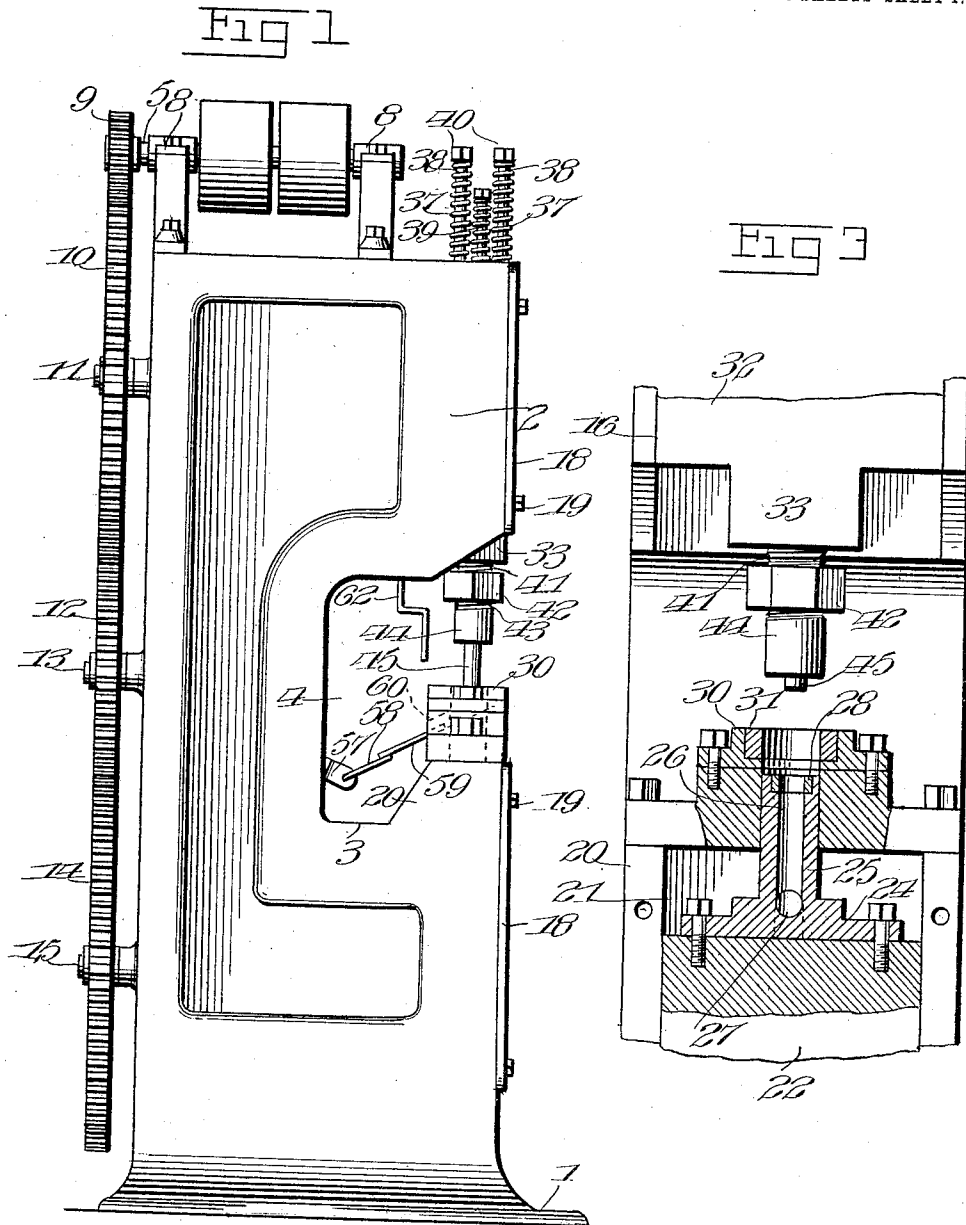


C. F. MENNIG.
 WASHER FORMING MACHINE AND PUNCH PRESS.
 APPLICATION FILED APR. 20, 1912.

1,062,490.

Patented May 20, 1913.

