

F. O. JAQUES, JR.
MACHINE FOR CONTOURING CROWN MATRICES.
APPLICATION FILED OCT. 27, 1908.

932,133.

Patented Aug. 24, 1909.

2 SHEETS—SHEET 1.

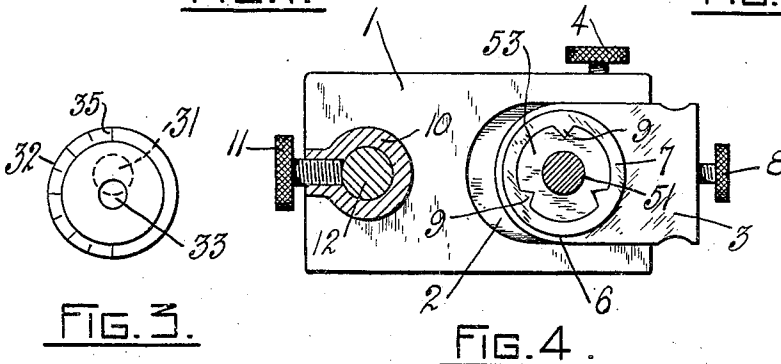
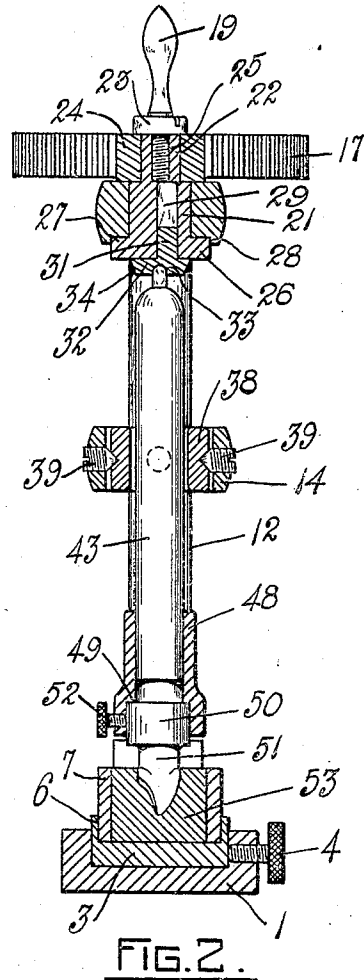
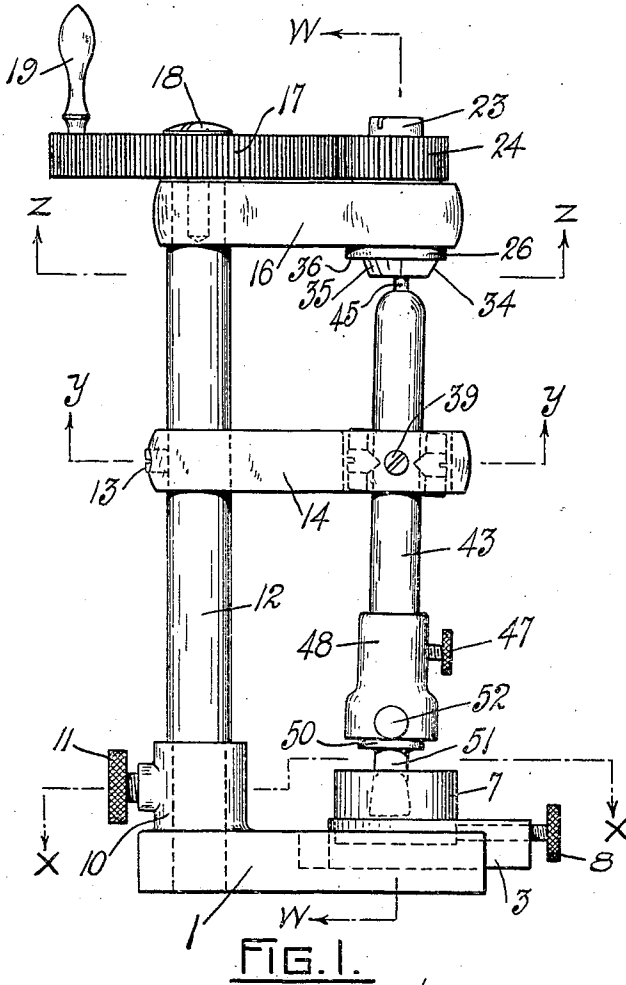


FIG. 4.

WITNESSES.

