May 19, 1925. 1,538,659

F. N. ROSS

MACHINE FOR MANUFACTURING STUDS, NIPPLES, AND SIMILAR ARTICLES

Filed March 6, 1922 5 Sheets-Sheet 1

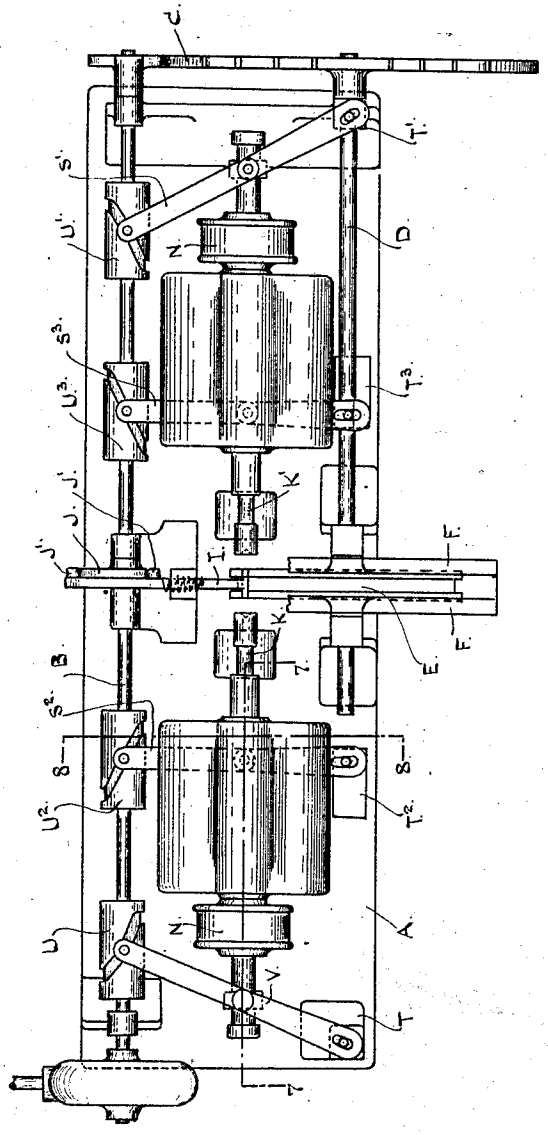


Fig. 1.

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Filed March 6, 1922 5 Sheets-Sheet 2

