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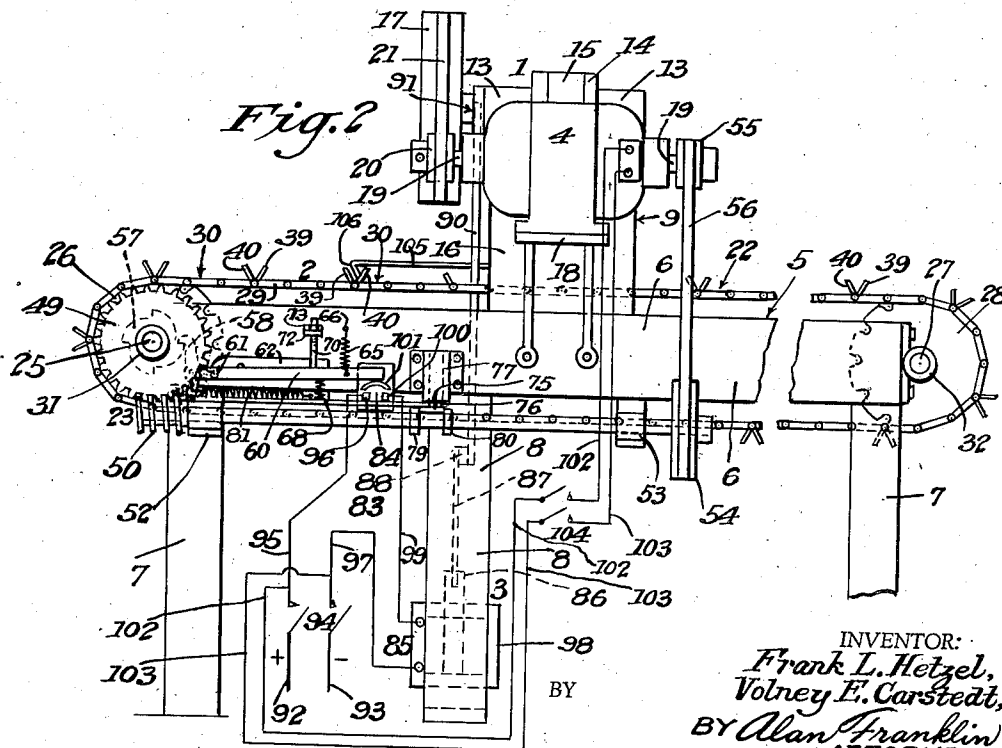
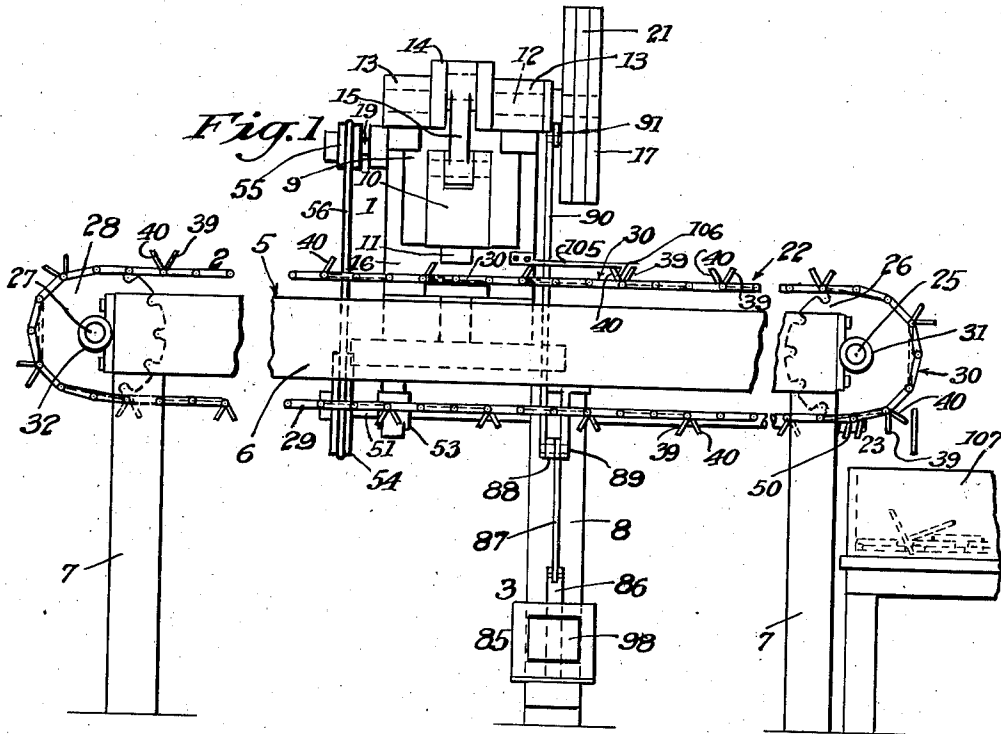
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STAMPING MACHINE

