

June 30, 1925.

1,543,823

H. BUSCHER

PUNCH PRESS UNLOADER

Filed July 16, 1924

3 Sheets-Sheet 1

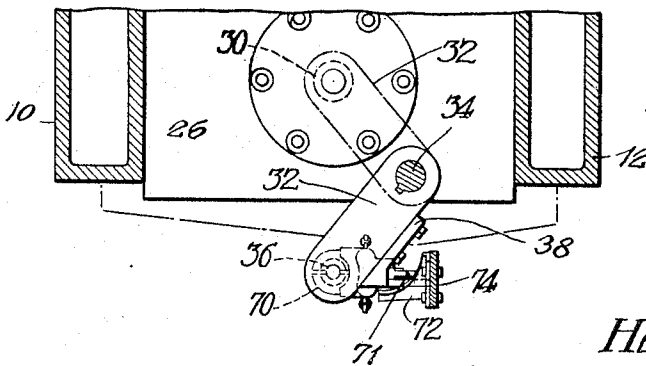
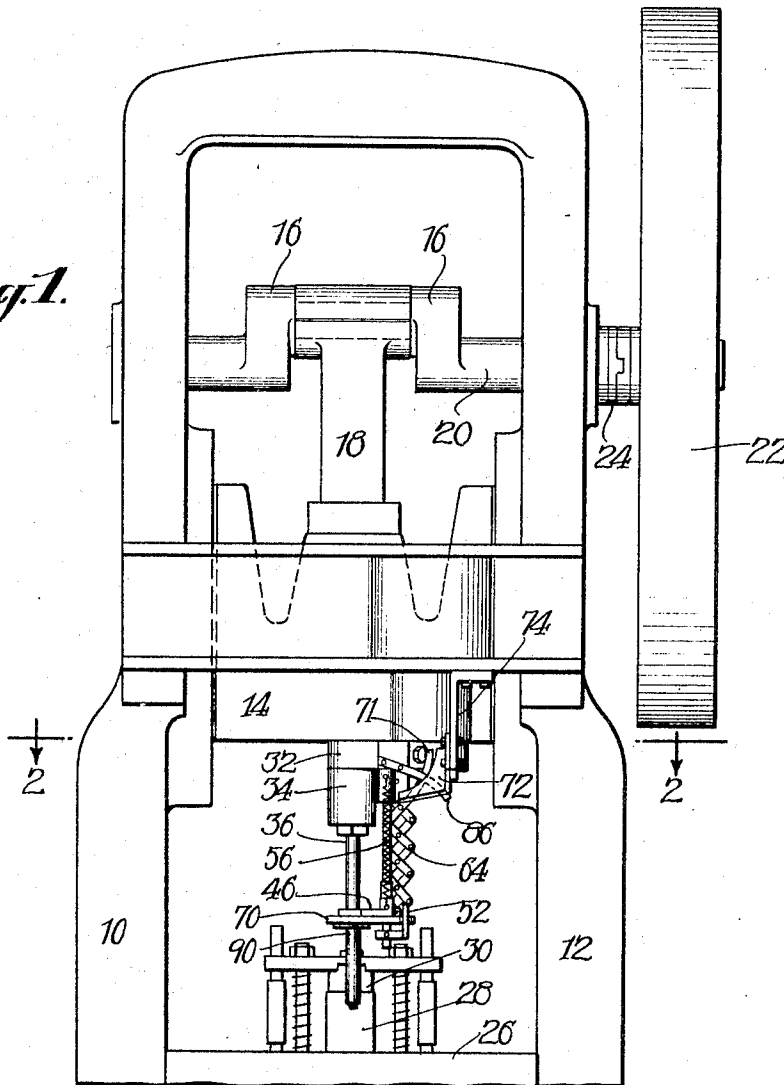


Fig. 2.

