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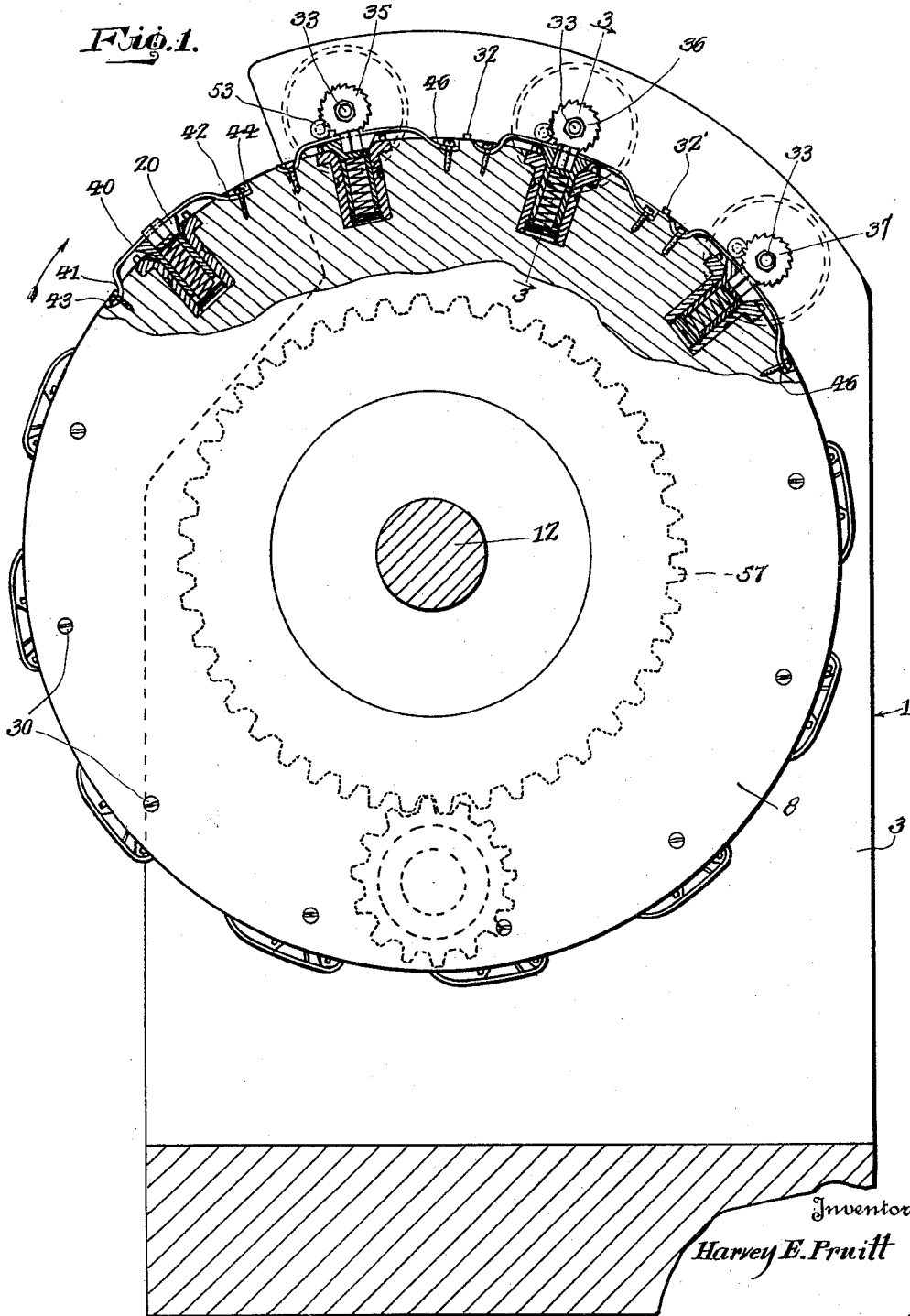
H. E. PRUITT

