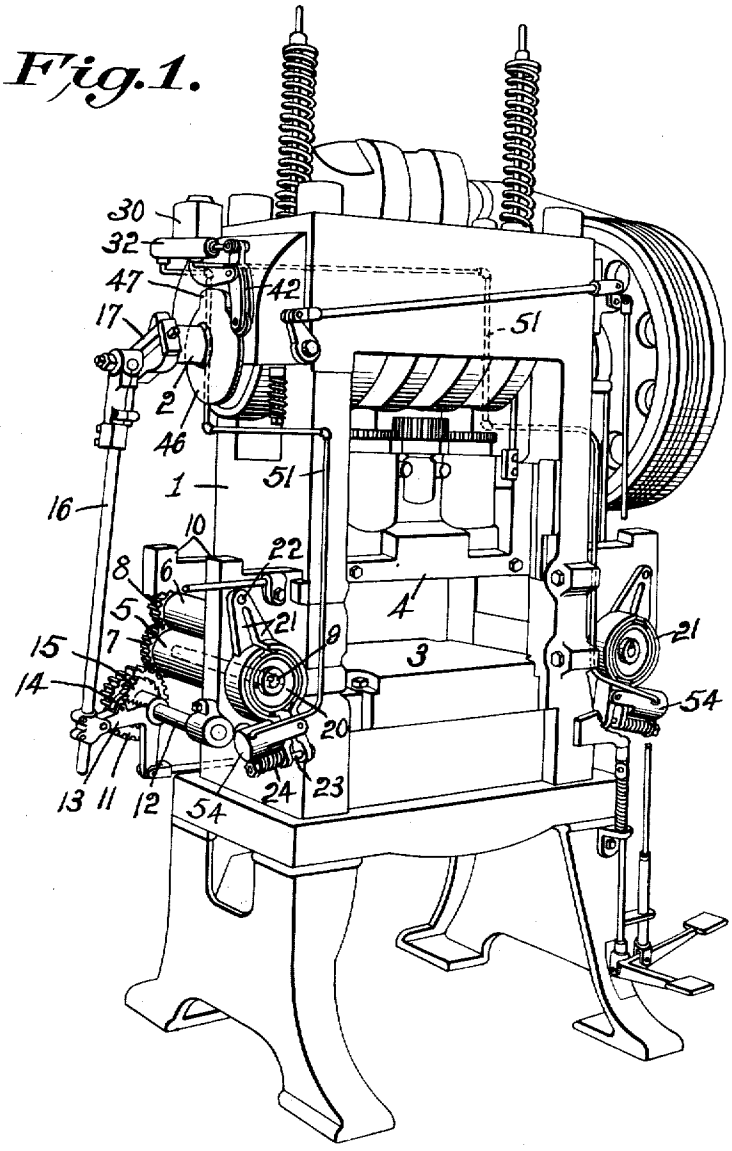
Aug. 1, 1939. E. V. CRANE ET AL 2,168,284

BRAKE MEANS FOR POWER PRESS FEED ROLLS

Filed Nov. 15, 1937 2 Sheets-Sheet 1

Fig. 1.



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Fig.2.