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3 Sheets-Sheet 2

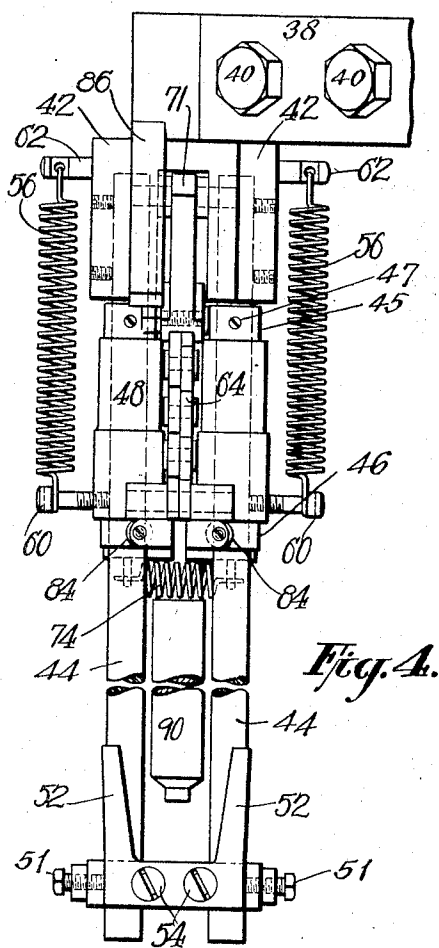


Fig. 4.

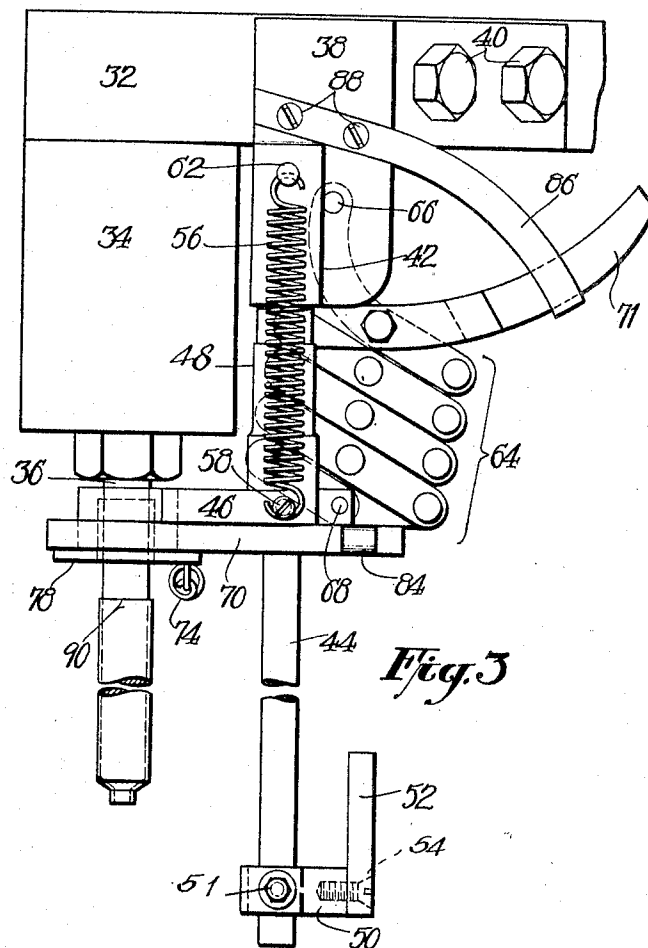


Fig. 3.

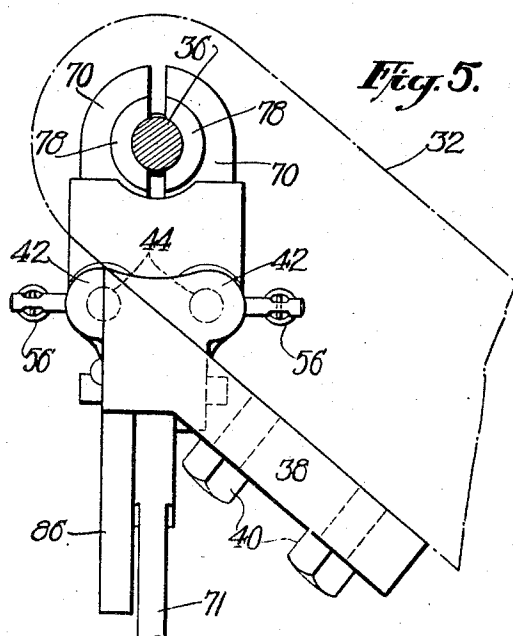


Fig. 5.

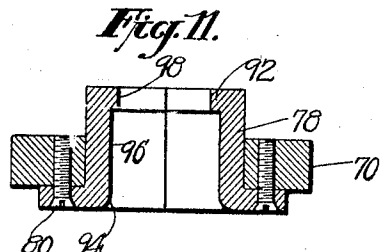


Fig. 11.