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CASTELLATING MACHINE

Filed Sept. 30, 1931

2 Sheets-Sheet 1



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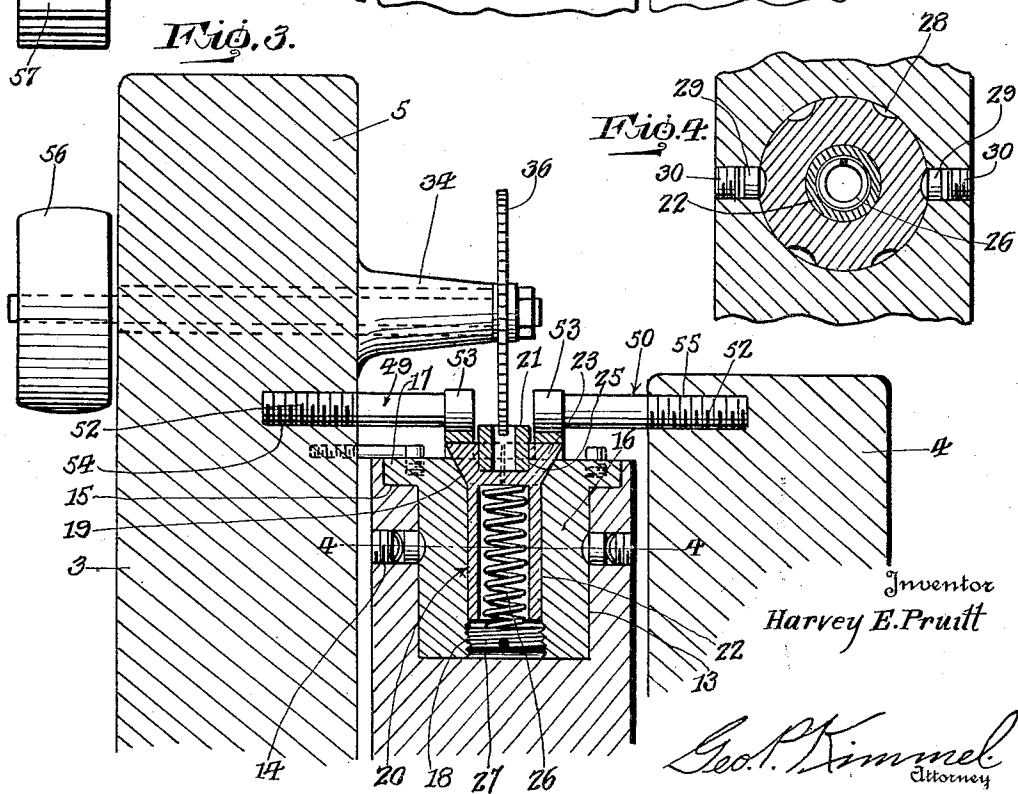
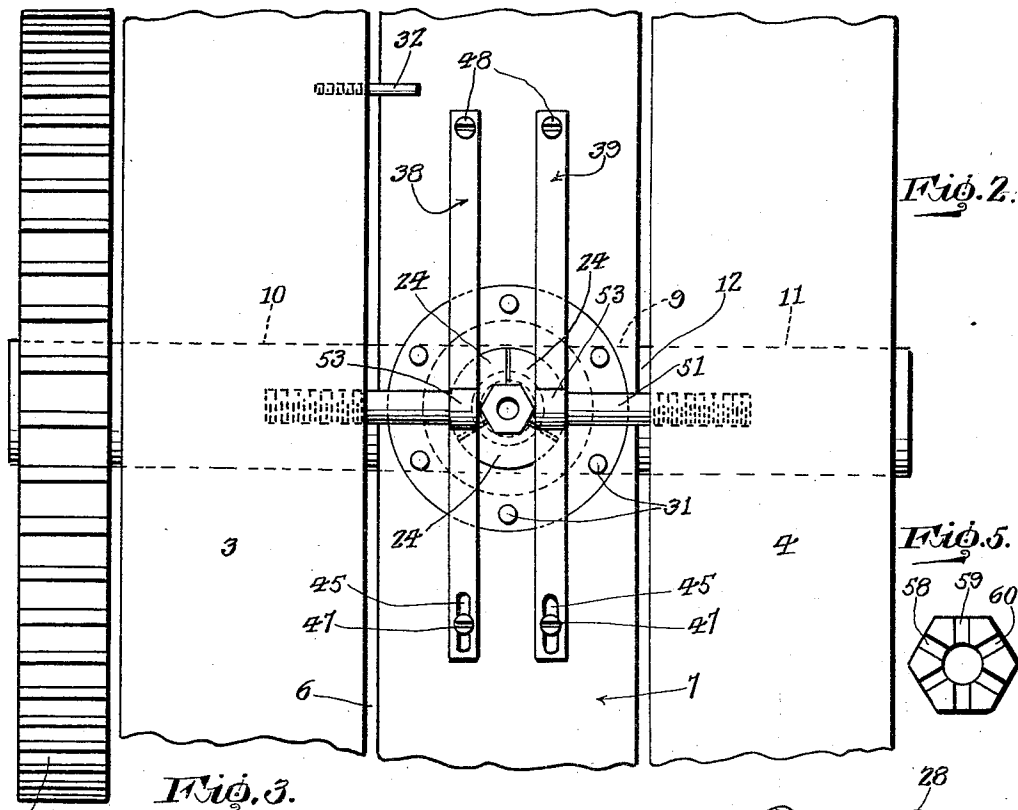
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UNITED STATES PATENT OFFICE

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CASTELLATING MACHINE

Application filed September 30, 1931. Serial No. 566,128.

