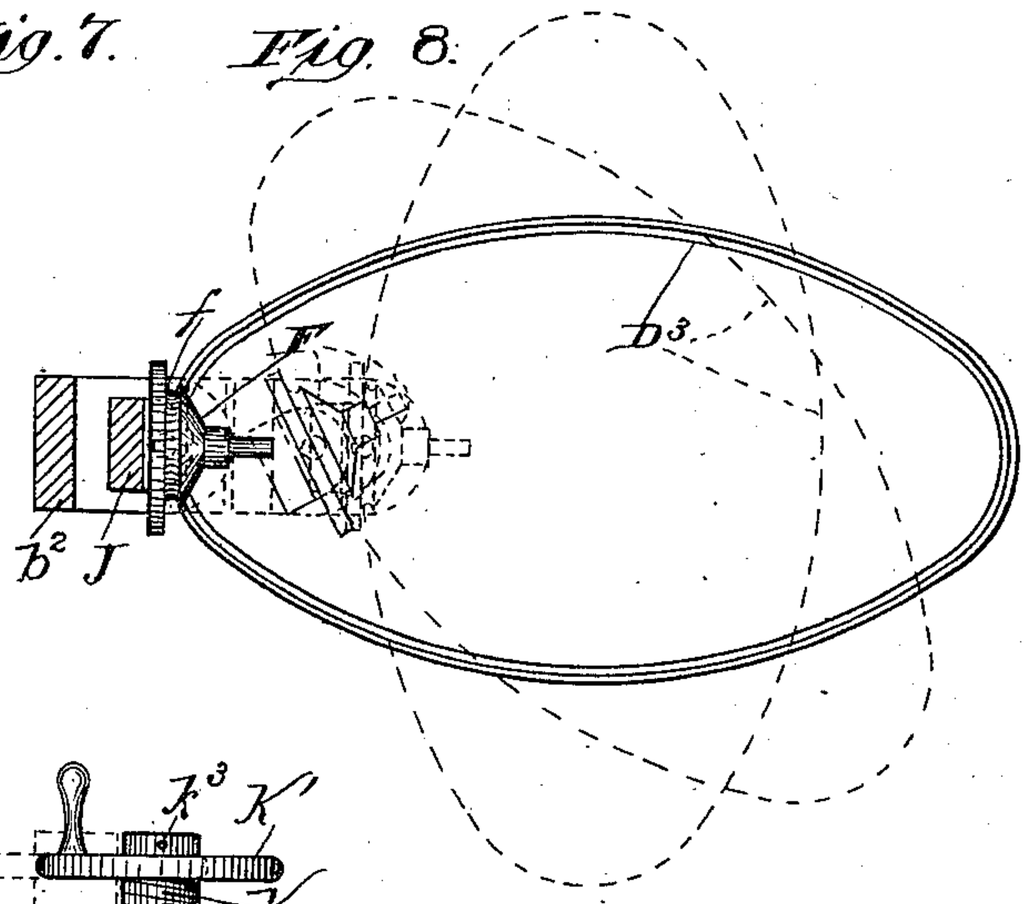


Fig. 7.

Fig. 8.