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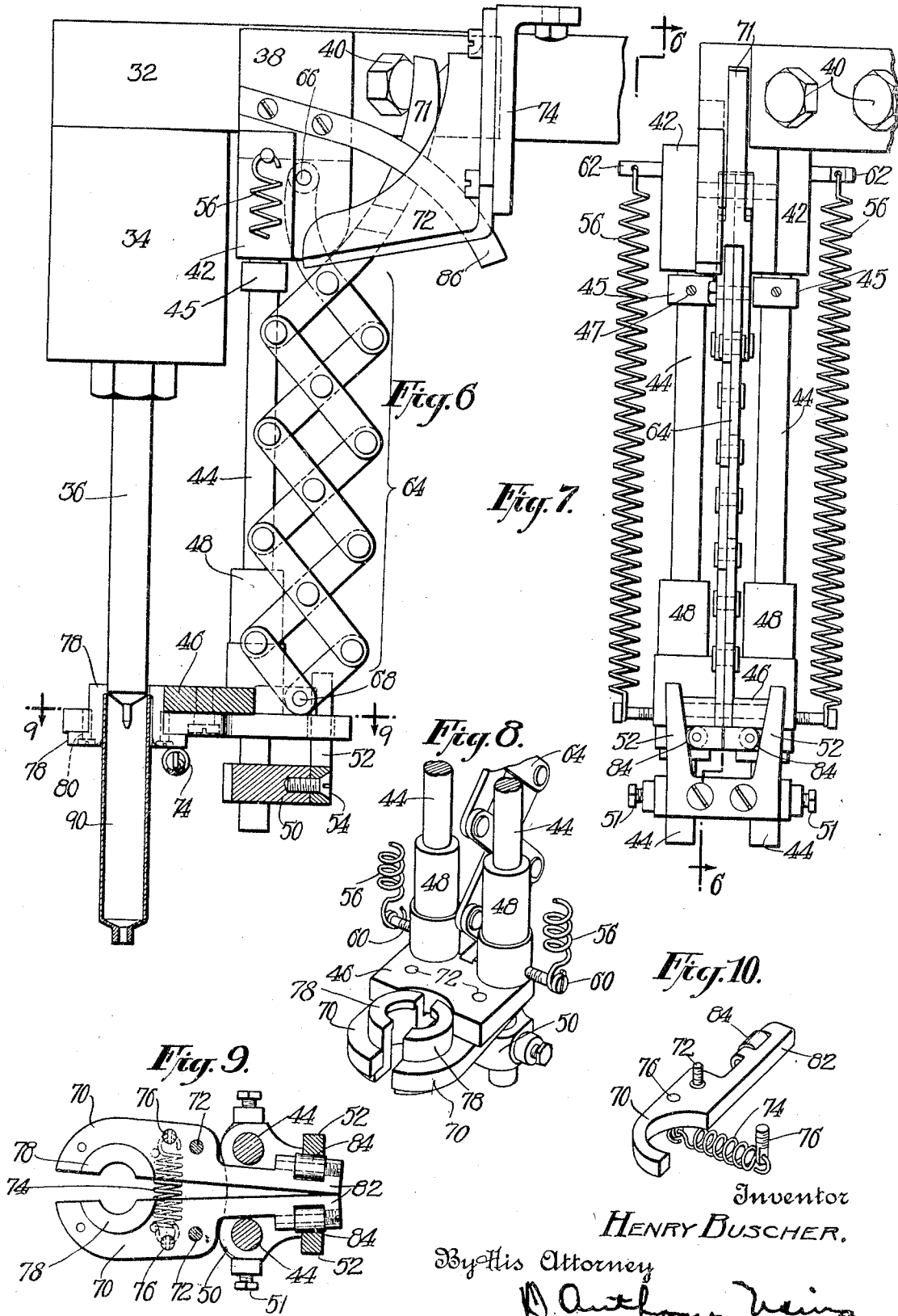
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PUNCH PRESS UNLOADER

Filed July 16, 1924

3 Sheets-Sheet 3



Inventor
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Patented June 30, 1925.

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UNITED STATES PATENT OFFICE.

HENRY BUSCHER, OF WEST HOBOKEN, NEW JERSEY.

PUNCH-PRESS UNLOADER.

Application filed July 16, 1924. Serial No. 726,271.