3 SHEETS—SHEET 1.



Witnesses

W. H. Sizer
John J. McCarthy

Inventor
Charles F. Mennig

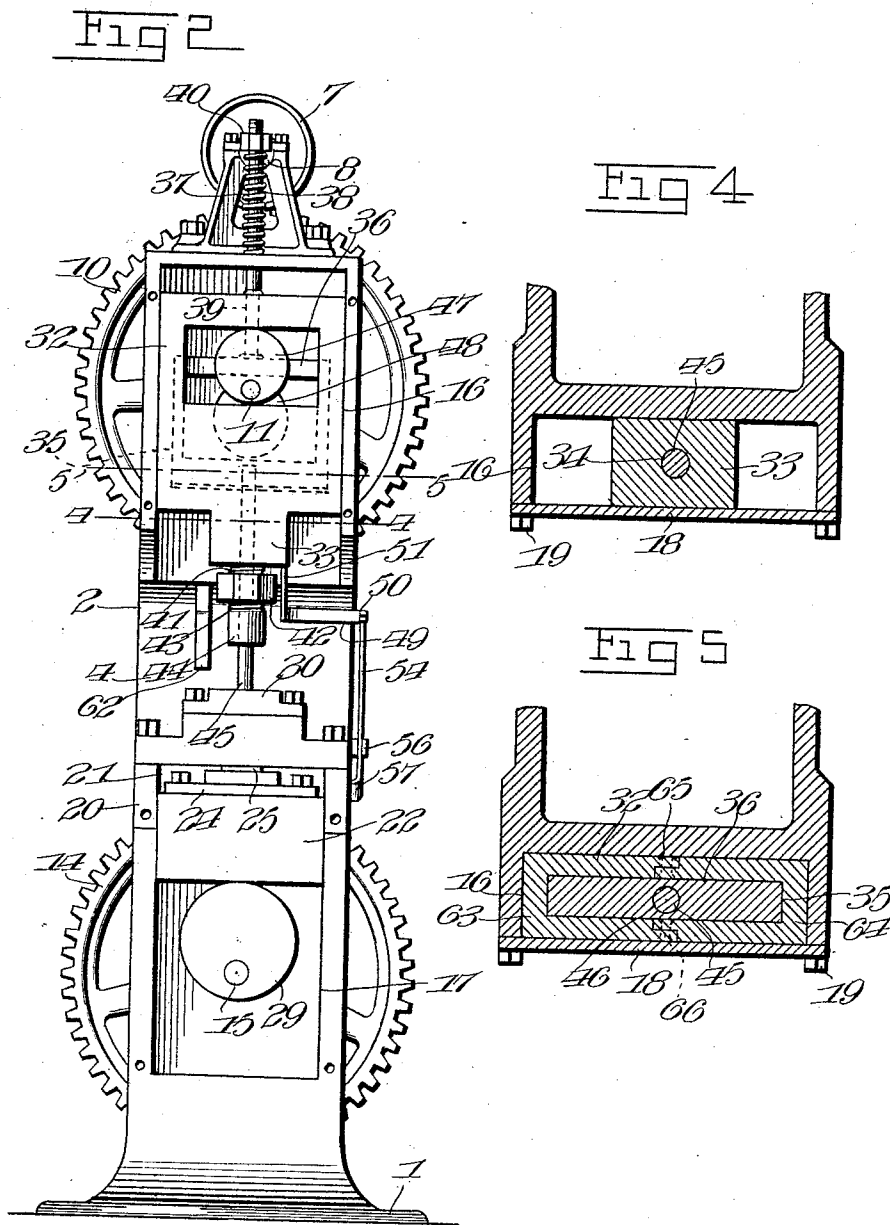
By *Victor J. Evans*
 Attorney

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3 SHEETS—SHEET 2.



Witnesses

M. H. Miller

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3 SHEETS—SHEET 3.

Fig 6

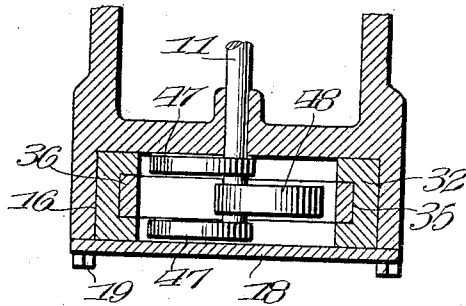
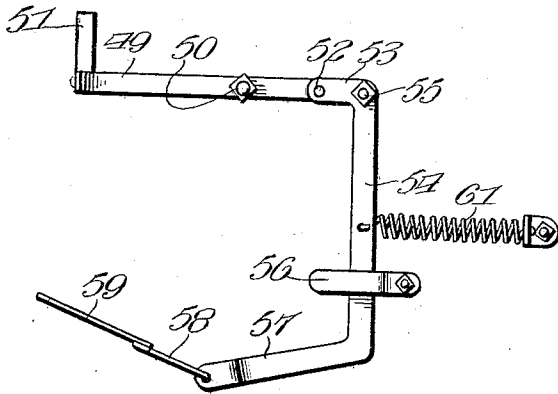


Fig 7



Witnesses

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UNITED STATES PATENT OFFICE.