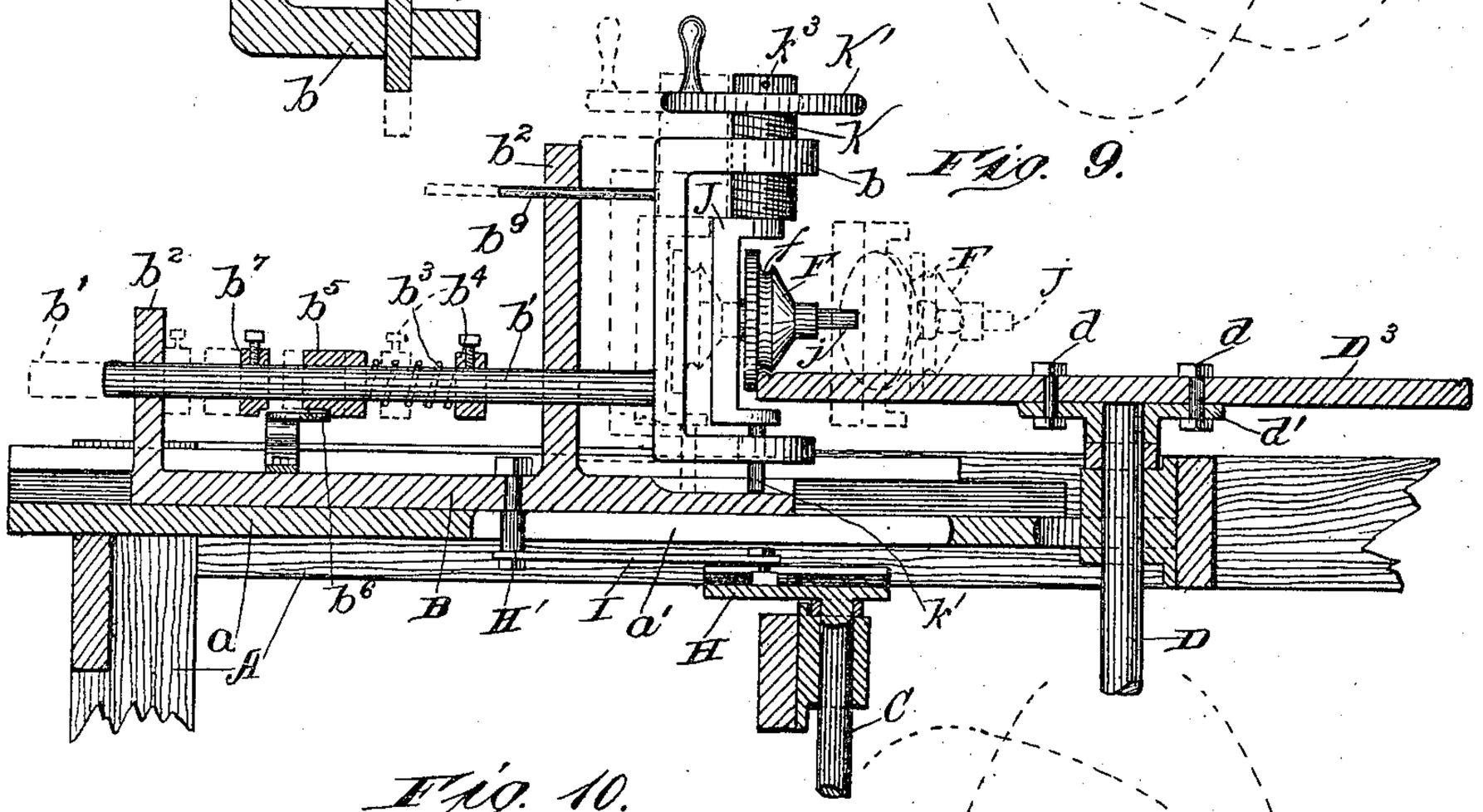


Fig. 9.

Fig. 10.

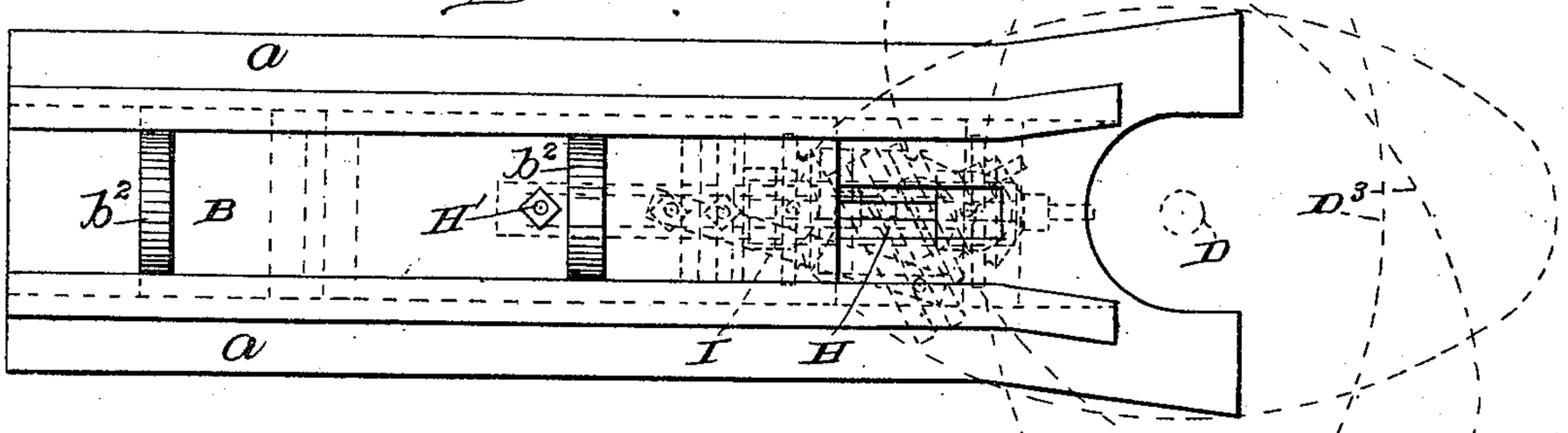
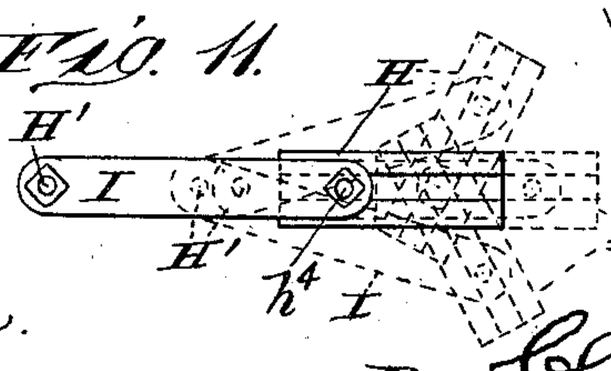