To all whom it may concern:

Be it known that I, HENRY BUSCHER, a citizen of the Republic of Germany, and a resident of West Hoboken, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Punch-Press Unloaders, of which the following is a specification.

This invention relates to means for automatically removing work pieces from forming machines. While not limited thereto, the particular device shown is adapted for stripping pressed metal collapsible tubes from one of the die members of a punch press.

In the manufacture of collapsible tubes such as those used for tooth paste, oil paints and similar plastic substances, the tubes are frequently made of soft metal such as white metal and are pressed from disc-like blanks by means of suitable co-operating die members. On the up stroke of the press, the formed tube is carried away from the lower die member and an arm which supports the upper die member swings outwardly so that an operator can strip the pressed tube from the upper die member by hand. The punch presses on which this work is done are provided with one revolution clutches and the operator is supposed to trip the clutch each time a tube is pressed so that he can strip the same from the upper die member while the latter is stationary. However, the operators on these presses are frequently paid on a piece-work basis, and to increase their daily outpoot after they have acquired skill, they frequently dispense with the operation of the one revolution clutch and strip the pressed tube from the die member while the punch press is still running. The machines are usually so arranged that there is a dwell after the upper die is lifted and swung outward. This gives a short period in which a skilled operator can remove the formed tube from the machine, provided the press is not running at too high a speed. At best this is a dangerous operation and even skilled operators loose their fingers occasionally and sometimes the entire hand.

My invention aims to provide means whereby pressed articles can be automatically stripped from the die member and permits running the presses at a much higher speed without hazard to those in charge of the presses. Where the work is stripped from the presses by hand, of course one

operator is required for each press. With the improved unloader herein shown, there is no necessity of having an operator for the purpose of removing the work from the press. The only time the services of an operator is required is when the unexpected happens due to imperfections in the blank or other causes. Hence one operator can oversee the work of a great number of machines, the blank from which the work is pressed being automatically fed to the dies by any suitable form of feed mechanism.

An embodiment of my invention is illustrated in the accompanying drawings in which Fig. 1 is a somewhat diagrammatic front elevation of a known type of punch press having my improved unloader attached thereto;

Fig. 2 is a horizontal section on line 2—2 of Fig. 1 in full line showing the upper die member of the press swung outwardly in which position the work is automatically unloaded from the press and in dotted lines showing the upper die member swung to punching position;

Fig. 3 is a detail view of my improved unloader detached from the machine and shown in its initial position;

Fig. 4 is a side elevation of the part shown in Fig. 3 as viewed from the right-hand side of said figure;

Fig. 5 is a top plan of the parts shown in Fig. 4 the swinging arm of the press being indicated in broken lines;

Fig. 6 is a view similar to Fig. 3 showing the unloader in the expanded position which it assumes when the tube is stripped from the upper die member;

Fig. 7 is an elevation of the unloader viewed from the right-hand side of Fig. 6;

Fig. 8 is a perspective view of the lower end of the unloader;

Fig. 9 is a horizontal section on line 9—9 of Fig. 6 illustrating the work engaging jaws of the unloader in their open position;

Fig. 10 is a detail perspective view of one of the stripping jaws;

Fig. 11 is a detail of a detachable punch engaging member carried by the stripping jaws.

Referring particularly to the drawings, 10 and 12 represent side frame members of a punch press of known design formed with suitable guides for a cross-head 14 which is reciprocated by cranks 16 connected by a pitman 18 with the cross-head. The cranks

16 are formed on a shaft 20 which is driven by the bull wheel 22 through a suitable foot controlled one revolution clutch 24 of known design. The press is provided with the usual bed 26 on which is mounted a die block 28 and a die 30. The reciprocating cross-head 14 carries an arm 32 which is best shown in Fig. 2 and which is pivoted to the shaft 34 and arranged to swing from an inner punching position shown by broken lines in Fig. 2 to an outer discharging position shown in full lines. The arm 32 has a boss 34 on the free end thereof to which is secured a punch 36 adapted to co-operate with the die 30. In the usual operation of punch presses of the character thus far described, the operator actuates a trip mechanism which permits the crank 20 to make one revolution and hence impart a downward stroke and return stroke of the punch. On the forward or down stroke, the punch co-operating with the die forms the blank of metal previously placed in the die to the desired shape. On the backward or up stroke the arm 32 swings outwardly to such a position that the operator can grasp the work which is carried up by the punch and can remove the same manually.