CHARLES F. MENNIG, OF POTTSVILLE, PENNSYLVANIA.

WASHER-FORMING MACHINE AND PUNCH-PRESS.

1,062,490.

Specification of Letters Patent.

Patented May 20, 1913.

Application filed April 20, 1912. Serial No. 692,135.

To all whom it may concern:

Be it known that I, CHARLES F. MENNIG, a citizen of the United States of America, residing at Pottsville, in the county of Schuylkill and State of Pennsylvania, have invented new and useful Improvements in Washer-Forming Machines and Punch-Presses, of which the following is a specification.

This invention relates to improvements in machines for making or forming washers.

In carrying out the present invention, it is my purpose to provide a machine of the character above set forth whereby washers may be punched and cut in a single operation, thereby eliminating the use of a number of machines usually employed for this purpose.

Furthermore, I aim to provide a washer forming machine wherein by means of a number of punches and dies and an operating mechanism for such punches and dies, the washers will be cut out of a sheet of material; and it is also my purpose to provide a machine of the class described which will embrace the desired features of simplicity, efficiency and durability coupled with cheapness of cost in manufacture and installation and which may be maintained at a minimum expense.

With the above and other objects in view, the invention consists in the construction, combination and arrangement of parts hereinafter set forth in and falling within the scope of the claims.

In the accompanying drawings there has been illustrated one preferred and practical embodiment of my invention, and in these drawings;

Figure 1 is a side elevation of a machine constructed in accordance with the present invention. Fig. 2 is a front elevation of the same, the face plates being removed. Fig. 3 is an enlarged fragmentary view of a portion of the machine, parts being shown in section and other parts in elevation. Fig. 4 is a transverse sectional view on the line 4-4 of Fig. 2. Fig. 5 is a similar view on the line 5-5 of Fig. 2. Fig. 6 is a transverse sectional view through the punch carrying heads. Fig. 7 is a side elevation of a detail of the machine.

Similar reference characters designate like parts throughout the several views.

In carrying my invention into practice, any suitable form of mechanism may be em-

ployed to convey or carry the strips of material, from which the washers are to be formed, to the washer forming machine and, likewise, any preferred or well known form of mechanism may be utilized to remove or convey the washers from the machine after the making or forming of such washers.

It is well known by those skilled in the art of washer manufacturing or making that two distinct and independent operations are usually required to punch or aperture the washer and cut the same from the material so as to give such washer the desired outline. Frequently these operations necessitate the utilization of separate machines and consequently require the employment of an operator or attendant for each machine used. Furthermore, considerable time and labor is required to effect the forming of the washer when a number of independent or separate machines are made use of.

By means of my invention, a single machine is employed and constructed in such manner as to enable the punching and cutting of the washer in a single operation, thereby eliminating the use of separate machines and accomplishing with a single machine what has heretofore required two independent and distinct machines and likewise the same number of operations. In the present instance, I have shown my invention as utilized in the formation or manufacture of annular or circular washers. It is to be understood, however, that the invention in its useful application is not limited to the particular purpose selected for illustrative purposes, as the machine may be employed in the manufacture of nuts and certain features thereof may be altered or changed to give to washers, nuts and the like, various contours.

Referring now to the accompanying drawings in detail, the body of the machine consists of a base plate 1 with which, in this instance, is cast integral a head 2, the latter being formed to provide a horizontal shelf or support 3 and a recess or opening 4 to accommodate the various dies and punches and other devices utilized in carrying the invention into effect.

The driving mechanism of the machine, in the embodiment of the invention selected for illustration, consists of a main driving shaft 5 upon which are mounted fixed and loose pulleys 6 and 7 respectively and which is journaled in bearings 8, 8 secured to the

upper surface of the machine, one extremity of the shaft 5 having keyed thereto a gear pinion 9 in mesh with a gear wheel 10 keyed upon one extremity of an actuating shaft 11 journaled in suitable bearings transversely of the head 2 of the machine, said gear wheel 10 meshing with a relatively small idle gear 12 loosely encircling a stub shaft 13 fixed to the head 2 of the machine, the wheel 12 meshing with a large gear 14 keyed upon one extremity of an actuating shaft 15 arranged transversely of the head 2 of the machine and an appropriate distance below the actuating shaft 11. Although I have described and utilized one particular form of driving mechanism for the machine, it is to be understood that I do not confine myself to such mechanism, as any suitable means may be employed for the purpose of driving the various elements of the machine.