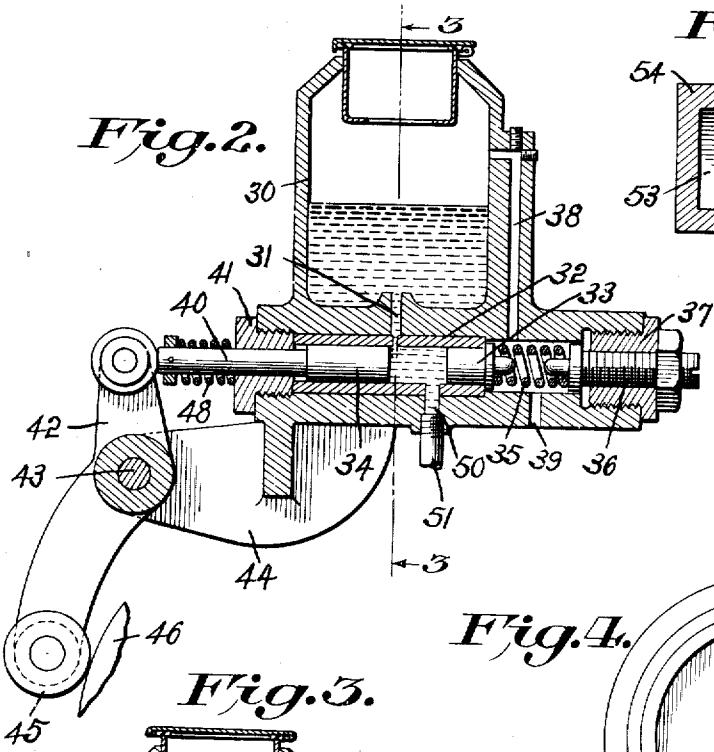


Fig.5.

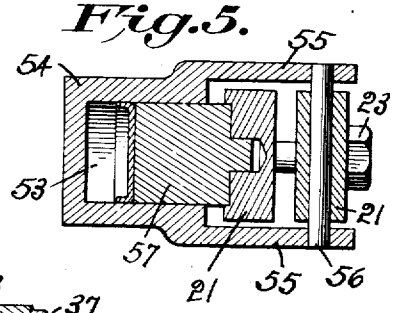


Fig.4.

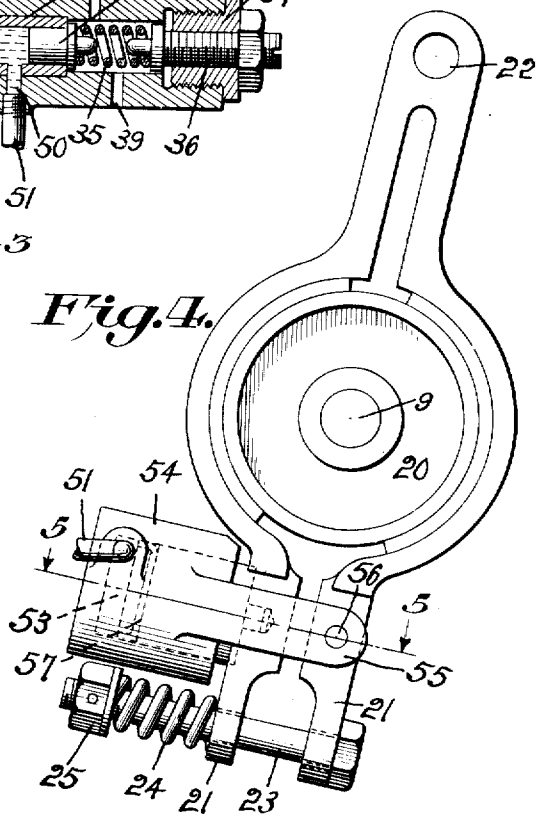
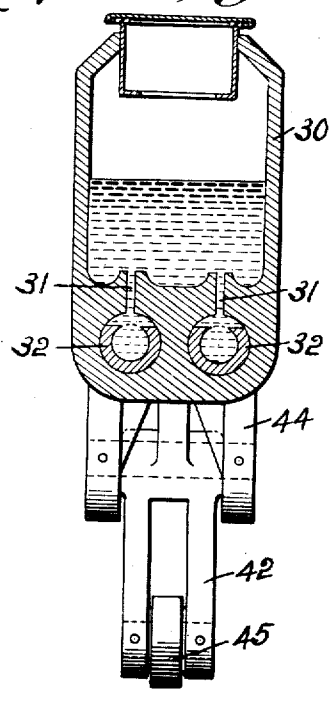


Fig.3.



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2,168,284

BRAKE MEANS FOR POWER PRESS FEED ROLLS

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Application November 15, 1937, Serial No. 174,546

9 Claims. (Cl. 271—2.4)

This invention relates to power punching and stamping presses, and particularly to mechanism for feeding the metal or other material to be acted on in continuous strip form to the press.

In the use of strip feeding mechanisms of this character, especially when run at high speeds, it is common to employ a ratchet or overrunning type of drive means to positively bring the feed rolls up to speed and to permit the rolls to overrun faster than the drive under certain conditions. Brake means are used in conjunction with such feed mechanisms, so that the feed rolls are presumably caused to slow down with the drive, or in other words will not run ahead of it or override due to their inertia. It is found in practice, however, that as feeding speeds increase, it becomes more and more difficult to get sufficient braking power to prevent or hold to a minimum the override of the rolls. There is an objection to the use of extremely high braking pressures to overcome this difficulty in that it puts an unnecessarily high load on the roller grip or ratchet clutch parts and other feed drive parts during the accelerating period.