This invention relates to a castellating machine, designed primarily for a castellating action upon nuts, but it is to be understood that a machine, in accordance with this invention may be employed in any connection for which it may be found applicable, and has for its primary object to successively form a plurality of oppositely extending grooves of the desired depth in the outer faces of successively positioned nuts.

Further objects of the invention are to provide a machine of the class referred to which is simple in its construction and arrangement, strong, durable, compact, thoroughly efficient in its use, conveniently operated, readily assembled and repaired, and comparatively inexpensive to set up.

To the above ends essentially the invention consists in such parts and in such combination of parts as fall within the scope of the invention as claimed.

In the drawings wherein like reference characters denote corresponding parts throughout the several views:

Figure 1 is a vertical section of a castellating machine in accordance with this invention.

Figure 2 is a fragmentary view in top plan of the machine with the cutters omitted.

Figure 3 is a section on line 3—3 Figure 1.

Figure 4 is a section on line 4—4 Figure 3.

Figure 5 is a plan view of the completed nut.

The machine includes a supporting structure referred to generally at 1 and comprising a base provided with a pair of upstanding, opposed, spaced, parallel supports 3, 4, the former being of greater height than and extending above the other, as at 5.

The space between the supports 3, 4 is indicated at 6 and in which is suspended for rotation a nut magazine referred to generally at 7, and consisting of a circular body 8 having an axial opening 9 which aligns with openings 10, 11 formed in the supports 3, 4 respectively. Extending through the aligning openings 9, 10 and 11, as well as being fixedly secured to body 8 is the operating shaft 12 for the magazine 7.

The magazine 7 is formed with a series of

equally spaced radially disposed, circular sockets 13 opening at the edge of body 8 and a series of spaced pairs of openings 14. The openings of each pair open at their outer ends at the side faces of body 8 and at their inner ends communicate with a socket 13. The number of sockets 13 can be as desired for the purpose of increasing or decreasing the capacity of the magazine 7. The number of sockets as illustrated is by way of example. Associated with each socket will be a pair of openings 14.

The wall of each socket is formed of two different diameters to provide a shoulder 15. The portion of smallest diameter of the wall of each socket is of greater length than that portion of largest diameter, the latter being at the outer end of the socket. Mounted in each socket 13 is a tubular collet carrier 16 provided with an outwardly directed annular flange 17 which seats against shoulder 15. The carrier 16 is flush at its outer end with the edge of body 8 and has its inner end seat against the bottom of socket 13. The diameter of carrier 16 is such as to have a snug sliding fit with respect to the wall of the socket. The inner face of carrier 16 at its inner end is formed with threads 18 for a purpose to be referred to. The inner face of carrier 16 at its outer end is flared as at 19 to provide a tapered seat. The carrier 16 is arranged for intermittently revolving within body 8.

Mounted in carrier 16 and bodily movable therewith is a collet 20 for clamping and supporting a hexagonal nut 21 to be grooved. The collet 20 includes a tubular part 22 and a tapered clamping head 23 which receives and clamps nut 21 in an extended position to be successively acted upon by a series of spaced groove forming cutters to be presently referred to. The head 23 closes the outer end of part 22 and is split to form a series of resilient clamping jaws 24 of segmental contour. The head 23 has its front or outer face formed with a hexagonal pocket 25 to receive the nut 21. Arranged within the part 22 and bearing against head 23 is a push out spring 26 for collet 20. Threadedly engaging with the threads 18 and bearing against

spring 26 is a tensioning plug 27 for the latter. The inner end of part 22 is permanently spaced from the plug 27. The normal position of the collets 20 is as illustrated at the left, right and bottom of the magazine 7 as shown in Figure 1. The clamping position of the collets 20 with respect to the nuts is as illustrated at the top of magazine 7 as shown in Figure 1.

