

July 17, 1928.

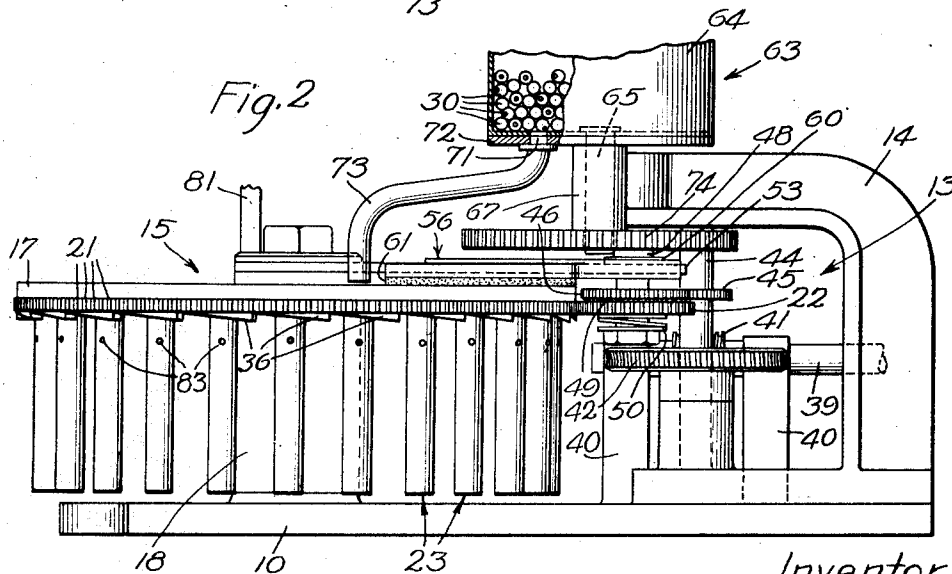
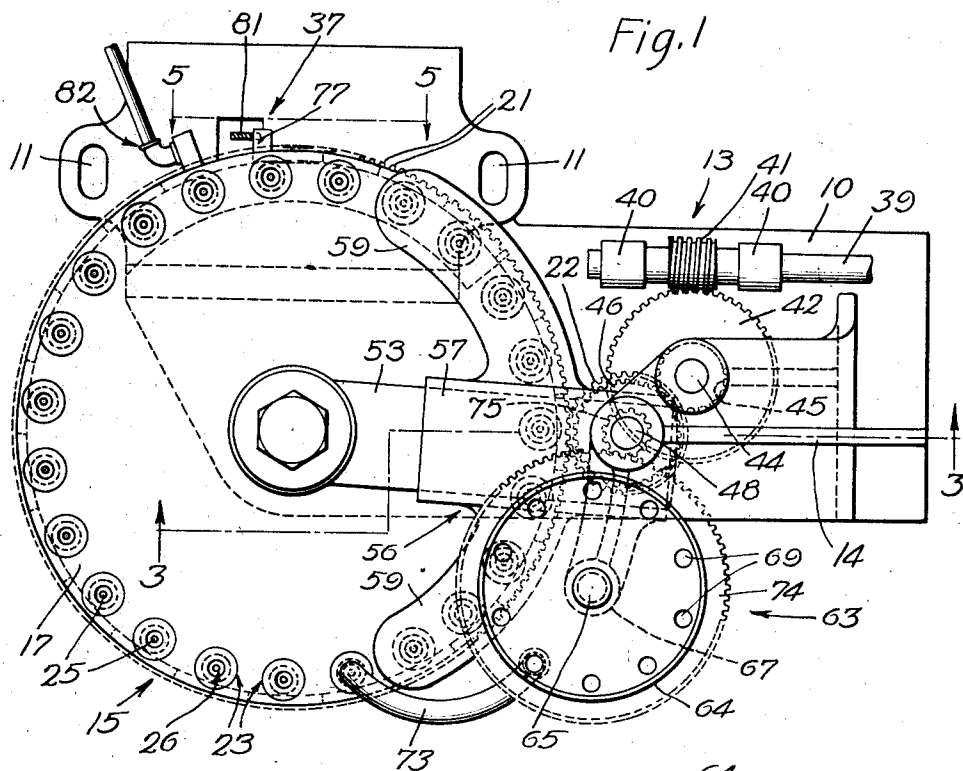
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1,677,178