The object of the present invention is the provision of simple and efficient means for applying a substantial braking pressure to the feed rolls at all times to insure proper functioning of the feed roll drive mechanism, together with auxiliary means which is automatically operated to apply the requisite added braking pressure when needed to prevent or hold to a minimum the mentioned override of the feed rolls.

Other objects and advantages of the invention will be apparent from the following detailed description, and from the accompanying drawings, in which—

Figure 1 is a perspective elevation of a press embodying the invention; Fig. 2 is an enlarged section through the control part of the auxiliary brake pressure applying means; Fig. 3 is a section on the line 3—3 in Fig. 2; Fig. 4 is an enlarged side elevation of the brake means associated with the feed rolls, with a part of the auxiliary brake means associated therewith, and Fig. 5 is a section on the line 5—5 in Fig. 4.

In Fig. 1, 1 is the main frame of the press which serves also generally as the main support for the feed mechanism. The particular press shown has an upper shaft 2 which may be the crank shaft operating the press plunger. The press, as is customary, has a bed 3, which may carry dies against which the punches or dies carried by the plunger 4, in the present instance disposed above the bed, are to work. These mentioned features of the press, nowever, form no part of the present invention.

The strip feeding mechanism comprises a pair of feed rolls 5 and 6 preferably geared together at one end by gears 7 and 8 mounted respectively thereon. The shaft 9 of the roll 5 is journaled in brackets 10 on the press frame side, and the gear 7 is in mesh with a drive pinion 11 carried by a shaft 12 journaled in suitable bearings on the brackets 10. A rocker-arm 13 is mounted for free rocking movements on the shaft 12 and carries a pawl 14 in normal spring pressed engagement with a ratchet wheel 15 in fixed relation to the pinion 11. It is thus apparent that a rocking of the arm 13 will impart intermittent feed wheel driving movements to the pinion 11. While a ratchet drive has been shown, it will be appreciated that any other suitable roll driving means may be used.

The rocker-arm 13 is connected by a rod 16 to a crank 17 on the press shaft 2, so that such shaft at each revolution imparts a roll feeding impulse to the rocker-arm.

The roll shaft 9 carries at one end a brake drum 20 with which a jaw type of brake coacts, such brake having the opposed arms 21 either spring or hingedly connected at one end and anchored at such end to one of the brackets 10, as shown at 22, and each having intermediate its ends a segmental brake portion or coaction with the drum. The outer or free ends of the brake arms are loosely connected by a bolt 23 which carries a coiled compression spring 24 intermediate a nut or shouldered portion 25 and the adjacent arm. The spring 24 coacts with the bolt to apply a predetermined braking pressure to the roll drum 20 and this pressure may be adjusted by an adjustment of the nut on the bolt. The features so far described are old and nothing is claimed for them apart from their cooperative action with the auxiliary brake means now to be described.

Mounted on the upper portion of the press frame 1, in the present instance above the shaft 2, is a reservoir 30 for containing a fluid such, for instance, as oil, and this reservoir has communication through a passage 31 in its bottom with the interior of a cylinder 32, one end of which is closed by a yielding plug member 33, while a plunger 34 operates in its other end. Outward movement of the plug 33 is opposed by a spring 35, one end thrust of which is against the plug while its other end thrust is against an adjusting screw 36, whereby the tension of the spring may be adjusted. The screw 36, in the present instance, is threaded into a gland nut 37 in the

base portion of the reservoir 30. A vent passage 38 opens communication between the interior of the reservoir above the oil level and the interior of the chamber in which the spring 35 is disposed and a passage 39 opens communication between such chamber and the atmosphere.