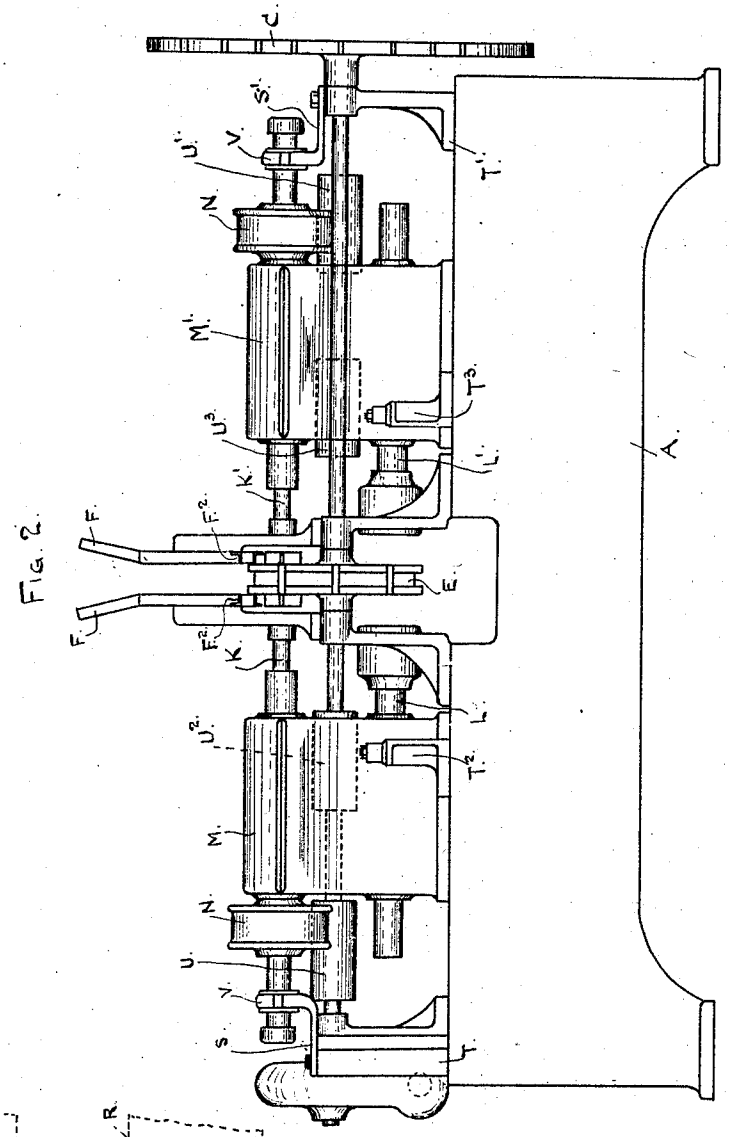


Fig. 2.

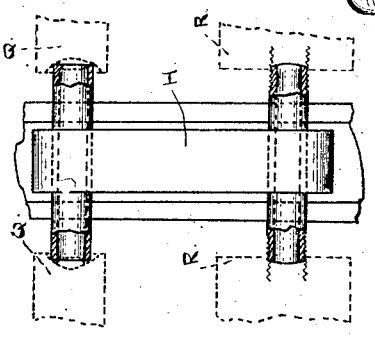


Fig. 9.

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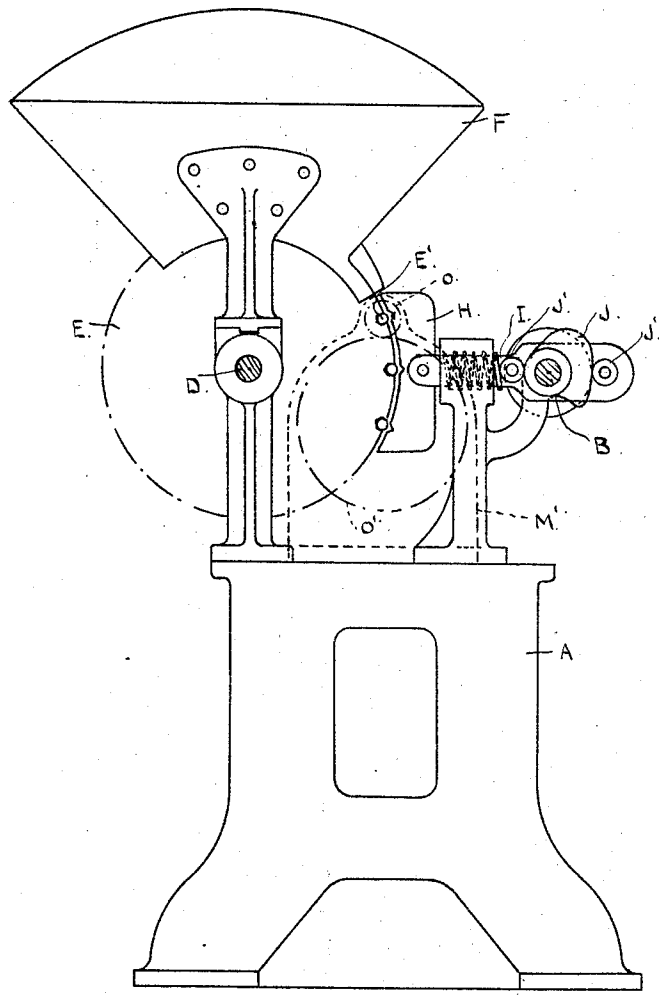
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MACHINE FOR MANUFACTURING STUDS, NIPPLES, AND SIMILAR ARTICLES

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FIG. 3.



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MACHINE FOR MANUFACTURING STUDS, NIPPLES, AND SIMILAR ARTICLES

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Fig. 5.

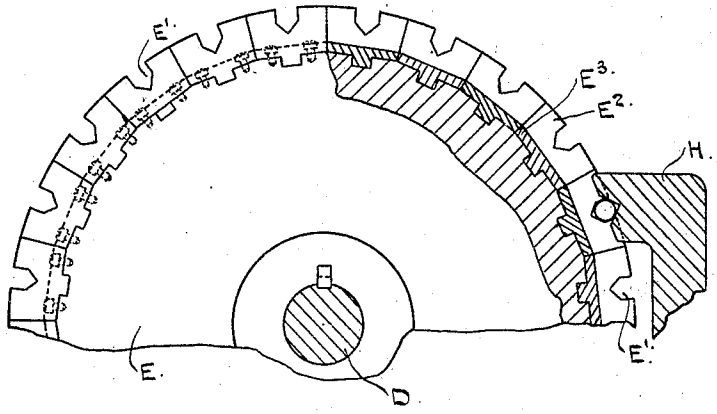


Fig. 4.