METHOD OF AND APPARATUS FOR ASSEMBLING MEMBERS

Filed Sept. 10, 1926

2 Sheets-Sheet 1



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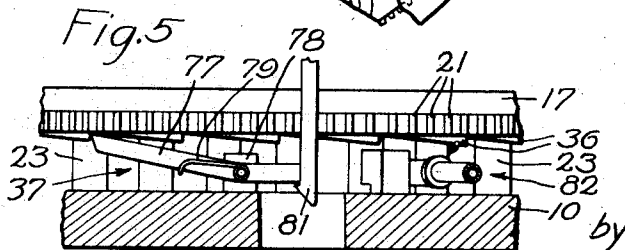
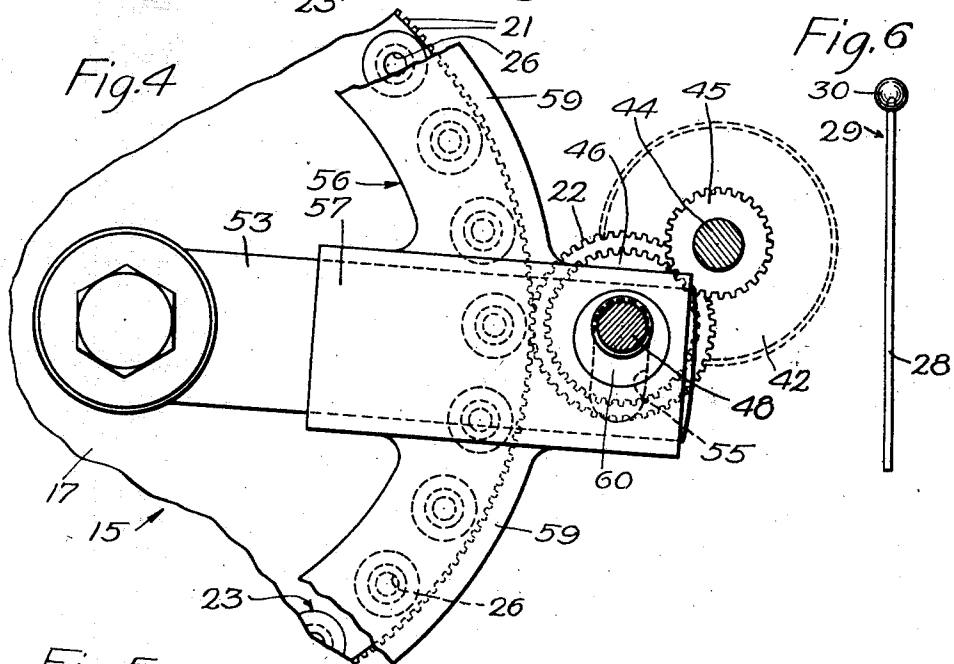
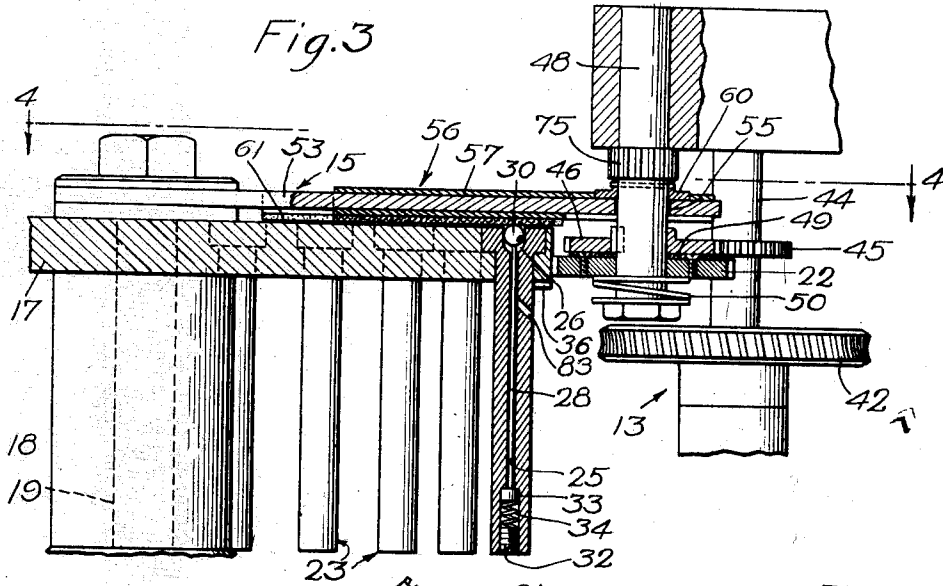
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METHOD OF AND APPARATUS FOR ASSEMBLING MEMBERS