Fig. 11.



Witnesses:
Chas. E. Gorton.
C. A. Adams.

Inventor:
Harry A. Seymoure.
By Charles Turner Brown
Atty.

UNITED STATES PATENT OFFICE.

HARRY A. SEYMOURE, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO JACOB LOWENTHAL, OF CHICAGO, ILLINOIS.

MACHINE FOR MAKING SHEET-METAL OVAL OR CIRCULAR FRAMES.

SPECIFICATION forming part of Letters Patent No. 685,531, dated October 29, 1901.

Application filed May 15, 1901. Serial No. 60,414. (No model.)

To all whom it may concern:

Be it known that I, HARRY A. SEYMOURE, a citizen of the United States of America, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Machines for Making Sheet-Metal Oval or Circular Frames, of which the following, when taken in connection with the drawings accompanying and forming a part hereof, is a full and complete description, sufficient to enable those skilled in the art to which it pertains to understand, make, and use the same.

The object of this invention is to obtain a machine whereby expansible sheet-metal oval and circular frames having turned-over edges, constituting on the front and back edge of the frame a bead or torus, may be easily and uniformly made, and incidentally to obtain a machine whereby expansible or non-expansible sheet-metal frames, either oval or circular in form and having a turned-over front edge constituting a bead or torus, forming the crowning molding of the frame, may be quickly and uniformly made.

A further and important object of this invention is to obtain a machine whereby frames of the kind above set out can be made of larger diameter than can be stamped or spun with a bead or torus on one edge thereof.

In the drawings referred to, Figure 1 is a perspective view of a machine embodying my invention, with a part of the stationary frame of such machine broken away to expose to view the working parts of the machine. Fig. 2 is a top plan view of the machine illustrated in Fig. 1. Fig. 3 is a vertical sectional view on line 3 3 of Fig. 2 viewed in the direction indicated by the arrows. Fig. 4 is a front view of a forming-wheel constituting an element in the machine embodying this invention, and Fig. 5 is a sectional view of such forming-wheel. Fig. 6 is a perspective view of a part of the pivotally and vertically movable frame in which the forming-wheel illustrated in Figs. 4 and 5 is rotatably mounted. Fig. 7 is a longitudinal vertical sectional view of the pivotally and vertically movable frame shown in perspective in Fig. 6, of the forming-wheel shown in front elevation and in longitudinal section in Figs. 4 and 5, and a sectional view of the head of the sliding frame of the machine, in which head the pivotally and vertically movable frame illustrated in Fig. 6 is mounted, and with broken lines indicating the vertical movement of such frame. Fig. 8 is a top plan view of the rotatable bed-plate of the machine, by means of which oval frames are made, and of the forming-wheel and pivotally and vertically movable frame, such frame being shown in section, with broken lines showing the rotatable bed-plate at different positions with corresponding positions of the forming-wheel. Fig. 9 is a vertical longitudinal sectional view of a modification of the machine embodying the invention, with broken lines showing different positions of the sliding frame, the pivotally and vertically movable frame, and the forming-wheel of the machine. Fig. 10 is a top plan view of the pivotally and vertically movable frame of the machine illustrated in Fig. 9 and of the sliding frame in which such pivotally and vertically movable frame is mounted, with broken lines showing the rotatable bed-plate of the machine in certain of its positions while rotating and the forming-wheel in its corresponding positions. Fig. 11 is a top plan view of an adjustable crank-arm and connection, by means of which the position of the sliding frame of the machine is determined, with broken lines showing such crank-arm and connection in different positions. Fig. 12, Sheet 2, is a vertical sectional view of the connection between the crank-arm and connection therefrom to the sliding frame of the machine. Fig. 13, Sheet 1, is a vertical sectional view of a portion of the edge of the rotatable bed-plate of the modifications of the machine illustrated in Figs. 7, 8, and 9 and of a portion of the forming-wheel. Fig. 14 is a sectional view of a portion of the bed-plate and the attached parts thereto of the machine illustrated in Figs. 1, 2, and 3 of the drawings; and Fig. 15 is a top plan view of a rotatable bed-plate and the forming-wheel thereof used in making a circular frame having a bead or torus on both edges thereof, such rotatable bed-plate arranged to be substituted for the oval bed-plate illustrated in Figs. 1, 2, and 3 of the drawings.