The upper front portion of the machine contiguous the opening 4 is formed to provide a guide way 16 and likewise the lower portion of the head contiguous the opening 4 is formed to provide a guide way 17, each guide way being closed by means of a cover 18 provided with apertures alining with threaded bolt holes in the side walls of the respective guide ways to receive bolts 19 whereby the covers may be attached to and detached from the machine at will to enable access to be had to the various parts. Fixed upon the shelf or support 3 is a bed piece 20 provided with a rectangular vertical opening 21 coaxial with the guide ways 17 and smaller in transverse area than the guide ways, and slidably disposed within the guide way 17, is a head 22 to which is bolted or otherwise fastened as at 23 the base 24 of a shank 25 formed with vertical and inclined passages 26 and 27 respectively communicating with each other and having counter-sunk in its upper or free extremity a die 28, the die 28 being secured to the respective end of the shank in any suitable manner or by any preferred or well known means. This shank 25, as shown, is of such dimensions transversely as to be slidable freely within the vertical opening 21 and is adapted for sliding movement therein under the action of the head 22. In the present instance, sliding movement is imparted to the head 22 by means of an eccentric or eccentrically mounted disk 29 disposed within the guide way 17 beneath the head 22 and mounted upon the extremity of the actuating shaft 15 opposite from the gear wheel 14. Thus, in the movement of the gear wheel 14, sliding movement is imparted to the head 22 to elevate the die 28 within the opening 21 in the bed piece 20. Bolted to the upper surface of the bed piece 20 and provided with an opening coaxial with the opening 21 of said bed piece, is a die holder 30 bolted or otherwise secured to the bed

piece and carrying a stationary die 31 of a cross section greater than that of the die 28 and coaxial with the last-mentioned die. Slidably disposed within the guide way 16 at the upper front side of the head 2, is a punch carrying head 32 shown in the present instance to be of substantially rectangular contour and provided with a depending internally screw threaded socket member 33 formed with a relatively small bore 34 opening onto the interior of the head 32, the interior of such head being hollowed out to provide a guide way 35. Mounted within the head 32 and slidably disposed within the guide way 35 of such head, is a second relatively small head 36 adapted for sliding movement within the head 32, the latter being adapted to slide within the guide way 16 at the upper forward portion of the head 2 of the machine. The vertically sliding heads 32 and 36 are normally maintained inoperative and at their limits of upward movement by a suitable tension means such as coiled expansion springs 37 two of such springs encircling the shanks 38, 38 secured to the upper edges of the sliding head 32 and projecting through apertures in the upper surface of the head 2 of the machine, while one of such springs 37 encircles a shank 39 fixed upon the sliding head 36 and projecting through the upper surface of the head 32 and an aperture in the head 2 of the machine, adjusting nuts 40 being employed to regulate or adjust the tension of the springs 37 and form abutments for the adjacent extremities of such springs, the opposite extremities of such springs bearing upon the proximate portion of the head 2 of the machine. Threaded into the socket member 33 on the head 32, is a plug 41 having threaded onto its free extremity a coupling 42 and into the coupling 42 is threaded one extremity 43 of a punch 44 as well as the plug 41 is provided with an internal bore coaxial with the bore 34 of the socket member 33, and through these registering bores is passed a punch 45 having one extremity threaded or otherwise fastened to the inner sliding head 36, as at 46. The punch 45 may be termed a hole punch and is cooperative with the die 28 to punch the center hole in the washer, while the cutting punch 44 cooperates with the stationary die 41 to cut the washer from the sheet or strip of material and give to such washer the desired contour, the punch 44 and die 41 being, in this instance, of circular outline. Keyed to the free extremity of the actuating shaft 11, within the guide way 16 are spaced parallel eccentrics 47 disposed upon the opposite sides of the inner sliding head 36 and operatively engaging the upper and lower walls of the head 32 at opposite sides of the head 36, so that in the movement of the actuating shaft 11, a sliding motion may be imparted