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

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METHOD OF AND APPARATUS FOR ASSEMBLING MEMBERS.

Application filed September 10, 1926. Serial No. 134,746.

This invention relates to an improved method of and apparatus for assembling members, and more particularly to a method of and apparatus for assembling apertured spherical members with companion wire or rod members.

It has heretofore been the practice in some instances in the process of assembling apertured spherical members at the ends of companion wires or rods for the worker to manually select these individual members from supplies thereof and insert the end of the rod within the aperture of a companion spherical member. Thus, for example, this process has been followed in some cases in the production of telephone ringer clappers which comprise a rod with a spherical head member mounted at the end thereof and which form a part of the telephone signaling or ringing apparatus. After these parts have been thus assembled, the clapper head is then securely fastened or swaged on the rod.

The object of this invention is to provide a method of and apparatus for facilitating and expediting the assembling of apertured members with companion members.

To attain these and other objects and in accordance with the general features of the invention, the improved method contemplates imparting to an apertured spherical member a rotary or rolling motion of such a character as to present all portions of its surface to the end of a rod held in a relatively fixed position to insure the registration of the aperture and the rod end. Thereafter the assembled parts may be secured together by swaging or otherwise. An apparatus embodying the invention and which may be used to advantage in practicing the improved method comprises an oscillating member frictionally engaging a plurality of apertured spheres positioned over the upper ends of rods in individual recesses or depressions in a rotatable carrier to roll the spheres. Thus, various portions of the surface of each sphere are presented to the associated rod until registration of the aperture and the rod end is effected when the sphere disengages the oscillatory member. The engaged sphere and rod are then advanced to a position where they are secured together by swaging as by a conventional punch press.

These and other objects will be more apparent from the following detailed descrip-

tion and the accompanying drawings illustrating one embodiment of the invention in an apparatus which may be employed in practicing the method, and wherein

Fig. 1 is a plan view of an assembling apparatus;

Fig. 2 is a side elevational view of the apparatus with the hopper thereof shown partly in section and supplied with clapper heads;

Fig. 3 is a fragmentary vertical sectional view of the apparatus taken on the line 3—3 of Fig. 1;

Fig. 4 is a fragmentary horizontal sectional view taken on the line 4—4 of Fig. 3;

Fig. 5 is a detailed vertical sectional view taken on the line 5—5 of Fig. 1 disclosing the intermittent stop mechanism; and

Fig. 6 is an elevational view of an assembled ringer clapper which is representative of the type of article adapted to be assembled by the apparatus.

Referring now to the drawings wherein like numerals are employed to designate similar parts throughout the various figures, a horizontally disposed base 10 which supplies a mounting for the apparatus is adapted to be mounted upon the bed of a conventional punch press in any suitable manner such as by screws (not shown) inserted through openings 11 provided at opposite sides of the rearwardly extending portion of the base (Fig. 1). One end of the base 10 supplies a mounting for a driving mechanism denoted generally by the numeral 13 and a hopper supporting frame arm 14 while the other end of the base supports a rotary carrier or indexing mechanism 15.