Each carrier 16 is formed with a row of spaced concavities 28 disposed circumferentially of the outer face thereof. The cavities are arranged whereby one will be diametrically opposite another. The pair of diametrically opposed cavities are adapted to receive a pair of oppositely disposed, opposed, spring controlled latching devices 29 mounted in a pair of openings 14. Each carrier is intermittently revolved. It requires six impulses to provide for one complete revolution of a carrier. After each impulse the carrier is latched in position by the devices 29 coacting with a pair of diametrically opposed cavities. The latching devices 29 are held within the openings 14 by the carriers and the retaining means 30 which are secured in the outer portions of openings 14.

The outer end of each carrier has secured thereto a series of equi-distant spaced pins 31, six in number and which are successively acted upon by a pair of shifting elements 32, 32' disposed over the magazine 7 in a manner to successively impact the pins. The elements 32, 32' are carried by the extended portion 5 of the support 3. The carriers are not shifted until they arrive at the upper portion of the support 3 and after nuts in the collets have had the first groove formed therein. The nuts are to be grooved transversely of the upper face thereof at three spaced points and each groove is intersected by the opening formed by the nut body. The manner in which the nuts appear after they have been grooved is shown by Figure 5. When an element 32 or 32' impacts a pin 31 the carrier will be shifted one-sixth of a revolution.

The magazine 7 when rotatably suspended between the supports 3, 4 projects outwardly beyond the front of such supports and is arranged below the top of support 4 and the extended portion 5 of support 3. Journaled in such extended portion 5 is a series of spaced cutter shafts 33, which are equally spaced with respect to each other, overhang magazine 7 and extend beyond the outer side of portion 4. A bearing 34 is provided for each shaft 33 and it is positioned on the inner side of portion 5. The shafts 33 extend beyond the outer ends of the bearings 34. Secured upon the extended inner ends of shafts 33 are cutters 35, 36 and 37 which are in the form of circular saws, disposed in alignment with the center of the edge of body 8 and in the path of

the nuts in those carriers at the top of magazine 7. See Figures 1 and 2.

As the magazine 7 travels in the direction of the arrow, Figure 1, and just before a carrier will reach cutter 35, the nut mounted in the collet positioned in such carrier will be clamped to such collet by an operating means or mechanism for the clamping jaws of the collet. As the magazine continues to move in the direction of the arrow the clamped nut will be acted upon by cutter 35 and grooved. After the nut has been grooved and passes away from cutter 35 the clamping jaws of the collet will be released. As the magazine travels towards cutter 36, the carrier referred to will be moved one-sixth of a revolution by the shifting element 32 impacting a pin 31. The grooved nut will bodily move with the carrier and present a non-grooved surface for cutter 36 to act upon. Just before the carrier reaches cutter 36 the grooved nut will be clamped to the collet by an operating means for the jaws of the collet. As the magazine continues to move in the direction of the arrow the clamped grooved nut will be acted upon by cutter 36 to provide a second groove in the nut. After the cutter 36 has acted upon the nut, the latter passes away from cutter 36 and the clamping jaws of the collet are released.

As the magazine travels towards cutter 37, the carrier referred to will be moved one-sixth of a revolution by the shifting element 32' impacting that pin 31 which is in its path, and another non-grooved surface of the grooved nut will be presented to be later acted upon by cutter 37. Just before the carrier reaches cutter 37 the grooved nut will be clamped to the collet by an operating means for the jaws of the collet. As the magazine continues to move in the direction of the arrow the clamped double grooved nut will be acted upon by cutter 37 to provide the third groove therein.

After the cutter 37 has acted upon the nut, the latter passes away from such cutter, the clamping jaws of the collet are released and as the magazine continues to travel in the direction of the arrow the carrier will be moved downwardly and the completed nut will drop from the collet by gravity.

The operating means for the clamping jaws of the collets consists of a pair of resilient, combined collet retainers and clamping jaw presser bars for each collet secured upon the edge of body 8, and a set of three spaced pairs of compressing members common to each pair of combined collet retainers and clamping jaw presser bars. The pairs of compressing members successively operate upon each pair of bars.

The bars of each pair are indicated at 38, 39, are arranged in opposed parallel spaced relation and disposed circumferentially of the edge of body 8. One bar of a pair opposes

one side of the outer face of the clamping head 23 of a collet and the other the opposite side of such face and act to retain the collet in the carrier. The bars are spaced from the pocket 25. The bars are of materially greater length than the diameter of a carrier. Each bar of a pair is of like construction and consists of an intermediate bow-shaped portion 40 and a pair of oppositely curved end portions 41, 42. The edge of body 8 is formed with a pair of spaced concavities 43, 44 coacting with each bar to receive the end portions 41, 42 respectively of the bar. The end portion 41 is formed with a lengthwise slot 45 and the end portions 42 with an opening 46. Extending through the slot 45 and opening 46 are holdfast devices 47, 48 respectively. The end portion 41 is slidably connected to body 8 and the end portion 42 held stationary thereon.