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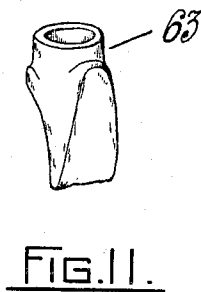
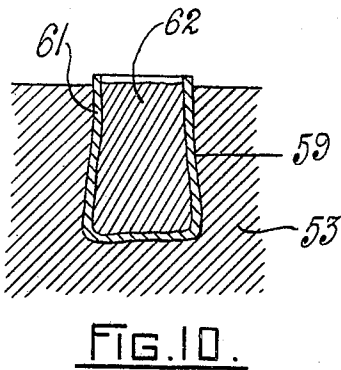
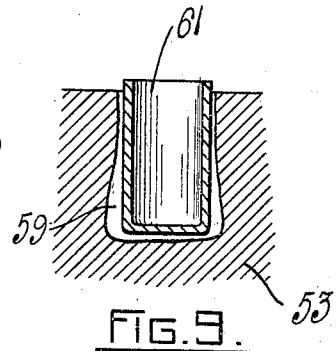
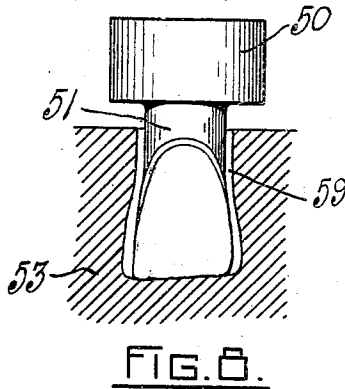
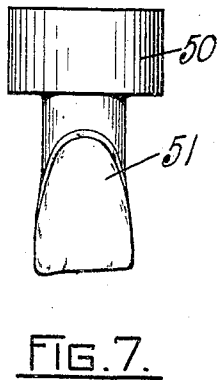
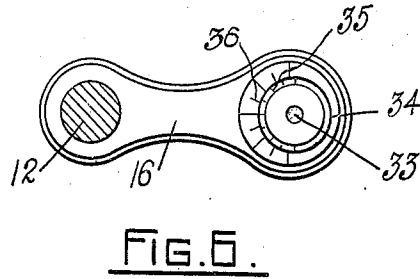
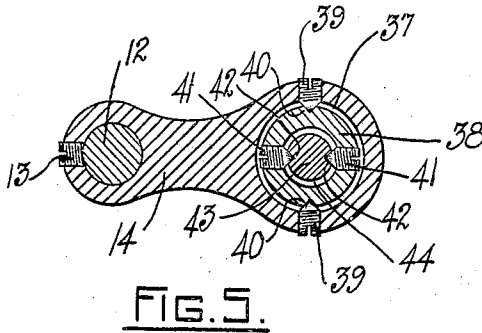
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WITNESSES.

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UNITED STATES PATENT OFFICE.

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MACHINE FOR CONTOURING CROWN-MATRICES.

932,133.

Specification of Letters Patent.

Patented Aug. 24, 1909.

Application filed October 27, 1908. Serial No. 459,699.

To all whom it may concern:

Be it known that I, FERNANDO O. JAKUES, Jr., a citizen of the United States, residing at Cranston, in the county of Providence and State of Rhode Island, have invented a certain new and useful Machine for Contouring Crown-Matrices, of which the following is a specification.

My invention relates to a machine for contouring matrices for seamless crowns.

In a co-pending application, Serial No. 459,698, filed October 27, 1908, is described a novel process or method of contouring seamless crowns, one step of which consists in forming a matrix having an orifice conforming in contour to the exterior of the natural tooth, and of such increased dimensions as to compensate for the thickness of the wall of the crown blank, to be later placed therein and operated upon. To perform these functions quickly, and accurately is the primary purpose of the present invention.

A further object is to provide means for adjusting the mechanism to increase or decrease the dimensions of the orifice according to the thickness of the particular crown blank wall to be manipulated; also to provide means for adjusting both the flask and the operating rod relatively to each other.

Other advantages will later be adverted to incidental to the subjoined description, and will be claimed.

The invention consists in a machine for performing the above functions; also in the novel construction and operation of the several and combined parts thereof.