Filed May 6, 1944

3 Sheets-Sheet 1



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UNITED STATES PATENT OFFICE

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STAMPING MACHINE

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6 Claims. (Cl. 164—20)

This invention relates to punch presses, and more particularly to an automatic stamping machine for stamping sheet material to conform to the shape of an article, for example a badge secured between two pieces of transparent sheet material to prevent unauthorized alteration of indicia on either side of the badge, while permitting the badge to be seen.

The general object of the invention is to provide a stamping machine of the character stated with an automatic feed mechanism for feeding the work into position to be stamped by the punch press and including means whereby the work may be placed and secured on said feed mechanism to register accurately with the die of the punch press, when the work is fed under said die by said feed mechanism.

Other objects and advantages will appear hereinafter.

The invention is illustrated in the annexed drawings which form a part of this specification and in which:

Fig. 1 is a front elevation of my invention.

Fig. 2 is a rear elevation of my invention.

Fig. 3 is a plan view of my invention.

Fig. 4 is an end elevation of my invention.

Fig. 5 is a rear elevation of certain parts of the feed mechanism, shown in one of its positions.

Fig. 6 is like Fig. 5 but showing the parts in another position.

Fig. 7 is a fragmentary plan view of the feed mechanism showing one of the work holders of said mechanism in its released position for receiving the work.

Fig. 8 is an edge view of the work holder as shown on Fig. 7.

Fig. 9 is a view like Fig. 7 but showing the work holder in its position holding the work in position to be stamped by the punch press.

Fig. 10 is an edge view of the work holder as shown on Fig. 9.

Fig. 11 is a face view of a badge stamped out by our invention.

Fig. 12 is a lower edge view of the badge shown on Fig. 11.

Referring more particularly to the drawings, in which corresponding parts are designated by the same reference characters in all of the figures, my invention includes generally a punch press 1, an automatic feed mechanism 2 for feeding the work to said press, electrical control means 3 actuated by said feed mechanism for controlling the operation of said punch press, and a motor 4 for driving said punch press and said automatic feed mechanism, which punch press feed mecha-

nism and motor are mounted upon a supporting frame 5.

The supporting frame 5 may comprise a pair of spaced parallel horizontal beams 6 arranged one in front of the other, legs 7 on which the ends of said beams are supported, and a pair of legs 8 on which said beams are respectively supported intermediate their ends.

The punch press 1 comprises a frame 9, a plunger 10, slidably mounted in said frame, a die 11 on the lower end of said plunger, a crank shaft 12 journaled in bearings 13 on the upper part of said frame, and formed with a crank 14, and a pitman 15 connected to said crank and the upper end of said plunger. The punch press frame 9 is formed at its rear with a downwardly-extending support 16 which is secured to the rear beam 6 of the frame 5 intermediate the ends of said beam, whereby the punch press 1 is mounted in its operative position on said frame. On the crank shaft 12 of the punch press 1 is secured a pulley 17.

A bracket 18 is secured to the rear of the punch-press frame 9, on which bracket is mounted the motor 4. On the motor shaft 19 is secured a pulley 20, over which pulley and the pulley 17 extends a belt 21, whereby the punch press 1 is driven by the motor 4.