A reference-letter applied to designate a

given part is used to indicate such part through the several figures wherever the same appears.

A is the stationary frame of the machine.

B is a sliding frame.

C is a vertical shaft rotatably mounted in frame A and is the driving-shaft of the machine.

C′ is the driving-pulley of the machine, and C² is the driving-belt.

C³ is a gear-wheel keyed on shaft C and intermeshing with gear-wheel D′ on shaft D. Shaft D is a vertical shaft rotatably mounted in frame A, and gear-wheel D′ is keyed thereon. Gear-wheel C³ has one-half the number of teeth therein as has the intermeshing gear-wheel D′, and therefore rotates twice to each rotation of such wheel D′.

D², Figs. 1, 2, and 3, is the bed-plate of the machine and is attached to the upper end of the rotatable shaft D by means of the bolts *d d*, passing therethrough and through the collar *d′*, which is keyed to such vertical shaft.

To make a frame having a bead or torus on both edges of the metal strip constituting such frame, a chuck is attached to the bed-plate D², and such chuck will be hereinafter sufficiently described, so that the operation thereof in connection with this machine may be understood by those skilled in the art, although no claim of patentable novelty is herein made on such chuck; but to make a frame having a bead or torus on one edge only of the metal strip which constitutes the frame no chuck is required, although, of course, such chuck may be so used, and D³ in Figs. 7, 9, and 13 illustrates a slight modification required in such bed-plate for such purpose.

D⁴, Fig. 15, is a circular bed-plate, which may be substituted for the oval bed-plate D² whenever desired, as by removing the bolts *d d* (see Figs. 1 and 9) from such oval bed-plate and replacing them in the circular bed-plate D⁴.

The oval bed-plates D² D³ (see Figs. 3, 9, 13, and 14) are provided, respectively, with the shoulder *d*³, on which shoulder the lower edge of the metal strip E rests and by which it is supported when the upper edge thereof is acted upon by the forming-wheel F to turn down such upper edge *e* and form the strip E into the oval or circular frame made thereof provided with the bead or torus *e′* (see Fig. 13) on the upper edge thereof, such upper edge being the front of the frame made on this machine.

A metal frame made on the machine embodying this invention and having a single bead or torus *e′* may be made non-expansible, the glass, picture, or other matter and backing being placed in the frame from the rear thereof and secured therein in the ordinary manner of securing backs in metal frames; but when a metal frame made on the machine embodying this invention is provided with a bead or torus *e′* on the front thereof and a corresponding bead or torus *e*² on the back thereof (see Fig. 14) I deem it essential to permit insertion of glass and other material therein to make such frame expansible; but nevertheless such expansibility is not required in the manufacture of such frames on the machine embodying this invention when the chuck hereinbefore referred to and about to be described is used, and hence no claim of patentable novelty for an expansible metal frame provided with a bead or torus on the front and back thereof is made in this application.