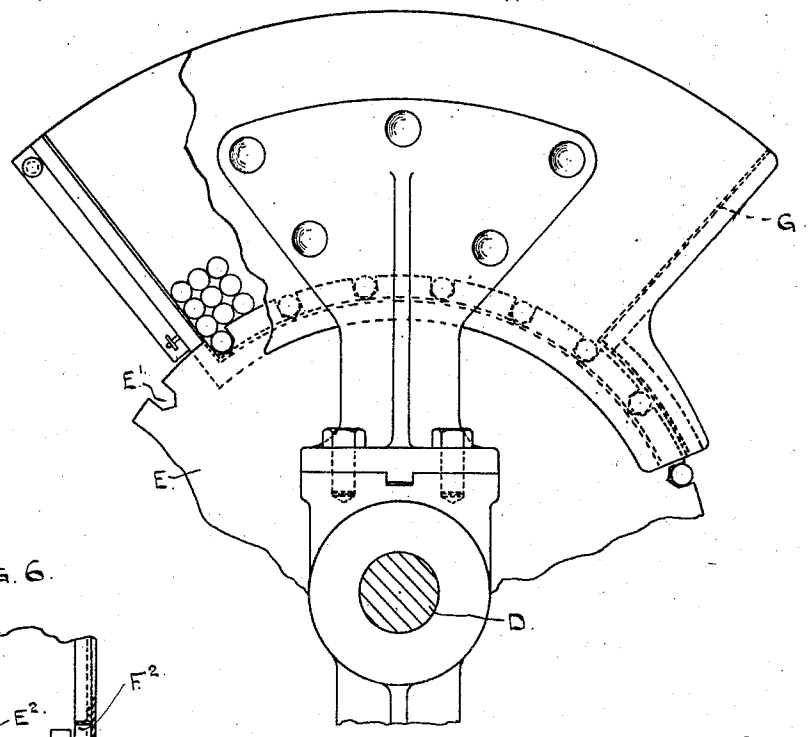
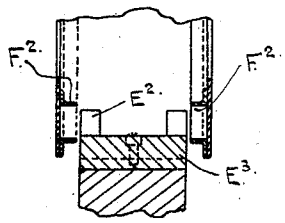


Fig. 6.



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MACHINE FOR MANUFACTURING STUDS, NIPPLES, AND SIMILAR ARTICLES

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Fig. 7.

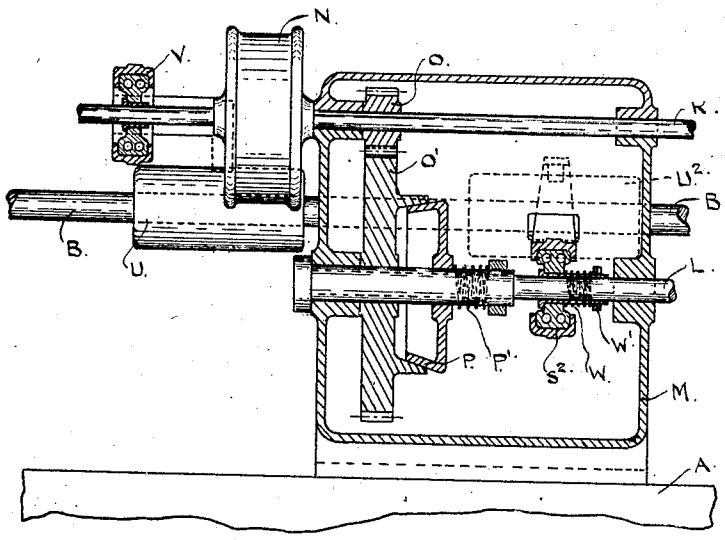
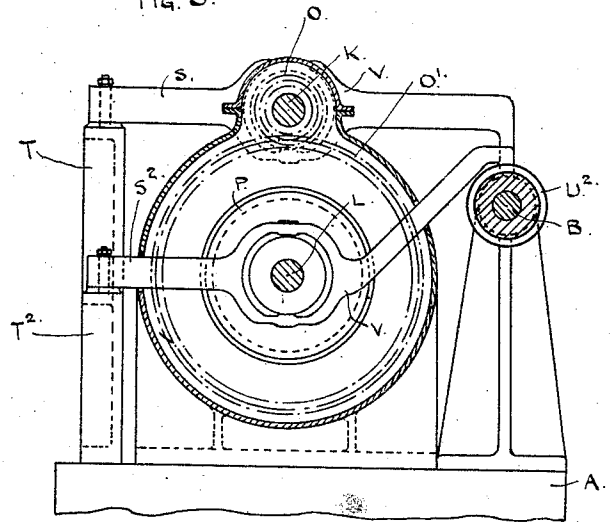


Fig. 8.