In the accompanying drawings which constitute a part of the specification, Figure 1 is a side elevation of a machine embodying my invention, Fig. 2, a section of the same on line *ww* of Fig. 1, Fig. 3, a bottom plan view of the crank disk, Fig. 4, a section of the machine on line *xx* of Fig. 1, Figs. 5 and 6, sections on lines *yy* and *zz* respectively of Fig. 1, Fig. 7, a side elevation of the tooth model, Fig. 8, a like elevation of the same within the matrix, the latter being shown in transverse section, Fig. 9, a like section of the matrix and an unblank therein, Fig. 10, a like section of the same after the internal swaging operation, and Fig. 11, a perspective view of the completely contoured crown.

Like reference characters indicate like parts throughout the views.

The frame of the machine may be of any form adapted to carry the operative parts. In the form thereof herein shown, the frame comprises a base, post, and two lateral arms upon the post. The base, 1, is provided with a longitudinal recess, 2, in its upper face to receive a slidable block, 3, which is adjustable therein by a set screw, 4, in the side of the base. The block or slide, 3, is provided in its upper face with a recess, 6, to receive a flask, 7, which is frictionally engaged by a set screw, 8, in the end of the slide. The inner face of the flask has preferably interspaced V-shaped vertical ribs, 9.

In a socket or bearing, 10, integral with the rear end of the base, 1, is a set screw, 11, engaging a vertical post, 12, loosely mounted in the bearing. Integral with an intermediate portion of the post, or fixed thereto by a screw, 13, is a horizontal arm, 14. Integral with or fixed to the upper portion of the post is a second horizontal arm, 16, in vertical alinement with the arm, 14. A gear, 17, is loosely mounted upon the upper extremity of the post, and in this instance is held in place by the head of a vertical screw or pin, 18, in the top of the post. Upon the upper face of the gear, 17, is an operating handle, 19.

Rotatably mounted in the outer end of the arm, 16, is a cylindrical hub, 21, having upon its upper end a retracted portion or stem, 22, which projects above the face of the arm, 16, and upon which is fixed by a screw, 23, or otherwise a gear or pinion, 24, which meshes with the gear, 17. In this instance, the screw is received in a vertical threaded opening, 25, in the stem portion, 22, of the hub. The lower end of the hub is of increased diameter forming an integral circular disk portion, 26, whose upper shoulder, 27, is seated in a recessed portion, 28; in the lower face of the arm, 16. Obviously the portion, 26, may be an independent disk fixed in any convenient manner to the hub, 21. The hub, 21, is provided off center with a vertical opening, 29, which extends to or communicates with the opening, 25. A crank pin, 31, off center upon the upper face of a circular crank disk, 32, is frictionally tightly fixed in the opening, 29. The center of the lower face of the crank disk, 32, is

provided with a curved cavity, 33, and its periphery is preferably beveled as at 34. The beveled portion is provided with micro-metric graduations, 35, adapted to register with a graduated index, 36, upon the lower face of the disk portion, 26, of the hub.

In the arm, 14, is a circular opening, 37, in which is a ring or sleeve, 38, sustained by pivot points, 39, fixed in the arm and entering diametrically opposite cavities, 40, in the exterior of the ring. At diametrically opposite portions of the ring, 38, are fixed pivot points, 41, disposed at right angles to the points, 39, entering cavities, 42, in an intermediate portion of a rod, 43, interspaced as at 44 from the ring, 38. The described interspaced ring, 38, and pivot points constituting a yielding bearing in the arm, 14, for the rod, 43. The upper end of the rod or a pin, 45, with a rounded extremity, registers in the cavity, 33, of the crank disk, 32. The lower end of the rod, 43, has mounted thereon by the screw, 47, and adjustable thereby, a sleeve, 48, provided with a seat, 49, adapted to receive the base, 50, of a tooth form, 51, which base is engaged by a clamping screw, 52, in the sleeve, 48.

The operation and application of the described machine is as follows: The form, 50, 51, of the natural tooth, preferably of plaster of paris, and constructed as is well known in the art, is secured by the screw, 52, in the sleeve, 48. The block, 3, with the flask, 7, is slid in beneath the form and adjusted horizontally with relation thereto by the screw, 4. The sleeve, 48, is then vertically adjusted by screw, 47, to lower the form within the flask the desired distance. Any required transverse adjustment of the form is effected by turning the post, 12, in the sleeve, 10, and clamping the post in such adjusted position by the screw, 11. Casting metal, 53, is then poured in a fused condition into the flask, 7, and the gear, 17, is then rotated by the handle, 19, which turns the pinion, 24, hub 21, and disk 32, thereby imparting a radial oscillating motion to the rod, 43, and to the form during the cooling of the fused metal. The described movement of the form in the metal during its soft plastic condition produces, as shown in Fig. 8, a matrix, 53, having an opening, 59, conforming substantially with the contour of the form, 51, but of greater lateral dimensions. After the matrix, 53, has cooled, the plaster model, 51, is by any convenient pointed tool manually fractured and the pieces removed from the cavity, 59. After withdrawal of the matrix, 53, flask, 7, and block, 3, from the base 1, a cylindrical seamless crown blank or thimble, 61, is placed in the opening, 59, of the matrix, as shown in Fig. 9. The blank is then partly or completely filled with soft material such as filings, or a block of wood or rubber, 62, and tamped down to expand or force