The indexing mechanism 15 includes a horizontal indexing plate 17 which is rotatably mounted and supported at the upper end of a bearing member 18 extending upwardly from the base 10 (Figs. 2 and 3). This bearing member 18 houses a vertical shaft 19 which reaches upwardly therefrom through the indexing plate 17. The periphery of the indexing plate 17 is provided with gear teeth 21 which mesh with a frictional driving gear 22 which forms a part of the driving mechanism 13, later to be described. Positioned marginally of the indexing plate 17 and depending therefrom are a plurality of vertically disposed holders 23. These holders are seated at their upper ends within the plate 17 and are provided

with a longitudinal bore 25 which terminates at its upper extremity in a depression or recess 26 (Fig. 3). The bore 25 is adapted to receive a rod or stem portion 28 of a ringer clapper 29 of the type disclosed in Fig. 6 and the depression 26 is designed to receive an apertured spherical clapper head 30. The lower extremity of each holder 23 is provided with a screw 32 and interposed between the screw 32 and a cylindrical insert 33 is a coil spring 34. When the stem 28 is lodged within the bore 25, the lower end thereof will rest upon the insert 33 and the upper end will extend into the depression 26 in supporting relation with respect to its associated head member 30. Marginal ratchet teeth 36 are formed on the underside of the indexing plate 17 and are designed for cooperation with an intermittent stop mechanism 37 (Fig. 5), later to be described.

The driving mechanism 13 includes a drive shaft 39 (Fig. 1) which may be operatively connected with a suitable driving source (not shown) such as a propelling element of a punch press with which the assembling apparatus is adapted to be associated. The drive shaft 39 is mounted in upright bracket members 40 and a worm 41 carried by the shaft 39 engages with a companion worm wheel 42 horizontally disposed above the base 10 and mounted upon a vertical shaft 44. Mounted upon this shaft 44 at a position above the worm wheel 42 is a pinion gear 45 which meshes with a companion gear 46 carried by a vertical shaft 48 and positioned adjacent the indexing plate driving gear 22. It is to be understood that the driving shaft 39 may be continuously rotated while the assembling apparatus is in use. The gear 46 continuously transmits power to the driving gear 22 which is rotatably mounted upon the shaft 48 and which is provided with a fibrous friction disk 49 which is held in engagement with the gear 46 through the action of a coil spring 50 disposed beneath and engaged with the driving gear 22 (Fig. 3).

An oscillatory device positioned immediately above the indexing plate 17 includes a horizontally disposed tongue member 53 which is pivoted at one extremity upon the upper end of the vertical shaft 19 and is provided with a transverse slot 55 at its opposite extremity (Fig. 4). This transverse slot 55 is traversed by the vertical shaft 48 and serves to permit of the oscillation of the tongue 53 within certain limits. Slidably mounted upon the tongue 53 is a segmental oscillatory member 56 which is formed with a central body portion 57 slidably engaging with the tongue 53 and a pair of integral oppositely disposed segmental plates 59 extending laterally therefrom. One end of the body portion 57 of the oscillatory mem-

ber 56 engages with an eccentric 60 carried by the shaft 48, and it will be obvious that the rotation of this eccentric 60 will impart an oscillatory swinging motion to the tongue 53 and a combined swinging and reciprocating movement to the segmental member 56. Suitably secured to the underside of the segmental oscillatory member 56 is a facing of rubber or other suitable material 61, the lower surface of which lies immediately adjacent to the upper surface of the indexing plate 17 and the upper open ends of the recesses 26 of the holders 23. Referring to Fig. 3 wherein a ringer clapper stem 28 is shown in position within a holder 23 and an apertured spherical head is engaging the upper end of the stem, it will be understood that the oscillatory and circular movement of the rubber facing 61 engaging with the upper surface portion of the spherical head 30 will cause the head to rotate within the depression 26. At some point during this rotation of the clapper head 30 the aperture formed therein will be carried into registration and engagement with the upper end of the clapper stem 25 which projects upwardly into the bottom of the recess 26.