The plunger 34 has a stem 40 projecting out from the end of the cylinder 32 through a gland nut 41 and in engagement at its outer end with the adjacent end of a lever 42 which is fulcrumed at 43 to a bracket 44 projecting from the base of the reservoir 30 and has its opposite end carrying a roller 45, riding on the periphery of a cam 46. This cam is fixedly mounted on the shaft 2 and its periphery is concentric to the shaft axis except for a land 47 (Fig. 1) provided thereon in proper relation to the shaft. Such land engages the roller 45 once during each revolution of the shaft 2 and causes a rocking of the lever 42 to effect an inward movement of the plunger 34 against the tension of a spring 48 which normally retains the plunger at the limit of its outward movement, as shown in Fig. 2. When the plunger is in this position, the cylinder end of the passage 31 is uncovered, but its position with respect to the plunger is such that the initial movement of the plunger from normal position causes a closing of the passage so that the plunger during the remainder of its stroke has a pressing action on the fluid within the cylinder.

The cylinder 32 adjacent to the plug 33 is provided with an outlet passage 50 which is in communication through a conduit 51 with the closed end of a chamber 53 within a cylinder 54. The cylinder 54 has a pair of laterally opposed arms 55 projecting in spaced relation from its inner end and straddling the outer end portions of the brake arms 21 transversely of a plane parallel to the axis of the shaft 9, said arms 55 being connected to the arm 21 which is more remote from the chamber end of the cylinder by a pin 56. The innermost brake arm 21 in this arrangement receives against its outer side the thrust of a plunger 57, which operates in and closes the open end of the cylinder 53.

It will be understood that the cylinder 32, conduit 51 and chamber 53 are filled with fluid from the reservoir 30 and that any pressure created on the fluid within the chamber 32 by a pressing action of the plunger 34 will be communicated to the plunger 57 to apply a braking pressure to the connected brake arm, which pressure is in addition to that exerted by the spring 24. This auxiliary braking action is timed to take place during the last half of each strip feeding cycle of the feed means, so that the feeding action of the rolls will be effectively stopped as soon as the feed means has completed a feeding stroke, thus holding to a minimum the override of the feed rolls. The auxiliary braking pressure is then released before the next feeding cycle, so that during the accelerating period of such cycle, the feeding action is only resisted by the customary brake means. An advantage in the use of an auxiliary braking means, which is operable substantially only during the decelerating period of the feed means, is that the braking pressure of the usual feed brake means may, if desired, be reduced so that less resistance is offered to the feeding action of the feed means, thus reducing the wear and strain on the feed parts.

There may be one or two, or even more, feed units to a press, two being shown in Fig. 1, and each of such units is equipped with an individual brake means, and each, in the application of the auxiliary pressure feature of the present invention, should include a fluid pressure connection. If more than one feed unit is employed, it is desirable to provide separate cylinders 32 and associated plunger parts for each unit, but all of the several plungers may be operated from a single cam 46 through a single lever 42 acting at its upper end against the stems of all plungers. Each cylinder 32 may have a conduit 51 leading to the pressure chamber 53 of the associated brake. The primary purpose of the spring pressed plug or backing plunger 33 in connection with each cylinder 32 is to serve as a spring load accumulator to insure properly adjusted pressure on each brake.

It will be understood that the invention is not restricted to any particular construction, arrangement or form of the parts, as it is capable of numerous modifications and changes without departing from the spirit of the claims.

Having thus described our invention, what we claim as new, and desire to secure by United States Letters Patent, is:

1. In a press of the class described having an intermittently operated work feeding means, and a brake for said means, mechanism automatically operable in predetermined relation to a feeding operation of said first means to actuate the brake to prevent overriding of the feed means, said mechanism including a cylinder and plunger connected to the brake, and means operable during a predetermined portion of a cycle of operation of the press to apply fluid pressure to said cylinder and plunger to actuate the brake.

2. In a machine of the class described having an intermittently operated work feeding means, a brake means for said work feeding means and normally acting to apply a predetermined braking pressure thereto, a cylinder and plunger associated with said brake and operable by fluid pressure in the cylinder to apply braking pressure to the brake, a fluid pressure line in communication with said cylinder containing a fluid, and means operable in predetermined relation to each feeding operation of said feeding means to apply pressure to the fluid in said line to apply an additional braking pressure to said work feeding means.