The automatic feed mechanism 2 includes generally a work-feeding conveyor 22, and an actuating mechanism 23, driven by the motor 4, for intermittently advancing said work-feeding conveyor to feed the work units 24 successively to the punch press 1 and for actuating the electrical means 3 for controlling the operation of said punch press. Said work-feeding conveyor 22 comprises a drive sprocket shaft 25, a pair of sprockets 26 secured on said shaft in spaced relation, a sprocket shaft 27, a pair of sprockets 28 secured on said shaft 27 in spaced relation, a pair of chains 29, each of which extending over one of said sprockets 26 and one of said sprockets 28, and a plurality of work carriers 30 mounted successively on said chains 29. The shaft 25 is journaled in bearings 31 secured on one end of the horizontal beams 6, respectively, of the supporting frame 5, and the shaft 27 is journaled in bearings 32, secured on the other end of said frame beams, respectively, with the sprockets 26 and 28 between said bearings 31 and 32, respectively, and between said frame beams 6. Each of the work carriers 30 comprises a plate 33 pivotally mounted on a pair of supporting rods 34 secured on the work-feeding conveyor 22; a work gripper 35 for gripping the work 24 on said plate in position to

be stamped by the punch press 1, and a trigger-actuated holding device 36 for holding said gripper in position gripping the work on said plate, and for releasing said gripper from the work, when the work has been stamped by the punch press 1, so that the stamped work may be delivered from feed mechanism 2, in the manner hereinafter more fully described. The plate supporting rods 34 extend between the chains 29 of the work-feeding conveyor 22 and the ends of said rods are secured in said chains, respectively. The plate 33 of each work carrier 30 is pivotally connected at its opposite side edges to a pair of supporting rods 34, respectively, by means of knuckles 37 formed on said side edges, respectively of said plate, there being a pair of said knuckles formed on each of said side edges through which one of said supporting rods 34 extends. The work gripper 35 of each work carrier 30, comprises a sleeve 38 and a plurality of gripping fingers 39, extending radially from said sleeve, which sleeve is turnably fitted on one of the supporting rods 34 of the work carrier, between the knuckles 37 on one edge of the plate 33 of the work carrier, through which knuckles said rod extends. The trigger-controlled holding device 36 for the work gripper 35 comprises a trigger 40 upstanding from the rear end of the sleeve 38 of said work gripper; a spring-engaging finger 41 extending radially from said rear end of said sleeve 38; and a flat spring 42 secured at one end at 43 to the plate 33 of the work carrier 30 and engaging at the other end said spring-engaging finger 41, said other end of said spring being bent downwardly and forming a stop 44 for engaging the outer side of the upper end of said finger 41 for arresting and holding the work gripper 35 in its raised and released position, as shown in Figs. 7 and 8 of the drawings. On the surface of the plate 33 of each work carrier 30 is stamped the outline 45 of the die 11 of the punch press 1, the shape of which die and outline corresponds to the shape of the article 46 secured between two pieces of transparent sheet material 47 and 48 to be stamped by the punch press die to the shape of said article.

The actuating mechanism 21 for actuating the work-feeding conveyor 22 and the punch press 1 will now be described.

On the rear end of the drive sprocket shaft 25 of the work-feeding conveyor 22 is secured a worm gear 49 in mesh with a worm 50 secured on one end of an actuating shaft 51, which shaft is slidably journaled in bearings 52 and 53 mounted on the rear beam 6 of the supporting frame 5. On the other end of said actuating shaft 51 is secured a pulley 54 and on the corresponding end of the shaft 19 of the motor 4 is secured a pulley 55, over which pulleys extends a belt 56 whereby said actuating shaft is driven by said motor. A ratchet-shaped element 57 is also secured on the drive sprocket shaft 25, which ratchet is engaged by a pawl-shaped element 58 pivoted at 59 on the forward end of a switch lever 60, which lever is pivoted at 61 on the forward end of a pawl-adjusting lever 62 pivoted at 63 on the rear side of the rear beam 6 of the supporting frame 5. To the lever 60 at 64 is connected one end of a coil spring 65, which spring is connected at its other end at 66 to the rear side of said rear beam 6. To the pawl-adjusting lever 62 at 67 is connected one end of a coil spring 68, which spring is connected at its other end at 69 to a part of the rear side of said side beam 6. A threaded bolt 70 is pivotally connected at one end at 71 to the pawl-adjusting lever 62 and extends loose-

ly through a lug 72 on the rear side of said rear beam 6, and a nut 73 is threaded on said bolt 70 for engaging said lug 72 for adjusting said lever 62 against the tension of the spring 68, in the manner and for the purpose hereinafter more fully described. To the lower end of said pawl 58 is connected one end of a rod 74, the other end of which is connected to an actuating arm 75 which is secured at one end to a pivot shaft 76 journaled in a bearing 77 secured on the rear side of the rear beam 6 of the supporting frame 5. The other end of said actuating arm 75 is formed with a fork 78 which straddles the actuating shaft 51 between two collars 79 and 80 secured on said shaft.