to the head 32 to move the latter within the guide way 16 and consequently impart movement to the cutting punch 44 to move the same toward and away from the stationary die 31, according to the position of the cams. Keyed to the shaft 11 intermediate the eccentrics 47, 47 is an eccentric 48 operatively engaging the upper and lower surfaces of the inner sliding head 36 and designed to rotate in synchronism or unison with the eccentric 29 on the lower actuating shaft 15, the eccentric 48 being mounted upon the shaft 11 in such manner as to render its respective sliding head active when the eccentrics 47, 47 have moved the head 36 to an inactive position, thus when the sliding head 36 is moved to an operative position under the action of the eccentric 48 to throw or force the hole punch 45 downwardly, the eccentric 29 is actuated to slide the head 22 upwardly and consequently move the die 28 upwardly within the bore 21 of the bed piece 20 so that the upper surface of the movable die will be flush with the similar surface of the fixed or stationary die whereby a sheet or strip of material between the die and the punch 45 will be stamped out to form the aperture of the washer.

The operation of the parts of the machine so far described may be briefly stated as follows: A sheet or strip of suitable material such as metal or the like is fed in any suitable manner so as to lie upon the stationary die 31 below the punches 44 and 45 and the belt shifted from the loose pulley 7 to the pulley 6, thus rotating the driving shaft 5 and the actuating shafts 11 and 15 through the medium of the gears 9, 10, 12 and 14. Upon the rotation of the actuating shafts 11 and 15, the eccentrics 48 and 29 respectively are rotated to slide the heads 36 and 22 downwardly and upwardly respectively, thus causing the center punch 45 to descend and the movable die 28 to ascend the latter engaging the under surface of the material, while the former is forced against the upper surface of such material and punches a hole therein, the released "cutting" passing through the bores 26 and 27, thence to a suitable receptacle or the like outwardly of the machine. In the continued movement of the shafts 11 and 15, the eccentrics 48 and 29 permit the respective sliding heads to be restored to their normal inoperative positions and subsequently the eccentrics 47, 47 act upon the sliding head 32 to depress such head and consequently force the cutting punch 44 into engagement with the material to cut the same in washer formation, the stationary die 31 coöperating with the cutting punch in this operation, as will be readily understood.

In order to remove the washers from the machine after the formation or making

thereof so that the same may be deposited upon a suitable conveyer or into a receptacle as desired, I make use of a washer release or removing mechanism which in the present instance consists of an L-shaped lever 49 pivoted at 50 and having one arm 51 disposed in the path of movement of the socketed member 33 on the sliding head 32, while to the free extremity of such lever is pivotally connected, through the medium of a loose connection 52, one arm 53 of a lever 54 pivoted as at 55 and mounted for swinging movement in a slotted guide 56 secured to an appropriate part of the head 2 of the machine. To the free end of the lever 54 is rigidly secured an arm 57 to which is connected through the medium of a link 58 a sliding plate 59 slidably disposed within a diagonal slot 60 formed in the bed piece 20 immediately below the stationary die 31, a spring 61 being employed and connected to the lever 54 and to a suitable fixed part of the machine head 2 to maintain the lever and consequently the washer releasing mechanism in inoperative position, normally. Immediately succeeding the cutting of the washer from the body or strip of material, the socketed member 33 engages the arm 51 of the lever 49 with the punch to swing such lever about its pivot 50, thus imparting a swinging movement to the lever 54, through the loose joint or connection 52, whereby the arm 57 is projected forwardly and likewise the plate 59 carried forwardly and within the diagonal slot 60, thus disposing the sliding plate 59 immediately below the stationary die 31 so that the washer may be deposited upon such plate and gravitate or slide down the same, through the opening 60 and onto a suitable conveyer or into a receptacle as found desirable. Fastened to the upper wall of the cut out portion 4 of the head 2 and depending therefrom and terminating in proximity to the stationary die 31 is a stripper 62 designed to move the strip or sheet of material, from which the washers are being formed, from the punches when the latter are returned to their normal positions.

The inner sliding head 32 is preferably formed of two sections 63 and 64 having their proximate ends rabbeted as at 65 and fastened to one another by means of bolts or the like 66, this construction being preferable so as to facilitate inserting the inner head into the outer head, the side walls of the outer head being open as shown.