The chuck hereinbefore referred to comprises oval ring G, which is rigidly attached to bed-plate D², split oval G′, which rests movably on bed-plate D², wedge-shaped keys G², which also rest movably on bed-plate D², and means for withdrawing split oval ring G′ and keys G² G² from the oval ring G or from the strip of metal E between such split oval ring and keys and the oval ring G. (See Fig. 14.) The mechanisms by which the split ring G′ and keys G² G² are controlled consist of the wheel G³, provided with a handle and rotatably mounted on spindle D⁵, which spindle may be a continuation of vertical shaft D, and the arms *g g′*, attached to the hub of hand-wheel G³ and to the split ring G′ and keys G² G², respectively, in such manner that the turning of the hand-wheel in one or the other direction will simultaneously move such split ring and keys inward and away from oval ring G and strip E or outward and against such strip E and ring G. In the split ring G′ and also in the keys G² G² there is a peripheral recess *g*², positioned relative to the bead or torus *g*³ (see Fig. 14) and the width of the strip E, so that when the bead or torus *e′* has been formed and the strip is placed on the bed-plate of the machine with bead or torus *e′* in recess *g*² there will be sufficient width of such strip at the edge *e* thereof to form the bead or torus *e*² when such strip is formed down on the bead or torus *g*³ by the forming-wheel H, as hereinafter described.

The manner in which the forming-wheel F is held in position relative to the oval bed-plate and attachments thereon, so as to be forced down upon the upper edges of the strip E to form the bead or torus thereon, and also the mechanisms by which such forming-wheel is forced down on the edge of the strip E are illustrated in Figs. 1, 2, 3, 7, 9, and 10, some of the special details of such mechanisms being shown on an enlarged scale in Figs. 4, 5, 6, 11, 12, 14, and 15, and now I will describe the same.

Sliding head B is moved back and forth to hold head *b* thereof in proper relative position to the bed-plate D² and its attachments by means of crank-arm H and connection I. Crank-arm H is keyed to the upper end of vertical rotatable shaft C to rotate with such shaft.

To make the machine changeable for the making of oval frames of different sizes, connection I is adjustable in crank-arm H, there-

by varying the length of such crank-arm, such adjustable attachment being obtained by providing the groove h in such crank-arm H (see Fig. 12) and placing the bolt h', with head h^2 thereof, in such groove h, so that the collar h^3 and nut h^4 may be fitted over the screw-threaded end of the bolt. Collar h^3 is placed within the hole in connection I. Tightening of the nut in place on bolt h' firmly secures such bolt in place without tightening the pivotal attachment of connection I thereto.

H′ is the pivotal attachment of connection I to sliding frame D and may be substantially the same in construction as is connection h, if desired.

Rotation of shaft C rotates crank-arm H, and as such shaft C makes two complete revolutions to each revolution of the shaft D the sliding frame B moves in unison with the path of the periphery of the bed-plate d^2, adjacent to head b, so that such head is maintained substantially in contact (when in an operative position) with the periphery of the ring or oval G or bed-plate D^2. To provide compensation of any variation which may occur in the movement of such head b and the periphery adjacent thereto of the oval ring G or bed-plate D^2, such head b is mounted on the longitudinally-movable non-rotatable shaft b' in standards b^2 b^2 of the sliding frame B, and spring b^3 is interposed on shaft b' between collar b^4 (which is firmly secured to shaft b') and the collar b^5, (which fits loosely on shaft b'.)

To move the head b from an operative position to an inoperative position, collar b^7 is firmly set on shaft b' and handle b^6 is pivotally mounted, as at b^8, Fig. 2, so that the swinging of the free end of such handle b^6 will alternately bring it into contact with the loosely-fitting collar b^5 or firmly-set collar b^7. When the free end of the handle b^6 is moved from the position thereof illustrated in Fig. 2 of the drawings toward the left, as soon as the part of such handle adjacent to set collar b^7 comes in contact with such collar the shaft b' will be moved from the position thereof illustrated in Figs. 2 and 9 in the drawings into substantially the position indicated by broken lines in Fig. 9 of the drawings. The position of shaft b' indicated by dotted lines in Fig. 9 of the drawings is termed by me its "inoperative" position, as at such time the forming-wheel F, pivotally mounted, as about to be described, in head b, is not in contact with the strip of metal designed to be made into a frame or with the bed-plate D^2 or any of the attachments on such bed-plate. When the handle b^6 is in the position illustrated by full lines in Figs. 1, 2, 3, and 9 of the drawings, the forming-wheel F is maintained in an operative position, loosely-fitting collar b^5 on shaft b' being forced to the right hand by such handle b^6 and collar b^4 being yieldingly forced to the right hand by spring b^3, interposed between such collars b^4 b^5, as hereinbefore described. When the forming-wheel is in operative position, by the movement of the handle as last above described it is yieldingly held with the rabbet f thereof above the bead or torus of split ring G′ and keys G^2 G^2 or bed-plate D^3 when such bed-plate D^3 is substituted for bed-plate D^2 and the attachments thereof. As the bed-plate D^2 is rotated with the rabbet f of the forming-wheel F in close contact with bead or torus of oval ring G′ such forming-wheel may be moved by the periphery of the oval ring to force head b, with shaft b', back, so that spring b^3 is compressed by set collar b^4 coming against one end of such spring when certain oval frames are made corresponding in shape with the bed-plates D^2 D^3, respectively, and for that reason the above-described construction of shaft b' in bearings b^2 b^2, with spring d^3 and collars d^4, d^5, and b^7 and handle b^6, is adopted by me. To prevent rotation of the head b and shaft b', pin or guide b^9 is secured in head b in position to move freely in a corresponding hole in the standard b^2, which is adjacent to such head.