A coil spring 81 is connected at one end to the pawl-shaped element 58 and at its other end to a part of the rear beam 6 at 82 for maintaining said pawl in engagement with the ratchet-shaped element 57.

The electrical control means 3 for controlling the operation of the punch press 1 comprises an electrical control circuit 83, including an automatic control switch 84 and a solenoid 85, the core 86 of which solenoid is connected by a link 87 to an arm 88 pivoted at 89 to the front leg 8 of the frame 5, which arm 88 is connected by a rod 90 to the conventional spring clutch 91 of the punch press 1, for shifting said clutch into or out of engagement for operating or discontinuing the operation of said punch press in the manner and for the purpose hereinafter more fully described. The circuit 83 is connected to mains 92 and 93 by a main switch 94, one lead 95 of said circuit extending from one terminal of said main switch to one terminal contact 96 of the automatic control switch 84, and another lead 97 of said circuit extending from the other terminal of said main switch to one end of the coil 98 of the solenoid 85. A lead 99 of said circuit 83 extends from the other terminal contact 100 of said automatic control switch 84 to the other end of said solenoid coil 98.

The automatic control switch 84 has a bridge contact 101 secured on the rear end of the switch lever 60, to the forward end of which is pivoted the pawl 58 of the actuating mechanism 23 for the work feed mechanism 2, which bridge contact engages the contacts 96 and 100 and closes the switch 84 when said pawl is swung outwardly from the ratchet 57 in the manner and for the purpose hereinafter more fully described.

The motor 4 is connected to the circuit 83 by leads 102 and 103, the lead 102 extending from the lead 95 of said circuit to one terminal of said motor, and the lead 103 extending from the other terminal of said motor to the lead 97 of said circuit, there being a motor switch 104 interposed in said leads 102 and 103.

A trigger trip arm 105 is secured to the punch press support 16 and its outer end 106 is bent downwardly for engaging and tripping the trigger 40 of the trigger-actuated holding device 36 for the work gripper 35 of each work carrier 30, for releasing said holding device from said work gripper, after the work on each carrier has been punched by the punch press 1, whereby the work gripper is caused to release the work on each carrier, so that the work will drop off the carrier into a box 107 as the carriers are advanced around the sprockets 26 of the work-feeding conveyor 22.

The work unit 24 to be stamped by the punch press 1 comprises the article 46, such as an identifying badge worn by employees in war production plants, and the two pieces of sheet material

47 and 48, between which said article is secured, which pieces of sheet material may comprise a transparent plastic, such as Lucite, and they may be secured together and to the article 46 by heating the same until they adhere to each other and to said article.

The operation of my invention is as follows:

The operator of my invention places a work unit 24 on each work carrier 30 of the work-feeding conveyor 22 at the left of the punch press 1 (Fig. 1) before said work carrier is fed by said conveyor into position under said punch press for stamping said work unit, and the work gripper 35 of the work carrier 30 is swung down by the operator into engagement with the work unit 24, while the spring 42 of the trigger-actuated holding device 36, engaging the spring engaging finger 41, holds the work gripper 35 firmly in position gripping the work unit on the carrier 30. (Figs. 9 and 10).