The machine shown and described embraces a washer forming machine and it will be seen that the washers are punched and cut in a single operation and with a single machine, thereby eliminating the use of a number of machines, heretofore employed. It will be noted that the die holder 30 is detachably connected to the bed piece and by

virtue of this construction dies of various sizes may be utilized. Likewise, the punches 44 and 45 may be removed, owing to their detachable connections, and other punches utilized, such interchangeability of the punches and dies permitting or enabling the manufacture or making of washers of various sizes.

From the foregoing description taken in connection with the accompanying drawings, the construction and mode of operation of my invention will be readily apparent to those skilled in the art, and while I have herein shown and described one particular embodiment of my invention by way of illustration, I desire it to be understood that I do not limit myself to the exact details of construction herein described and delineated, as modification and variation may be made without departing from the spirit of the invention or exceeding the scope of the claims.

I claim:

1. In a machine of the class described, a punch, a second punch concentric with the first punch, a stationary die coöperative with the second punch, a movable die coöperative with the first punch, means for operating the first punch and movable die simultaneously, and means for actuating the second punch subsequent to the operation of the first punch and movable die.

2. In a machine of the class described, a punch, a second punch, a stationary die coöperative with one of said punches, a movable die coöperative with the other punch, means for operating the movable die and the respective punch simultaneously, and means for actuating the other punch to engage the stationary die subsequent to the operation of the first punch and movable die.

3. In a machine of the class described, a punch, a second punch concentric with the first punch, a stationary die coöperative with one of said punches, a movable die disposed within the stationary die and coöperative with the first punch, means for operating the first punch and movable die simultaneously, and means for operating the second punch to engage the stationary die subsequent to the operation of the first punch and movable die.

4. In a machine of the class described, a punch, a second punch concentric with the first punch, a stationary die coöperative with the second punch, a movable die coöperative with the first punch and disposed normally below the stationary die and movable into said die, means for operating the first punch and movable die simultaneously, said means including a pair of actuating shafts and a cam on each shaft, and means for actuating the second punch to engage the stationary die subsequent to the operation of the first punch and movable die, said last-named

means including an eccentric mounted upon one of said actuating shafts and adapted to operate its respective punch subsequent to the operation of the other punch.

5. In a machine of the class described, a punch carrying head adapted for sliding movement and provided at its lower end with a socket member, a second punch carrying head slidably disposed within the first head, a punch carried by the last-mentioned head and extending outwardly of the lower end of such second head and through the socket member thereof, a second punch carried by the socket member of the first-mentioned head and arranged concentrically of the first punch, a stationary die coöperative with the second punch, a movable die coöperative with the first punch, means for operating the first-mentioned punch carrying head and a punch carried thereby and the movable die simultaneously, and means for actuating the second punch carrying head and the respective punch carried thereby subsequent to the operation of the first punch and movable die.

6. In a machine of the class described, a punch carrying head adapted for sliding movement and provided at its lower end with a socket member, a second punch carrying head slidably disposed within the first head, a punch carried by the last-mentioned head and extending outwardly of the lower end of said first head and through the socket member thereof, a second punch carried by the socket member of the first-mentioned head and arranged concentrically of the first punch, a stationary die coöperative with the second punch, a movable die coöperative with the first punch, means for operating the first-mentioned punch carrying head and a punch carried thereby and the movable die simultaneously, means for actuating the second punch carrying head and the respective punch carried thereby subsequent to the operation of the first punch and movable die, and a washer release or removing mechanism coöperative with said punches and dies to remove the finished article from the machine.

7. In a machine of the class described, a punch carrying head adapted for sliding movement and provided at its lower end with a socket member, a second punch carrying head slidably disposed within the first head, a punch carried by the last-mentioned head and extending outwardly of the lower end of said first head and through the socket member of the first-mentioned head and arranged concentrically of the first punch, a stationary die coöperative with the second punch, a movable die coöperative with the first punch, means for operating the first-mentioned punch carrying head and punch carried thereby and the movable die simultaneously, means for actuating the second

punch carrying head and the respective
punch carried thereby subsequent to the op-
eration of the first punch and movable die,
a washer release or removing mechanism co-
5 operative with said punches and dies to re-
move the finished article from the machine,
said washer release or removing mechanism
comprising a lever having an arm disposed
in the path of movement of said socket mem-
10 ber, a sliding plate controlled by said lever

for removing the finished articles from the
machine, and means normally holding said
mechanism inoperative.

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

CHARLES F. MENNIG.

Witnesses:

GEORGE W. MENNIG,
GEORGE NEWCOMBE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."