To supply the spherical clapper heads 30 to the depressions 26 a hopper mechanism 63 is provided (Figs. 1 and 2) which comprises a cylindrical container 64 which is secured to the upper end of a vertical shaft 65 mounted within a bearing member 67 formed at the extremity of the frame arm 14 mounted upon the base 10. The bottom of the container 64 is provided with a plurality of spaced concentrically arranged apertures 69 which upon the rotation of the container are adapted to successively register with a companion opening 71 (Fig. 2) provided in a fixed disk member 72 suitably secured to the upper end of the bearing 67. This opening 71 is connected with a conduit or pipe 73 which serves to direct clapper heads 30 entering the opening 71 into supported position within the depressions 26 of the holders 23. The rotation of the container 64 is occasioned through the operation of a large gear 74 carried at the lower end of the shaft 65 which engages with a pinion gear 75 keyed to the shaft 48. It is to be noted that the frame arm 14 also supplies an upper bearing support for the shafts 44 and 48 as well as a support for the hopper mechanism 63.

The intermittent stop mechanism 37 is located upon the rearwardly extending portion of the base 10 and includes a pawl 77 (Fig. 5) pivotally mounted upon a block 78 supported by the base 10. The pawl 77 is adapted to be held in engagement with the marginal ratchet teeth 36 of the indexing plate 17 through the action of a spring 79, a tripping finger 81, which may be secured in any suitable manner to the reciprocatory

slide of a press (not shown) is designed to momentarily disengage the pawl. This momentary disengagement of the pawl will take place during the upward movement of the tripping finger 81 which permits the frictionally driven driving gear 22 to impart a partial rotation to the indexing plate 17. When the pawl 77 again engages with the next following ratchet tooth 36 the indexing plate 17 will remain stationary for a period which is sufficient in duration to permit of a swaging or other suitable operation for affixing a clapper head with an associated stem 28.

To eject the assembled clapper heads subsequent to the swaging, an air-pressure device 82 is provided which operates to project a stream of air into the bore 25 of a holder 23 through an inclined opening 83 (Fig. 3) provided therein. The air pressure is sufficient to dislodge the assembled members from the holder and to force them upwardly therefrom, and this ejecting operation takes place during the dwell of the indexing plate 17 occasioned by the engagement of the pawl 77 with the ratchet teeth thereof.

In the operation of the apparatus a supply of apertured clapper heads 30 is placed within the hopper container 64 and rotation is imparted to the drive shaft 39 from any suitable source of power. Rotation of the shaft 39 causes the rotation of the gear 46 on the shaft 48 through the pinion gear 45 meshing therewith, the worm wheel 42 and its companion worm 41. When the pawl 77 is momentarily disengaged from the ratchet teeth 36 of the indexing plate 17, the gear 46, which is frictionally engaged with the driving gear 42, imparts a rotary movement to the indexing plate. Successive momentary disengagements of the pawl 77 results in the indexing plate 17 being intermittently rotated. The pinion gear 75 carried by the shaft 48 causes the rotation of the hopper container 63 through the large gear 74 and as the openings 69 in the bottom of the container register successively with the opening 71 of the stationary disk 72 the clapper heads 30 are carried by gravity into the pipe 73 which directs them to the depressions 26 in the holders 23 as said depressions are carried into position beneath the lower tip of the pipe 73. The direction of rotation of the indexing plate 17 is shown by the directional arrow (Fig. 1) and clapper stems 28 are manually inserted within the bores 25 of the holder members 23 before the depressions 26 companion to these bores are advanced into position to receive a clapper head beneath the pipe 73 as described. Clapper heads 30 are in this manner deposited within the depressions 26 and rest upon the upper ends of companion stem members 28 and as the clapper members thus associated con-