The switches 94 and 104 of the circuit 83 of the electrical control means 3 being closed, electric current passes from the main 92 through switch 94, lead 95 and lead 102, motor switch 104 and through the field coils of the motor 4, and then through lead 103 motor switch 104, lead 97 and switch 94 to main 93, whereupon the motor 4 is driven and the motor shaft 19 and the pulleys 20 and 55 are rotated. Rotation of the pulley 20 causes the pulley 17, through the belt 21, to be rotated freely on the crank shaft 12 of the punch press 1, while said pulley 17 is normally released from said crank shaft by the disengaged clutch 91. Rotation of the pulley 55 by the motor 4 causes rotation through the belt 56 and pulley 54, of the actuating shaft 51 and worm 50 of the actuating mechanism 23 for the work feed conveyor 22; and rotation of said worm 50, in mesh with the worm gear 49 rotates said worm gear shaft 25, ratchet-shaped element 57, and sprockets 26 (clockwise in Figs. 1 and 3, and counter clockwise in Figs. 2, 5 and 6), whereupon the work-feeding conveyor 22 is advanced a short distance to bring a work carrier 30 and the work unit 24 gripped therein directly under and into alignment with the punch press 1, during which operation the tooth of the ratchet-shaped element 57 engaging the pawl-shaped element 58 lifts said pawl-shaped element and thereby swings the switch lever 60 on its pivot 61 until the automatic control switch 84 of the clutch-actuating circuit 83 is closed. The closing of said control switch prevents further movement of the switch lever 60 by the ratchet-shaped element 57 and pawl-shaped element 58, and said pawl-shaped element, engaging said tooth of said ratchet-shaped element, prevents further rotation of said ratchet-shaped element and the sprocket shaft 25, worm gear 49 and conveyor sprockets 28, whereby further advancement of the work-feeding conveyor 22 is arrested, with the work unit 24, gripped in one of the work carriers 30 on said conveyor, positioned in accurate registration with the die 11 on the lower end of the plunger 10 of the punch press 1. The closing of the automatic control switch 84 closes the clutch-actuating circuit 83, whereupon electric current passes from the main 92 through the main switch 94, lead 95, automatic control switch 84, lead 99, coil 98, of solenoid 85, lead 97, and main switch 94 to main 93, and said solenoid 85, through its core 86, link 87, and the arm 88 and connecting rod 90, shifts the clutch 91 into engagement, clutching the pulley 17 to the crank shaft 12 of the punch press 1, whereupon said crank shaft is rotated by the mo-

tor 4, through pulley 20, belt 21, pulley 17, and clutch 91, and the punch press 1 is operated, so that its descending die 11 cuts the sheet material 47 and 48 of the work unit 24 under said die, along the edge of the article 46 of said work unit gripped by the work-gripper 35 of the work carrier 30, which work carrier is arrested in position below said die of said punch press by the engagement of said tooth of the ratchet-shaped element 57 by the pawl-shaped element 58, while the control switch 84 for the clutch-actuating circuit 83 is closed, as aforesaid. The worm gear 49 being held against rotation by the engagement of the pawl-shaped element 58 with the tooth of the ratchet-shaped element 57 when the automatic control switch 84 of the clutch-actuating circuit 83 is closed, the rotation of the worm 50 in mesh with said worm gear 49, as aforesaid, causes said worm and the worm shaft 51, together with the collars 79 and 80 and pulley 54 on said shaft and the belt 56 on said pulley to be drawn forwardly (to the left in Figs. 2, 5 and 6, and to the right in Fig. 3), whereupon the arm 75, engaged by said collar 80, is swung on its pivot 76 (to the left in Figs. 2, 5 and 6, and to the right in Fig. 3) and the pawl-shaped element 58, through the link 74 is swung on its pivot 59 outwardly from the ratchet-shaped element 57, until said pawl-shaped element escapes said tooth of said ratchet-shaped element (Fig. 6), whereupon the spring 65 swings the switch arm 60 and opens the automatic control switch 84, breaking the clutch-actuating circuit 83 and releasing the clutch 91, which causes the punch press 1 to discontinue its operation after having punched the article 46 out of the work unit 24, as aforesaid, and as the worm 50 continues its rotation, as aforesaid, the worm gear 49 is rotated by said worm counterclockwise (Figs. 5 and 6), which causes the conveyor shaft 25, ratchet-shaped element 57 and sprockets 26 to rotate correspondingly and said sprockets to advance the work-feeding conveyor 22 until the work carrier 30 and the stamped article 46 therein are moved forwardly from under the punch press 1, and said stamped article is discharged from said work carrier as hereinafter described, and a succeeding work carrier 30 and a work unit 24 gripped thereon are moved to their initial position under the punch press, and during said operations, upon escapement of the pawl-shaped element 58 from said tooth of said ratchet-shaped element 57, the rotating worm 50, in mesh with the rotating worm gear 49, is moved rearwardly (to the left in Fig. 3 and to the right in Figs. 2, 5 and 6), together with the work shaft 51, collars 79 and 80, and pulley 54 on said shaft and belt 56 on said pulley, as fast as the pawl-shaped element 58 swings inwardly as it rides down the incline edge of the escaped tooth of the ratchet-shaped element 57, under the influence of the spring 81 and the lever 75 through the link 74, as said lever is swung counterclockwise (Fig. 3) on its pivot 76 by the engagement of the outer end of said lever by the collar 79 on the rearwardly moving worm shaft 51, until the pawl-shaped element 58 engages the next tooth succeeding said escaped tooth, and arrests said operating parts of the machine in their initial position, as illustrated in Figs. 1 to 5, inclusive of the drawings, thus completing a cycle of operations of the machine, which will be repeated upon further driving of the machine by the motor 4 as above described.