Forming-wheel F is mounted in head b as follows: J is the pivotally and vertically movable frame, provided with the spindle j, on which the forming-wheel F is rotatably mounted. To provide for the rotation of the rabbet f of forming-wheel F in substantially the same vertical plane in which the pivotal parts k k' are placed, a considerable portion of the frame J is cut away between such pivotal part k k', as is well illustrated in Figs. 6 and 7 of the drawings. Pivotal parts k k' of frame J are sufficiently long to permit the required vertical movement in frame b, and to control such vertical movement the screw-threaded collar K is placed on pivot k to turn loosely thereon, with hand-wheel K′ keyed thereto and head k^2 firmly secured on pivotal part k, as by pin k^3, so as to permit rotation of such screw-threaded collar K and to prevent longitudinal movement of such collar K on pivot k, and such screw-threaded collar K fits corresponding screw-threads in the hole in the head b, through which such collars extend. (See Fig. 7.)

I find when constructed as last above described the forming-wheel F will readily assume all and any of the several positions thereof required when the bed-plates D^2 and D^3 are respectively rotated, while by means of the continuous rotation of the hand-wheel K′ such forming-wheel F is gradually forced down upon the upper edge e of the strip E, and such upper edge is thereby forced or formed down onto the bead or torus of the bed-plate.

The several positions of the forming-wheel F, crank-arm H, connection I, and pivotally and vertically movable frame J are indicated by the broken lines in Figs. 8, 9, 10, and 11 of the drawings.

When a metal frame having a bead or torus on the front edge thereof is to be made on the machine embodying my invention by the use

of the bed-plate D^3, (see Figs. 9 and 13,) the flange f' (or vertical part f') of the forming-wheel F is relied upon to maintain the strip E in close contact with the periphery of such bed-plate, and in such case the spring b^3 is made with considerable tension thereto. The manner in which such strip E is so held in place is well illustrated in Fig. 13 of the drawings.

The peripheral groove g^2 (see Figs. 3 and 14 of the drawings) is made at the upper part thereof on line g^4, Fig. 14, so that as the split ring G' and keys G^2 G^2 are drawn inward and away from the strip E and turned over bead or torus e' or e^2, or both, thereon such strip may be raised simultaneously with the retraction or drawing in of such split ring and keys, and thereby the strip E is disengaged from the chuck of the machine.

When a single bead or torus e' is made on the machine embodying my invention with the bed-plate D^3, (see Figs. 9 and 13,) the frame may be drawn vertically off from such bed-plate after it has been formed up from strip E, as hereinbefore described.

When a circular frame, with a bead or torus on one or both of the edges thereof, is made with or by a machine embodying this invention, as on the bed-plate D^4, the connection I is loosened or taken from pivotal connections H' and h' and the sliding frame B is rigidly secured in place on frame A, as no movement in such sliding frame B is there required, as head b is at all times substantially the same distance from the axial line of shaft D.

To turn the bead or torus e' on the machine embodying this invention and using the bed-plate D^2 with the several attachments thereof, a strip of metal E, preferably sheet-brass known as "soft" or "half-hard," is taken and the ends secured together, after which such strip is placed between oval G and split oval G', with the lower edge thereof against shoulder d^3, and such split oval, together with the keys G^2 G^2, are forced outwardly and firmly against such strip. The table D^2, together with the oval G, split oval G', and keyes G^2 G^2, are then rotated, as by the driving-belt C^2, shafts C and D, and intermeshing gear-wheels C^3 and D', and the forming-wheel is gradually forced down on the upper edge e of such strip E by means of hand-wheel K'.