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Patented May 19, 1925. 1,538,659

UNITED STATES PATENT OFFICE.

FREDERICK N. ROSS, OF DETROIT, MICHIGAN.

MACHINE FOR MANUFACTURING STUDS, NIPPLES, AND SIMILAR ARTICLES.

Application filed March 6, 1922. Serial No. 541,607.

To all whom it may concern:

Be it known that I, FREDERICK N. ROSS, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Machines for Manufacturing Studs, Nipples, and Similar Articles, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to machines for the manufacture of threaded pipe nipples, studs and similar articles, and it is the object of the invention to obtain automatic means for successively performing upon a series of blanks the necessary operations for completing the same. It is a further object to guard against the breaking of the dies or other cutters which are used and to avoid throwing the machine out of time in case of clogging. With these and other objects in view the invention consists in various features of construction as hereinafter set forth.

In the drawings:

Figure 1 is a top plan view of the machine;

Figure 2 is a side elevation thereof;

Figure 3 is an end elevation;

Figure 4 is a sectional side elevation of the work feeding hopper;

Figure 5 is a sectional elevation through the feeding wheel and work holding clamp;

Figure 6 is a cross-section through a portion of the hopper and wheel;

Figure 7 is a longitudinal section showing the driving mechanism for the cutters;

Figure 8 is a cross-section showing the same mechanism;

Figure 9 is an elevation of the work holding clamp.

In the manufacture of studs, pipe nipples, etc., the stock is first cut to the proper length and is then threaded at opposite ends. The cutting of the stock will generally raise a burr adjacent to the cut which must be removed in the finished product, and it is also necessary to chamfer the ends to avoid the raising of a burr by the threading operation. Inasmuch as both ends are threaded, these operations must either be successively performed or some means provided which will hold the work without interference with the operations at either end. My improved construction consists essentially of a means for alternately advancing and clamping the stock and performing on the stock, while in clamped position, the necessary machining operations. These, in the case of the manufacture of pipe nipples, consist; first, in removing the burr and chamfering the ends, and; second, in cutting the threads. The construction is also such that the work when clamped is centrally held with sufficient clearance for the operation of the tools upon each end thereof. Furthermore, provision is made for feeding and clamping blanks of various dimensions and for supplying the blanks to the feeding means from a hopper or holder.

In detail, A is a suitable frame upon which is mounted the driving and cam shaft B. C is a gear, such, for instance as the well-known Geneva movement, for transmitting from the shaft B an intermittent rotation to a parallel shaft D and for rigidly locking the shaft D from movement during its intervals of rest. Upon the shaft B is mounted the feed wheel E which is arranged between parallel and adjustable walls F, F′ forming a hopper for the blanks. The walls F and F′ are adjustably mounted upon the frame A so that they can be moved nearer together or farther apart to correspond to the length of the nipples or studs to be placed in the hopper. The end walls of the hopper are formed by inturned flanges G on the side walls F and F′ and the bottom of the hopper is formed by the feed wheel E.

The feeding of the work is accomplished by providing the periphery of the feed wheel E with a series of pockets E′, each of a size to receive one blank. Therefore, as the wheel E is intermittently operated, the blanks in engagement with the pockets will be moved step by step and carried out from the hopper to one side thereof. At this side there is arranged a clamping device comprising a shoe H which is mounted upon a slidable rod I actuated by a cam J engaging roller bearings J′ thereon. The cam J is mounted on the shaft B and the shape of the cam and timing thereof is such that during the interval in which the shaft D is stationary, the rod I will be actuated to press the shoe H against two of the blanks that are in pockets at the side of the wheel E. As shown in Figures 5 and 6, the pockets in the periphery of the wheel E are formed by outwardly projecting lugs E^2 on exchangeable cross bars E^3. The lugs E^2 are arranged in pairs on opposite ends of the

cross bar E^3 and between these lugs is a space for receiving the clamping shoe H. The sides of the hopper F and F' are provided with channel bars F^2 through which the blanks are guided in passing out from the hopper to a point for engagement with the shoe H.