My improved unloader is so arranged that as the punch moves upwardly and swings out, the work is automatically stripped therefrom, hence the press can be run at a high rate of speed without being tripped at each revolution and without danger to operators.

My improved unloader includes a bracket 38 which is secured by bolts 40 to the punch carrying arm 32. This bracket is formed with a pair of bosses 42 in which are secured depending rods 44 which form guides for a vertically movable member 46 which is formed with elongated hubs 48 which encircle the rods 44. At their lower ends, the guide rods 44 are held in spaced relationship by a small casting 50 which also serves to support the fixed cams 52, these being secured to the member 50 by flat head screws 54. This member 50 is adjustably secured to rods 44 and set screws 51 so that the set position of the cams can be varied to suit work of different lengths. Adjacent to the bosses 42 of the supporting bracket, the rods 44 carry collars 45 which are adjustably secured thereto by suitable set screws 47 as shown. These collars limit the upward movement of the member 46 and are adapted to be set to accommodate the unloader for operating on work pieces of different lengths.

The movable member 46 is free to slide up and down on the guides 44 and springs 56 are secured at their lower ends to studs 60 carried by said member 46 and at their upper ends to studs 62 projecting from the bosses 42 of the bracket 38. A lazy-tongs 64 is connected at one end by means of a stud 66

to the bracket 38 and at the other end by means of a stud 68 to the member 46. At the upper end of the lazy-tongs is provided an arm or horn 71 which is adapted to strike a cam 72 carried by a fixed bracket 74 secured to the cross-bolster of the punch press. The cam 72 is so shaped and positioned that when the cross-head of the punch press moves up and the arm 32 swings outwardly, the horn or arm 71 will strike said cam 72 and extend or expand the lazytongs. This results in moving the member 46 down along the guide rods against the action of the springs 56.

Gripping jaws 70, 70 are pivoted at 72, 72 to the underside of the member 46, and are normally drawn together by means of a tension spring 74, the ends of which are pressed through pins 76 depending from the jaws. Each jaw carries a bushing member 78 which is secured in place by screws 80. Each jaw 70 is provided with an extended arm 82 and a roller 84 pivotally mounted therein. These rollers are adapted to co-act with the cam members 52 secured to the member 50 to expand the jaws 70.

To prevent transverse strain on the lazy-tongs members 64 when the extended end 71 strikes the cam 72, I provide a guide arm 86 which is secured by screws 88 to the bracket 38. This arm is so shaped and positioned that it does not interfere with the cam 72 and is arranged to take the thrust as the unloader assemblage is swung around the fixed cam 72 in operation.

Assuming at the start that the punch supporting arm 32 is at its highest position and swung inwardly so that the punch 36 carried thereby is in axial alignment with the die 30 secured to the bed of the press, the end 71 of the lazy-tongs will be free of the cam 72 and in its collapsed position as shown in Fig. 3 with the jaws 70 embracing the punch. At this time the rollers 84 are clear of the cam 52, hence the spring 74 holds the bushings 78 in close contact with the cylindrical surface of the punch. As the punch moves down and strikes the disc-like blank in the die 30 the metal thereof will flow upwardly around the cylindrical punch 36 and in the case illustrated form a collapsible tube 90 on the punch. As the cross-head 14 moves up the arm 32 will swing outwardly approximately to the full line position shown in Fig. 2 and in so doing, the horn 71 of the lazy-tongs strikes the cam 72 and expands the latter as shown in Fig. 6 thus moving the member 46 downward and because of the engagement of the jaws 70 with the tube 90, the latter will be stripped longitudinally from the punch. It will be noticed in Fig. 11 that the bushings 78 are formed with a slight shoulder 92 which is formed to engage the top edge of the tube on the

punch. The lower part of each portion 78 is rounded-off as at 94 so that as the metal flows upward along the punch in the forming operation, there will be no interference. In the case of tubes of short lengths, when the jaws move down to initially engage the top of the tube the same can smoothly pass over the forward edge of the tube. The offset between the surfaces 96 and 98 of each portion 78 is about equal to the thickness of the wall of the tube being formed. Hence the pressure exerted by the spring 74 will cause the jaws to grasp the tube with a slight pressure after the jaws have passed beyond the end of the punch 36. Toward the end of the downward stroke of the jaws 70, however, the rollers 84 strike the inclined surfaces of the cams 52 which results in separating the jaws as shown in Fig. 9 so as to release the tube 90 and permit it to fall into a suitable receptacle or into a discharge chute leading to a suitable storage receptacle.