I have throughout this specification referred to the turned-over portion of the sheet-metal strip constituting the frame made by the hereinbefore-described machine as a bead or torus; but it is evident that the precise shape given to such turned-over part is not an essential part of this invention and that, if desired, a different contour line of the edge-molding, as an ogee, ovolo, astragal, or other form, may be made.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a machine for making sheet-metal frames, the combination of a rotatable bed-plate, provided with a bead, means for removably attaching a strip of sheet metal, having its ends united, to such bed-plate, adjacent to the bead, and with one edge thereof projecting beyond the bead, a pivotally and longitudinally movable frame, a forming-wheel rotatably mounted on the pivotally and longitudinally movable frame, such forming-wheel provided with a peripheral rabbet corresponding in shape with the bead, means to rotate the bed-plate, and means to maintain the forming-wheel adjacent thereto with the rabbet therein over the bead and in contact with the projecting edge of the metal strip; substantially as described.

2. In a machine for making sheet-metal frames, the combination of a rotatable bed-plate provided with a bead, means for removably attaching a strip of sheet metal, having its ends united, to such bed-plate, adjacent to the head and with one edge thereof projecting beyond the bead, a sliding frame, a pivotally and longitudinally movable frame mounted in the sliding frame, a forming-wheel rotatably mounted in the pivotally and longitudinally movable frame, such forming-wheel provided with a peripheral rabbet corresponding in shape with the bead, means for rotating the bed-plate, and means to maintain the forming-wheel with the rabbet therein, in contact with the projecting edge of the metal strip; substantially as described.

3. In a machine for making sheet-metal frames, the combination of a rotatable bed-plate provided with a bead, means for removably attaching a strip of sheet metal, having its ends united, to such bed-plate, adjacent to the bead and with one edge thereof projecting beyond the bead, means to rotate the bed-plate, a sliding frame, a head yieldingly mounted in the sliding frame, a pivotally and longitudinally movable frame mounted in such head, a forming-wheel rotatably mounted in the pivotally and longitudinally movable frame, such forming-wheel provided with a peripheral rabbet corresponding in shape with the bead, a screw-threaded collar on the pivotally and longitudinally movable frame and a corresponding screw-thread in the yielding head, and means to automatically move the sliding frame, whereby the rabbet in the forming-wheel is maintained in position over the bead and in contact with the projecting edge of the metal strip as the bed-plate rotates; substantially as described.

4. In a machine for making sheet-metal frames, the combination of a rotatable bed-plate provided with a bead, means for removably attaching a strip of sheet metal, having its ends united, to such bed-plate, adjacent to the bead and with one edge thereof projecting beyond the bead, shafts rotatably mounted in the frame of the machine, intermeshing gears on such shafts, a connection between the bed-plate and one of such shafts and a crank-arm on the other of such shafts,

a sliding frame, a connection between the sliding frame and the crank-arm, a head yieldingly mounted in the sliding frame, a pivotally and longitudinally movable frame mounted in such head, a forming-wheel rotatably mounted in the pivotally and longitudinally movable frame, such forming-wheel provided with a peripheral rabbet corresponding in shape with the bead, a screw-threaded collar on the pivotally and longitudinally movable frame and a corresponding screw-thread in the yielding head, and means to automatically move the sliding frame whereby the rabbet in the forming-wheel is maintained in position over the bead and in contact with the projecting edge of the metal strip as the bed-plate rotates; substantially as described.

5. In a machine for making sheet-metal frames, the combination of a rotatable bed-plate, provided with a molding on the operating-face thereof, means for removably attaching a strip of metal having its ends united, to such bed-plate, adjacent to the molding and with one edge thereof projecting beyond such molding, a movable frame, a head yieldingly mounted in such frame, a pivotally and longitudinally movable frame in such head, a forming-wheel rotatably mounted on the pivotally and longitudinally movable frame, such forming-wheel provided with a peripheral rabbet corresponding in shape with the molding, means to rotate the bed-plate, means to automatically move the movable frame to maintain the forming-wheel in the yielding head thereof adjacent to the molding and means to maintain such forming-wheel in contact with the projecting edge of the metal strip to force the same to a shape corresponding with the molding substantially as described.

HARRY A. SEYMOURE.

Witnesses:
CHARLES TURNER BROWN,
C. A. ADAMS.