tinue to be indexed, the upper exposed surface of each clapper head is carried into frictional engagement with the facing 61 of the segmental oscillating member 56. The oscillating movement of the member 56 through the action of the eccentric 60 causes the rotation of the clapper head within the recess 26. This rotating or rolling movement is sufficient to insure the presentment of the every portion of the spherical surface to the end of the stem 28 and at some point during its travel beneath the facing 61, the aperture of the clapper head will be carried into registration and consequent engagement with its companion stem by gravitational force or by the action of the spring 34. In this connection it will be understood that the coil spring 34 in the bottom of each holder 23 which yieldingly supports an insert 33 provides a movable support to take care of variations in the length of the stems and also supplies a means for forcing the end of the stems into the apertures by companion heads. As the clapper members are advanced from beneath the facing 61 with the apertures of each clapper head engaged with a companion stem, a suitable swaging mechanism (not shown) may be employed to effectively join the members, this swaging operation taking place during the dwell of the indexing plate. Subsequent to the swaging operation and during the dwell of the indexing plate the assembled clapper members may be ejected by any suitable means such as the air pressure device 82.

Thus it will be apparent that the apparatus described permits the practice of a method of handling clapper members whereby these members may be continuously and expeditiously assembled.

What is claimed is:

1. The method of assembling an apertured spherical member with a companion member, which consists in associating the apertured spherical member with the companion member, imparting motion to the spherical member of such a character as to enable the presentation of every surface portion thereof to the companion member, and discontinuing the motion upon the registration of the aperture with the companion member whereby the apertured spherical member is assembled on the companion member.

2. The method of assembling an apertured spherical member with a rod, which consists in vertically positioning the rod, resting the apertured spherical member upon the upper end of the rod, rotating the spherical member upon the end of the rod to present various surface portions of the spherical member successively to the rod, and causing the end of the rod to register with the aperture of the spherical member whereby they are in assembled relation.

3. In apparatus for assembling an aper-

5 tured member with a companion member, means for supporting an apertured member and a companion member, and means for engaging the surface of a supported, apertured member to vary the position thereof with respect to another companion member whereby the end of the companion member registers with the aperture in the spherical member and assemblage of the members is effected.

10 4. In apparatus for assembling an apertured spherical member with a companion member, means for supporting an apertured spherical member with its surface engaged with a companion member to be assembled therewith, means for rotating a supported apertured spherical member with respect to its companion member whereby the end of the companion member registers with the aperture in the spherical member and assemblage of the members is effected, and means for actuating the rotating means.

15 5. In apparatus adapted for attachment to the bed of a press for assembling apertured spherical members with companion members, means for supporting the companion members, means for supporting apertured spherical members with the surfaces thereof engaged with companion members for assembly therewith, means for rotating the supported spherical members, and means operable to intermittently advance the supported members in a predetermined path.

20 6. In apparatus for assembling apertured spherical members with companion members, means having depressions for supporting apertured spherical members in engagement with the upper surface of companion members extending into the depressions, means for indexing the supporting means, and means for engaging the upper surface portion of a supported spherical member for rotating the member to cause the registration

of the aperture therewith with the companion member.

45 7. The method of assembling an apertured member with another member, which consists in associating the surface of the apertured member with the other member, changing the relative positions of the members to present various surface portions of the apertured member to the other member, and causing the assemblage of the apertured member on the other member.

50 8. The method of assembling an apertured spherical member with a companion member, which consists in engaging the surface of the apertured spherical member with the companion member for assembly therewith, changing the relative positions of the members to present various surface portions of the spherical member to the companion member, and causing the assemblage of the apertured spherical member on the companion member.

55 9. The method of assembling an apertured spherical member with a companion member, which consists in rotating the apertured spherical member associated with the companion member engaging the surface of the spherical member, and causing the assemblage of the apertured spherical member on the companion member.

60 10. The method of assembling an apertured spherical member with a companion member, which consists in rotating the apertured spherical member associated with the companion member engaging the surface of the member, causing the assemblage of the apertured spherical member on the companion member, and advancing the assembled members to a predetermined position.

80 In witness whereof, I hereunto subscribe my name this 25 day of August, 1926.

JOSEPH WILLIAM FAY.