The compression members of each pair are designated 49, 50 the former coacts with bar 38 and the latter with bar 39. The members of each pair are of like construction, oppositely disposed, arranged in endwise opposed alignment and spaced from each other. Each member consists of a shaft 51 provided with a threaded portion 52 and a roller 53 mounted on one end of shaft 51. The members 49 have their threaded portions 52 secured in sockets 54 formed in the support 3. The members 50 have their threaded portions 52 secured in sockets 55 formed in the support 4. The member of each pair overhang magazine 7 and are disposed transversely with respect to the edge of body 8. The rollers 53 of members 49 ride against the bow-shaped portions of the bars 38 for the purpose of compressing the latter. The rollers 53 of member 50 ride against the bow-shaped portions of the bars 39 for the purpose of compressing the latter. The bars of each pair are simultaneously compressed by the rollers of a pair of members. When the bars of a pair are compressed they press inwardly that collet with which they are associated and act upon the clamping jaws of the collet head to provide for such jaws clamping the nut in the pocket in such head. The beveled seat in the carrier coacting with the beveled outer periphery of the collet head to force the jaws to clamping position when the collet is moved inwardly by the pair of bars against the action of the push out spring for the collet.

After the rollers of a pair of members 49, 50 pass clear of the bow-shaped portions of a pair of bars, such portion will move outwardly and such movement will be assisted by the collet, due to the push out action thereon by its push out spring. The bow-shaped portions of the bars are normally extended from the edge of the body 8 so as to be engaged by the rollers of the compressing members therefor as the magazine rotates. The slots in the ends of the bars enable the bow-shaped por-

tions to be compressed by the rollers without the bending or distorting of the bars.

The nuts to be acted upon are positioned in the pockets 25 in the heads 23 of the collets from the front of the machine. The nuts after being acted upon fall upon the base 2.

Each cutter shaft can be driven by any suitable means and as shown the shaft is provided with a drive pulley 56 operated from any suitable source. The shaft 12 can be driven by any suitable means and as shown it is operated by a reduction gearing 57. The operation of the shaft 12 can be intermittent if desired. The grooves formed in the nut are indicated at 58, 59 and 60.

What I claim is:—

1. In a castellating machine, a magazine comprising a circular rotatable body provided in its edge with spaced revoluble carriers each carrying a spring controlled collet including a normally extended, peripherally beveled head formed with a nut receiving pocket and a plurality of normally inactive shiftable clamping jaws for the nut, said carriers including beveled seats upon which the beveled peripheries of said heads are slidably mounted, an operating shaft for said body, a supporting structure for said shaft, coacting elements carried by said structure and carriers for intermittently and successively revolving the carriers on the rotation of said body, a pair of spaced opposed presser bars carried by said body for and extending across each head, means carried by said structure for successively compressing each pair of presser bars to simultaneously shift the jaws of a head successively to successively clamp a nut to the head in position to be acted upon, and a plurality of cutters carried by said structure for successively grooving the successively clamped nut during the rotation of said body.

2. In a castellating machine, a magazine comprising a circular rotatable body provided in its edge with spaced revoluble carriers each carrying a spring controlled collet including a normally extended head formed with a nut receiving pocket and a plurality of normally inactive shiftable clamping jaws for the nut, an operating shaft for said body, a supporting structure for said shaft, coacting elements carried by said structure and carriers for intermittently and successively revolving the carriers on the rotation of said body, a pair of spaced opposed presser bars carried by said body for and extending across each head, means carried by said structure for successively compressing each pair of presser bars to simultaneously shift the jaws of a head successively to successively clamp a nut to the head in position to be acted upon, and a plurality of cutters carried by said structure for successively grooving the successively clamped nut during the rotation of said body, each of said carriers having a bev-

eled seat and the head of each collect having a tapered periphery opposing a seat, said seats and tapered peripheries of the heads coacting to shift the clamping jaws to clamping position with respect to the nuts.