the blank wall against the sides of the orifice, 59. The flask, 7, is then released by screw, 8, from its seat in block, 3, and the matrix forced out of the flask and transversely fractured by a hammer or otherwise leaving the contoured crown, 63, as shown in Fig. 11. The desired thickness of the crown wall, 61, varies; and in order to accommodate the size of the matrix to blanks having different wall thicknesses, it is necessary to vary the size of the opening, 59, to correspond. This variation is effected by the radial throw of the tooth model which is regulated to any desired degree by turning the disk, 32, upon its pin, 31, until the graduations, 35, register with the proper graduations of index, 36, upon the face of the disk portion, 26, of the hub. The removal of the crank disk for adjusting purposes is effected by introducing an implement through the openings, 25 and 29, and pressing the same against the pin.

What I claim is,

1. In a machine for contouring crown matrices, the combination with a flask for fused metal, of a frame, means mounted in the frame for supporting a tooth form within the flask, and means upon the frame engaging the supporting means for imparting radially oscillating movement to the form supporting means.

2. In a machine for contouring crown matrices, the combination with a flask for fused metal, of a frame means mounted in the frame and radially movable therein for supporting a tooth form within the flask, and means upon the frame for imparting continuous oscillating movement to the supporting means.

3. In a machine for contouring crown matrices, the combination with a frame, of a radially movable rod mounted intermediate its length in the frame, means upon the lower end of the rod for holding a tooth form, and means in the frame engaging the upper end of the rod for radially oscillating the holder.

4. In a machine for contouring crown matrices, the combination with a frame, of a rod pivotally mounted intermediate its length in the frame, means upon one end of the rod for engaging a tooth form, and rotary means in the frame engaging the other end of the rod for oscillating the rod.

5. In a machine for contouring crown matrices, a flask for holding fusible metal adapted to receive the impression of a tooth form, means in vertical alinement with the flask for supporting the tooth form, and means for continuously oscillating the supporting means.

6. In a machine for contouring crown matrices, the combination with a frame, of a vertical rod pivotally mounted in the frame, a tooth form holder upon the end of the rod,

means in the frame engaging the rod for oscillating the holder, a flask in the frame in vertical alinement with the holder, and means for adjusting the flask relatively to the holder.

7. In a machine for contouring crown matrices, the combination with a frame, of a vertical rod pivotally mounted in the frame, a tooth form holder upon one end of the rod, means in the frame and engaging the rod for oscillating the holder, and means in the frame engaging the oscillating means for regulating the degree of oscillation of the holder.

8. In a machine for contouring crown matrices, the combination with a frame, of a rod pivotally mounted upon the frame, a tooth form holder upon the rod, means in the frame engaging the rod for oscillating the holder, means in the frame coöperating with the oscillating means for regulating the degree of oscillation of the holder.

9. In a machine for contouring crown matrices, the combination with a frame, of a vertical rod pivotally mounted upon the frame, a tooth form holder upon the lower end of the rod, means in the frame engaging the rod for oscillating the holder, means in the frame coöperating with the oscillating means for regulating the degree of oscillation of the holder, a flask slidably mounted in the frame below the holder, and means for adjusting the flask horizontally with relation to the holder.

10. In a machine for contouring crown matrices, the combination with a frame, of a vertical rod pivotally mounted upon the frame, a tooth form holder upon the lower end of rod, means in the frame engaging the rod for oscillating the holder, means in the frame engaging the oscillating means for regulating the degree of oscillation of the holder, a flask mounted in the frame below the holder, and means in the frame for transversely adjusting the holder relative to the flask.

11. In a machine for contouring crown matrices, the combination with a frame, of a vertical rod pivotally mounted upon the frame, a tooth form holder upon the lower end of the rod, means in the frame engaging the rod for oscillating the holder, means in the frame engaging the oscillating means for regulating the degree of oscillation of the holder, a flask mounted in the frame below the holder, means for horizontally adjusting the flask relatively to the holder, and means transversely adjusting the holder relatively to the flask.