As the arm 32 swings inward toward the position shown in broken lines in Fig. 2 the horn 71 of the lazy-tongs is swung clear of the cam 72 and thus permits the springs 56 to collapse the lazy-tongs and slide the member 46 and the jaws 76 carried thereby from the position shown in Fig. 6 to the upper position shown in Fig. 3 ready for another cycle of operation. As the punch 36 moves down again the above described cycle will be repeated and so on as long as the cross-head 14 of the press is reciprocated.

The device shown is of simple construction and permits the presses to be run at a higher speed than heretofore and does away with the necessity of having a separate operator for each individual press. The design is such that the same unloading mechanism can be used on presses making collapsible tubes or similar articles of different diameters, it merely being necessary when changing from one size of work to another to fit bushings 78 of the corresponding size to the jaws 70.

The unloader while not limited thereto is well adapted for handling articles made of soft metal such as white metal, lead and similar materials.

Articles made of such soft metals present problems not encountered in the handling of stiffer materials such as sheet steel, copper, tin and so forth, which are not so apt to be bent or damaged when engaged by moving parts.

The unloader described is capable of embracing the soft metal tube or other article with a gentle pressure without denting it and is also adapted to push against the thin edge of a tube or the like without damaging or altering the shape thereof.

Though I have described with great par-

ticularity a specific embodiment of the invention, it is not to be construed that I am limited thereto as various modifications and substitution of equivalents may be made by those skilled in the art without departing from the invention as defined in the appended claims.

What I claim is:—

1. In a punch press having a reciprocable swinging arm carrying a punch, a device arranged to partake of the swinging movement of the punch to strip the work from said punch on the backward and outward stroke thereof.

2. In a punch press having a reciprocable swinging arm carrying a punch, an unloader including a member embracing the work on the punch and means for moving the latter longitudinally of the punch to strip the work therefrom.

3. An unloader for punch presses including a reciprocable swinging arm carrying a punch, guide members carried by said arm, a member slidable on the latter members, jaws carried by said member and means for moving the latter to strip the work from the punch.

4. In a punch press having a reciprocable swinging arm carrying a punch, an unloading mechanism supported by said swinging arm including jaws adapted to embrace the work carried by the punch, means for moving said jaws longitudinally of the punch, supports and guiding means for said jaws and means for separating said jaws so as to release their grip on the work.

5. In combination with a punch press having a reciprocating portion carrying an arm adapted to be swung into and out of alignment with a forming die, an unloading mechanism carried by said arm including a jaw supporting member, means for moving the latter in the direction of the length of the punch as the arm is swung out of alignment with the forming die, work engaging jaws carried by said member and means for releasing the work from the grip of said jaws.

6. In a punch press, an unloading device adapted to strip work from the punch including work engaging jaws, means for moving the latter longitudinally of the punch and means for releasing the work from the grip of said jaws.

7. In a punch press having a reciprocating punch, an unloading device including a pair of jaws adapted to embrace the work on the punch, means for moving said jaws longitudinally of the punch, yielding means tending to hold the jaws in engagement with the work and means for separating said jaws to release the work therefrom.

8. A punch press unloader including jaws arranged to embrace the work, means for moving said jaws longitudinally of the

punch and means for releasing the work from the jaws at the end of such longitudinal movement.

9. A punch press unloader including jaws
5 arranged to embrace the work, means for moving said jaws longitudinally of the punch and means for releasing the work from the jaws at the end of such longitudinal movement, said jaws being provided
10 with detachable portions which are adapted to be changed to permit the device to be used with punches of varying sizes.

10. A punch press for making collapsible
15 tubes of soft metal including a laterally and longitudinally movable punch and means movable longitudinally of the punch for automatically removing such a tube therefrom.

11. A punch press for making collapsible

tubes of soft metal including a laterally
swinging arm carrying a punch in combination with means arranged to partake of
20 the swinging movement of said arm and adapted to engage the rear end of the punch during the operation thereof and movable
25 along the punch on the backward movement of the latter to strip the work therefrom.

12. A punch press for making a tubular
article of soft metal in combination with an
unloader adapted to embrace the outside of
30 such tubular article and engage the end thereof so as to push it from the press.

In witness whereof, I have hereunto
signed my name.

HENRY BUSCHER.