After the article 46 is stamped from the work unit 24 gripped in each workcarrier 30 and the

work carrier is advanced by the work conveyor 22 from under the punch press 1, as aforesaid, the work carrier passes under the trigger trip arm 105 so that the end 106 of said arm engages the tripper 40 of the trigger-controlled holding device 36 for the work gripper 35 of the work carrier 30 and swings said trigger 40 rearwardly and the spring-engaging finger 41 upwardly raising the free end of the spring 42 and the work gripper fingers 39 upwardly and causing the work gripper 35 to release the work unit 24 on the work carrier 30. As each work carrier 30 is advanced by the work-feeding conveyor 22 over the conveyor drive sprockets 26 the stamped work unit 24, released by the trigger trip arm 105, as aforesaid, together with the stamped article 46 in said work unit, drop off the work carrier into the box 107 at the remote end of the work-feeding conveyor 22, and said article 46, such as a badge, secured between the transparent sheet material 47 and 48 with said material stamped along the outline of said article, may be removed from said box for use.

The work-feeding conveyor 22 may be adjusted to bring the work carriers 30 and the work units 24 with the articles 46 gripped thereon into exact registration with the die 11 of the punch press 1, by turning the adjusting unit 73 on the threaded adjusting bolt 70. By turning said adjusting nut 73 in one direction said nut runs downwardly on the adjusting bolt 70 and engages the upper face of the lug 72 and draws said adjusting bolt and the rear end of the pawl-adjusting lever 62 upwardly, swinging said lever counterclockwise (Figs. 5 and 6) on its pivot 63 and lowering the forward end of said lever, the switch lever 60 and the pawl-shaped element 58, whereby said pawl is adjusted to engage a tooth of the ratchet-shaped element 57 at a lower position, which adjustment of said pawl-shaped element and ratchet-shaped element adjusts the work-feeding conveyor 22 and its work carriers 30, slightly rearwardly to register with the punch press 1. By turning the adjusting nut 73 in the other direction said nut runs upwardly on the adjusting bolt 70 and the spring 68 draws the rear end of the pawl-adjusting lever 62 downwardly, swinging said lever clockwise on its pivot 63 and raising the forward end of said lever, the switch lever 60 and the pawl 58, whereby said pawl is adjusted to engage a tooth of the ratchet 57 at a higher position, which adjustment of the pawl and ratchet adjusts the work feeding conveyor 22 slightly forwardly to register with the punch press 1.

We claim:

1. A stamping machine including a punch press, a feed mechanism with a plurality of work carriers, on each of which work carriers is indicated the outline of the article of the work unit to be stamped by said punch press when said outline registers with the die of said punch press, means for gripping said work units on said carriers, respectively, with the articles of said work units in registration with said outlines on said carriers and means for operating said feed mechanism and said punch press in synchronism, whereby said carriers of said feed mechanism are fed successively under said punch press and said work units, gripped on said work carriers, are stamped successively by said punch press.

2. A stamping machine as claimed in claim 1 including means for arresting said feed mechanism, during each operation of the punch press, with the outline of the article on one of the work carriers of said feed mechanism in registration with the die of said punch press.