The machining operations upon the blanks are performed in two successive positions in which said blanks are clamped by the shoe H. In the first of these positions the removal of the burr and the chamfering of the ends of the blank is effected; in the second position the threading operation is performed. For accomplishing these operations spindles K, K' and L, L' are arranged respectively in axial alignment with the work in the two positions of clamping. These spindles are mounted in house standards M, M' on the frame A, which are preferably longitudinally adjustable upon said frame for different settings. The spindles K and K' are driven by pulleys N mounted thereon and connected by belts (not shown) to any suitable source of power. The spindles L, L' are driven through the medium of a step-down gearing O, O' and a friction clutch P. This clutch is set at a proper tension by the pressure of the spring P' so that in case of catching of the cutting tool on the spindle L, rotation of said spindle can be arrested, thereby avoiding breaking of the tool.

To form the work, the spindles K, K', L, L' are simultaneously moved axially so as to carry the cutters into engagement with the clamped work. As shown in Figure 9, the chamfering and burr rolling cutters Q are carried by the spindles K and K' and the threading dies R by the spindles L and L'. The axial advancement of these spindles is accomplished by levers S, S', S^2, S^3 which are fulcrumed at one end on brackets T, T', T^2, T^3 and have their opposite ends in engagement with cams U, U', U^2, U^3 on the shaft B. The levers are attached to the spindles through the medium of suitable fork arms V and the cams are so fashioned that during the interval of rest of the shaft D and clamping of the shoe H, the levers S, S', S^2, S^3 are all simultaneously actuated to advance their corresponding spindles. Thus the spindles K, K' with their cutters Q will chamfer the ends of the blanks and remove the burr therefrom, while the spindles L, L' with their threading dies R will cut threads on the opposite ends of the nipples.

As has been stated, the spindles L and L, are non-positively driven through the medium of the friction clutches P. There is also a non-positive connection for actuating these spindles longitudinally comprising the spring W which is between the levers S^2 and S^3 and a collar W' on the spindle. Therefore, if the threading die should catch, there is not only a stopping of the rotation of the spindle, but also a yielding of the spring W which prevents any longitudinal movement of such spindle. Therefore, the machine is not thrown out of time by any clogging of the work.

In operation, the wheel E having been adjusted with cross bars E^3, providing pockets of suitable size, and the sides F, F' of the hopper having been properly adjusted, the work blanks, such as short tubes for forming nipples, are placed in parallel relation within the hopper resting upon the periphery of the wheel E. Motion is then imparted to the machine which will advance the nipples received by the various pockets E', carrying them outward and into the positions of registration with the work clamp. Here the chamfering, burring and threading operations will be simultaneously performed during the interval in which the Geneva movement C locks the shaft B and feed wheel E from movement. By the time that the shaft B is again rotated the cutting tools have been withdrawn and the completed nipple will be released from the feed wheel while the chamfered nipple will be adjusted into position for threading. The operation can thus continue automatically and without interruption, unless there should be a clogging or catching of the tool. In this event the defective nipple can be easily released and without exerting any stress which will break the die.

What I claim as my invention is:

1. The combination of means for intermittently advancing a series of cylindrical blanks, of a clamp successively engageable with the central portion of said blanks, a slidable member secured to said clamp having a cam follower mounted thereon, a cam engaging said follower for intermittently actuating said clamp, and a pair of longitudinally reciprocable rotary tools axially aligned with the blank engaged by said clamp.

2. The combination with means for intermittently advancing a series of cylindrical blanks, of a clamp engageable simultaneously with the central portions of a plurality of said blanks, a slidable member secured to said clamp having a cam follower mounted thereon, and a cam engaging said follower for intermittently actuating said clamp.

3. The combination with means for intermittently advancing a series of cylindrical blanks, of means engageable with the central portion of said blanks for clamping the same at a plurality of points in their advancement during the interval of rest and releasing the same during the advancement thereof, rotary tools arranged in axial alignment with each clamped blank at opposite ends thereof, and means for simultaneously re-

ciprocating all of said rotary tools into and out of engagement with said blanks during the interval of rest.

4. The combination with means for intermittently advancing a series of cylindrical blanks, of a clamping shoe simultaneously engageable with a plurality of blanks at the central portions thereof, means for engaging said shoe with said blanks during the interval of rest to firmly clamp the latter and release the same from the clamping action during the advancement thereof, opposed rotary tools arranged in axial alignment with the clamped blanks at opposite ends thereof, and means for reciprocating said tools into and out of engagement with the respective ends of the blanks during the interval of rest.