12. In a machine for contouring crown matrices, the combination with a frame, of a vertical rod pivotally mounted upon the frame, a tooth form holder upon the lower end of the rod, means in the frame engaging the rod for oscillating the holder, a flask

mounted in the frame below the holder, and means for adjusting the flask relatively to the holder.

13. In a machine for contouring crown matrices, the combination with a frame, of a vertical rod pivotally mounted upon the frame, a tooth form holder adjustably mounted upon the lower end of the rod, means in the frame coöperating with the rod for oscillating the holder, a flask in the frame below the holder and horizontally adjustable with relation to the holder, and means in the frame for transversely adjusting the holder relatively to the flask.

14. In a machine for contouring crown matrices, the combination with a frame, and flask, of a vertical operating rod pivotally mounted intermediate its length in the frame above the flask, a form holder upon the lower end of the rod, a crank disk rotatably mounted in the frame engaging the upper end of the rod, and means upon the frame for rotating the crank disk.

15. In a machine for contouring crown matrices, the combination with a frame and flask, of a vertical operating rod pivotally mounted intermediate its length in the frame above the flask, a form holder upon the lower end of the rod, a disk rotatably mounted in the frame and provided with a cavity in which registers the upper end of the rod, and means upon the frame for rotating the crank disk.

16. In a machine for contouring crown matrices, the combination with a frame and flask, of a vertically disposed operating rod pivotally mounted intermediate its length in the frame above the flask, a form holder upon the lower end of the rod, a disk eccentrically and rotatably mounted in the frame engaging the upper end of the rod, and means upon the frame for rotating the disk.

17. In a machine for contouring matrices, the combination with a frame, of an operating rod pivotally mounted intermediate its length in the frame, a hub rotatably mounted in the frame adjacent the end of the rod, a disk eccentrically mounted in the hub and provided with a cavity in which registers the end of the rod, and means upon the frame for rotating the hub.

18. In a machine for contouring matrices, the combination with a frame, of an operating rod yieldingly mounted intermediate its length in the frame, a hub provided with graduations upon its face rotatably mounted in the frame, a disk eccentrically fixed in the hub and resting against the face of the hub and provided with peripheral graduations adapted to register with the graduations upon the hub and provided with a cavity in its face adapted to receive the end of the rod, and means upon the frame for rotating the hub.

19. In a machine for contouring matrices, the combination with a frame, and an operating rod yieldingly mounted intermediate its length in the frame, of a hub provided with
 5 a longitudinal opening rotatably mounted in the frame adjacent the end of the rod a disk upon the lower end of the hub and provided upon its lower face with a cavity adapted to receive the end of the rod, a pin
 10 upon the upper face of the disk fixed in the longitudinal opening, a pinion fixed to the hub, and a driving gear upon the hub engaging the pinion.

20. In a machine for contouring matrices, the combination with a base, a post, and a horizontal arm upon the post, of a second horizontal arm fixed to the post below the first arm and provided with an opening, a ring of less diameter than the opening within
 20 the opening, pivot points in the arm engaging the periphery of the ring at diametrically opposite points, an oscillatory operating rod of less diameter than the ring traversing the ring, pivot points in the ring and disposed at an angle to the pivot points first
 25 mentioned engaging the rod at diametrically opposite points, and rotary means in the first arm engaging the end of the operating rod for actuating the operating rod.

21. In a machine for contouring matrices, the combination with the base and flask, of a
 30 socket upon the base, an axially movable vertical post mounted in the socket, an adjusting screw in the socket engaging the post, two horizontal arms fixed to the post in vertical
 35 alinement with the flask, an operating rod yieldingly mounted in one arm, and means in the other arm operatively connected with the rod for actuating the rod.

22. In a machine for contouring crown
 40 matrices, the combination with a flask for fused metal, of a frame, means mounted in the frame for supporting a tooth form within the flask, and means upon the frame for
 45 imparting radially oscillating movement to the form supporting means.

23. In a machine for contouring crown matrices, the combination with a flask for
 50 fused metal, of means for supporting a tooth form within the flask, and means for imparting radially oscillating movement to the form supporting means.

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

FERNANDO O. JAQUES, JR.

Witnesses:

HORATIO E. BELLOWS,

WALTER LOUIS FROST.