3. A stamping machine comprising a punch press, an endless chain feed conveyor for feeding work units successively to said punch press, a drive shaft and sprockets for driving said endless chain conveyor, a worm wheel on said drive shaft, a slidably journaled worm shaft, a worm on said worm shaft in mesh with said worm wheel, bearings in which said worm shaft is slidably journaled, a collar on said worm shaft, a ratchet-shaped element secured on said conveyor drive shaft, a pawl-shaped element for engaging said ratchet-shaped element for arresting said feed conveyor against movement successively in positions with the work units on said feed conveyor under said punch press for punching said work units successively, a pivoted arm engaged by said collar and actuated by said worm shaft, a rod connected to said arm and to said pawl-shaped element, a motor, means for enabling said motor to rotate said worm shaft, whereby said worm, in mesh with said worm wheel, draws said worm shaft rearwardly and said worm shaft, through said pivoted arms and said connecting rod, swings said pawl-shaped element until it disengages a tooth of said ratchet-shaped element, so that said worm in mesh with said worm wheel will draw said worm shaft forwardly and said worm will rotate said worm wheel and conveyor drive shaft and sprockets to advance said conveyor, until the next work unit on said conveyor is brought under said punch press, and said pawl-shaped element actuated by said worm shaft through said pivoted arm and said connecting rod engages the next tooth on said ratchet-shaped element to arrest said conveyor with said next work unit on said conveyor in position under said punch press to be punched, and means for actuating said punch press to punch each work unit when fed under said press by said feed conveyor.

4. A stamping machine as claimed in claim 3 in which the means for actuating the punch press comprises means for driving the punch press, a clutch controlling said driving means, an electrical circuit including a switch and actuating means for said clutch, and means whereby said switch is closed by said pawl-shaped element, when said pawl-shaped element disengages a tooth of said ratchet-shaped element, for closing said circuit to cause said clutch-actuating means to swing said clutch into engagement so that said punch press will be driven by its said driving means.

5. A stamping machine including a punch press, a feed mechanism for feeding the work to said punch press, said feed mechanism including a drive shaft, a ratchet-shaped element on said drive shaft, a pawl-shaped element for engaging the teeth of said ratchet-shaped element successively, for successively arresting said feed mechanism in operative position under said punch press, an adjusting lever for said pawl-shaped element, a switch lever pivoted to said pawl adjusting lever and on one end of said switch lever is pivoted said pawl, means for adjusting said pawl-adjusting lever for adjusting the position of engagement of said pawl-shaped element with the teeth of said ratchet-shaped element and thereby adjusting the movement of said feed mechanism, so that said feed mechanism will register with said punch press for stamping work fed by said feed mechanism, driving mechanism for said punch press including a controlling clutch, a clutch-actuating circuit including a controlling switch actuated by said switch lever, driving mechanism for said drive shaft and said

ratchet-shaped element of said feed mechanism constructed and arranged first to advance said feed mechanism to bring a work unit into register with said punch press, and to rotate said ratchet-shaped element to lift said pawl-shaped element to swing said switch lever to close said clutch-actuating circuit to engage said clutch and cause said driving mechanism for said punch press to operate said punch press to punch said work unit, and means actuated by said drive mechanism for said drive shaft and said ratchet-shaped element for disengaging said pawl-shaped element from said ratchet-shaped element and for swinging said switch lever to open said switch and break said clutch-actuating circuit to discontinue operation of said punch press, and to enable said drive mechanism, through said drive shaft, to advance said feed mechanism to its next position in which position said feed mechanism is arrested by the engagement of said pawl-shaped element with the next tooth of said ratchet.

6. A stamping machine including a punch press, a feed mechanism for feeding work units to said punch press successively, said feed mechanism including a drive shaft, a ratchet-shaped element on said drive shaft, a pawl-shaped element for engaging the teeth of said ratchet-shaped element successively for successively arresting said feed mechanism in operative position under said

punch press, means for adjusting said pawl-shaped element for adjusting its position of engagement with the teeth of said ratchet-shaped element and thereby adjusting the movement of said feed mechanism, so that said feed mechanism will register with said punch press for stamping the work fed by said feed mechanism, mechanism for driving said drive shaft and said ratchet-shaped element for driving said feed mechanism, means actuated by said driving mechanism for swinging said pawl-shaped element outwardly when a work unit on said feed mechanism has been stamped by said punch press until said pawl-shaped element disengages each tooth of said ratchet-shaped element, and for swinging said pawl-shaped element inwardly to engage the next tooth of said ratchet-shaped element to arrest said feed mechanism in its next position, as said feed mechanism is advanced by said driving mechanism to bring the next work unit under said punch press, and means for actuating said punch press to stamp each work unit when fed under said punch press by said feed mechanism and while said feed mechanism is arrested by the engagement of said pawl-shaped element with a tooth of said ratchet-shaped element.

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