5. The combination with a rotary wheel or drum having spaced outwardly extending peripheral flanges notched for the reception of cylindrical blanks, of means for intermittently rotating said wheel to advance the blanks in engagement therewith, a shoe registering with the central portion of a blank in one position of advancement for clamping the same, a cam for advancing said shoe to clamping position during the interval of rest, a rotary pair of threading dies registering with the opposite ends clamped blank in axial alignment therewith, and means for reciprocating said rotary dies into and out of engagement with the blank during the interval of rest while said blank is rigidly clamped by said shoes.

6. The combination with means for intermittently advancing a series of cylindrical blanks, of means for clamping said blanks at a predetermined point in their advancement during the interval of rest, a threading cutter arranged in axial alignment with said blank while in clamped position, means for axially reciprocating said threading cutter into and out of engagement with the blank during the interval of rest, means for imparting rotary motion of the threading cutter, and means permitting the yielding of both the rotary drive and the reciprocating means for said cutter to avoid injury thereto in case of clogging.

7. The combination with a rotary wheel or drum having a transversely notched periphery, of means for feeding cylindrical blanks into engagement with the notches of said drum, means located at a plurality of points in the advancement of said blanks for centrally clamping the same during the interval of rest, a plurality of rotary cutters arranged to axially align with the opposite ends of the clamped blanks, rotary spindles for carrying said cutters, means for positively driving one of said spindles, means for non-positively transmitting rotary movement from said driven spindle to the other spindle, means for positively reciprocating the first-mentioned spindle to move the same into and out of engagement with the work in registration therewith during the interval of rest, and means for non-positively reciprocating the other spindle, whereby the latter is permitted to remain stationary both as to rotation and reciprocation in case of clogging.

8. The combination with a frame, of a rotary shaft mounted thereon, a shaft arranged parallel thereto, a rotary drum on the latter shaft having transversely arranged peripheral notches for receiving cylindrical blanks, a transmission between the first and second shafts for imparting to the latter alternate partial rotations and for locking the same from movement during the interval between said partial rotations, a clamping shoe for engaging a cylindrical blank in one position of advancement thereof, a cam on said continuously rotating shaft for actuating said clamping shoe during the interval of rest of the intermittently rotating shaft, a rotary tool in registration with the clamped blank, and means including a cam on said continuously rotating shaft for reciprocating said rotary tool into and out of engagement with the blank during the interval of rest.

9. The combination with a frame, of a shaft mounted thereon, a parallel shaft mounted on said frame, a rotary drum on the latter shaft provided with peripheral notches for receiving cylindrical blanks, a clamping shoe for engaging a blank in one position of advancement thereof to centrally clamp the same during the interval of rest of said rotary drum, a cam on said continuously rotating shaft for actuating said shoe, rotary tools axially aligned with the clamped blank at opposite ends thereof, spindles for carrying said tools, transversely extending levers for reciprocating said spindles into and out of engagement with the blank and cams on said continuously rotating shaft for actuating said levers.

10. The combination with a rotary drum, of a series of notched cross bars detachably secured to the periphery of said drum, said cross bars being exchangeable to provide larger or smaller notches, a hopper for receiving a series of cylindrical blanks arranged above said drum to permit said blanks to enter said notches, means for intermittently rotating said drum to advance the blanks in the notches thereof, means for clamping the blanks at a predetermined point in their advancement, and a rotary cutter in axial alignment with the clamped blank adapted to be moved into operative engagement therewith during the interval of rest.

11. The combination with a drum having a notched periphery, of plates parallelly arranged on opposite sides of said drum and

adjustable towards or from the same, inwardly extending flanges on said plates forming thereof a hopper for the holding of cylindrical blanks of a length corresponding to the spacing between said plates, the bottom of said hopper being formed by said rotary drum, means for intermittently rotating said drum to advance the blanks in engagement with the notches thereof, means for clamping said blanks at one point in their advancement to hold the same stationary, and means for performing a machining operation on the clamped blank.

12. The combination of a rotary drum, notched cross bars exchangeably mounted upon the periphery of said drum and varying in length and the size of the notches, plates mounted on opposite sides of said drum and adjustable towards or from the same to correspond to the length of said notched cross bars, flanges projecting inward from said plates, forming in connection therewith a hopper for receiving cylindrical blanks of a length corresponding to the spacing between said plates, and means for intermittently rotating said drum to advance the blanks in engagement with the notches and to present additional notches for engagement with said blanks.

In testimony whereof I affix my signature.

FREDERICK N. ROSS.