3. In a castellating machine, a suspended, rotatable magazine provided with a series of carriers, a spring controlled normally projected collet mounted in and bodily moving with each carrier, each collet including a peripherally beveled head having a nut receiving pocket and a plurality of clamping jaws for clamping the nut to the head, said carriers including beveled seats upon which the beveled peripheries of said heads are slidably mounted, pairs of presser bars carried by the magazine for retaining the collets in the carriers and for shifting the jaws to clamping position, an operating shaft for and suspending the magazine, a supporting structure for the shaft, said carriers and structure having coacting means for intermittently and successively revolving the carriers, means secured to said structure for successively compressing each pair of presser bars to simultaneously and successively shift the jaws of each collet to clamping position, and a plurality of cutters secured to said structure for successively grooving the successively clamped nut during the rotation of said body.

4. In a castellating machine, a magazine for successively positioning the work to be acted upon successively by a series of spaced cutters, said magazine comprising a rotatable body of circular form having its edge provided with a plurality of spaced sockets, an intermittently revoluble carrier mounted in each socket, a depressible collet bodily moving with and positioned in each carrier and including a head formed with a plurality of work clamping jaws and a pocket to receive the work, means within the collet and the carrier for normally extending the head from the carrier, said carrier and heads having coacting means for moving the jaws to clamping position on the depressing of the collets, and an independent, compressible means extending across each head for retaining a collet within its carrier and when compressed moving the jaws to work clamping position.

5. In a castellating machine, a rotatable suspended circular body, a plurality of spaced, normally extended, revoluble spring controlled work holders mounted in said body and each including normally inactive clamping jaws for the work and coacting means for shifting the jaws to active position, a supporting structure for said body, an independent, compressible means extending across each holder for retaining it in said body and when compressed moving the jaws of the holder to work clamping position, means carried by said structure for successively shifting each compressing means, means carried

by said structure and work holders intermittently revolving each holder after the shifting of said compressible means, and a set of cutters for successively acting upon the work in each holder after the operation of said compressible means.

6. In a castellating machine, a magazine for successively positioning the work to be acted upon successively by a series of spaced cutters, said magazine comprising a rotatable body of circular form having its edge provided with a plurality of spaced sockets, an intermittently revoluble carrier mounted in each socket, a depressible collet bodily moving with and positioned in each carrier and including a head formed with a plurality of shiftable work clamping jaws and a pocket to receive the work, said carriers and heads having coacting means for shifting the jaws to active position on the depressing of the collets, means within the collet and the carrier for normally extending the head from the carrier, an independent, compressible means extending across each head for retaining a collet within its carrier and when compressed moving the jaws to work clamping position, and means for intermittently latching each carrier during the revolving thereof.

7. In a castellating machine, a rotatable suspended circular body, a plurality of spaced, normally extended, revoluble spring controlled work holders mounted in said body and each including normally inactive clamping jaws for the work and coacting means for shifting the jaws to active position, a supporting structure for said body, an independent, compressible means extending across each holder for retaining it in said body and when compressed moving the jaws of the holder to work clamping position, means carried by said structure for successively shifting each compressing means, means carried by said structure and work holders intermittently revolving each holder after the shifting of said compressible means, a set of cutters for successively acting upon the work in each holder after the operation of said compressible means, and means for intermittently latching each carrier during the revolving thereof.

8. In a castellating machine, a magazine including a rotatable body for moving the work to a position to be acted upon and having spaced sockets, an intermittently revoluble carrier within each socket, a spring controlled, normally extended work holder mounted in and bodily moving with each carrier and including normally inactive clamping jaws for the work, said carriers and work holders having coacting means for moving the jaws to active position, and a pair of compressible presser bars extending across each holder and its carrier for retaining them in said body and when compressed shifting the jaws of the holder to work clamping po-

sition, each of said bars having an intermediate normally extended portion and a pair of end portions, one of said end portions being fixed to said body and the other being
5 slidably connected to said body.

9. In a castellating machine, a magazine including a rotatable body for moving the work to a position to be acted upon and having spaced sockets, an intermittently rev-
10 oluble carrier within each socket, a spring controlled, normally extended work holder mounted in and bodily moving with each carrier and including normally inactive clamping jaws for the work, a pair of compressible
15 presser bars extending across each holder and its carrier for retaining them in said body and when compressed shifting the jaws of the holder to work clamping position, each of
20 said bars having an intermediate normally extended portion and a pair of end portions, one of said end portions being fixed to said body and the other being slidably connected to said body, each carrier having a tapered
25 seat, and each work holder including a tapered head normally extending from said seat and of which said jaws form parts thereof.

In testimony whereof, I affix my signature hereto.

30 HARVEY E. PRUITT.

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