3. In a machine of the class described having a machine drive shaft, intermittently operated work feeding means, and a brake for said means normally operable to apply a predetermined braking pressure thereto, a cylinder and plunger associated with said brake and operable by predetermined relative movements thereof to apply the brake, a second cylinder having communication with said first cylinder, a fluid in said cylinders and the communication therebetween, a plunger operable in said second cylinder to press said fluid and impart relative brake applying movements to said first cylinder and plunger, and cam means carried by said machine drive shaft operable to impart a fluid pressing movement to said second plunger during the decelerating portion of the cycle of said feeding means.

4. In a machine of the class described having an intermittently operated work feeding means, and a brake normally acting on said means to apply a predetermined braking pressure thereto, a cylinder containing a liquid, a plunger operable in said cylinder, means operable in predetermined relation to a feeding operation of said feeding means to actuate said plunger to apply pressure to the liquid in the cylinder, and means in communication with said cylinder and oper-

able by pressure therein to apply an increased braking pressure to said brake to prevent overriding of the feeding means.

5. In a machine of the class described having an intermittently operated work feeding means, and a brake normally acting on said means to apply a predetermined braking pressure thereto, a cylinder containing a fluid to transmit pressure, a plunger operable in said cylinder, means operable in predetermined relation to a feeding operation of said feeding means to actuate said plunger to exert pressure on the fluid in the cylinder, means in communication with said cylinder and operable by fluid pressure therein to apply an increased braking pressure to said brake to prevent overriding of the feeding means, and cushion means in association with said cylinder adjustable to regulate the pressure applied to the brake by pressure of the fluid.

6. In a machine of the class described having an intermittently operated work feeding means, and a brake normally acting to apply a predetermined braking pressure to said means, a cylinder having a liquid supply port in a side thereof, a reservoir for containing a liquid and having communication with said port to normally supply liquid therethrough to the cylinder, a plunger operating in said cylinder and normally standing in uncovering relation to said port, means automatically operable in predetermined relation to each feeding operation of said feeding means to move said plunger to close said port and exert pressure on the liquid in said cylinder, and means connected to said brake and operable by pressure of the liquid in said cylinder to apply an increased predetermined braking pressure to said brake.

7. In a machine of the class described, a plurality of intermittently operated work-feeding means, individual brakes for each of said means, and mechanism automatically operable at a predetermined point in the cycle of operation of said work-feeding means to actuate each brake to prevent overriding of said means, said mechanism including a liquid cylinder and piston for each brake, a pressure cylinder for each brake cylinder, and common means operable to exert pressure in each pressure cylinder.

8. In a machine of the class described, a plurality of intermittently operated work-feeding means, individual brakes for each of said means, liquid pressure operated means to operate each brake at a predetermined point in the cycle of operation of said work-feeding means to prevent overriding of said means, a liquid pressure cylinder for each of said last means, and means common to all of said pressure cylinders to exert pressure in each.

9. In a machine of the class described, a plurality of intermittently operated work-feeding means, individual hydraulically actuated brakes for each of said means, a pressure cylinder for each of said hydraulically actuated brakes and means common to all of said pressure cylinders to exert pressure in each at a predetermined point in the cylinder of operation of said work feeding means.

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CERTIFICATE OF CORRECTION.

Patent No. 2,168,284. August 1, 1939.

EDWARD V. CRANE, ET AL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, second column, line 30, for the word "or" read for; page 3, second column, line 32, claim 9, for "cylinder" read cycle; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 19th day of September, A. D. 1939.

Henry Van Arsdale,
Acting Commissioner of Patents.

(Seal)

able by pressure therein to apply an increased braking pressure to said brake to prevent overriding of the feeding means.

5. In a machine of the class described having an intermittently operated work feeding means, and a brake normally acting on said means to apply a predetermined braking pressure thereto, a cylinder containing a fluid to transmit pressure, a plunger operable in said cylinder, means operable in predetermined relation to a feeding operation of said feeding means to actuate said plunger to exert pressure on the fluid in the cylinder, means in communication with said cylinder and operable by fluid pressure therein to apply an increased braking pressure to said brake to prevent overriding of the feeding means, and cushion means in association with said cylinder adjustable to regulate the pressure applied to the brake by pressure of the fluid.

6. In a machine of the class described having an intermittently operated work feeding means, and a brake normally acting to apply a predetermined braking pressure to said means, a cylinder having a liquid supply port in a side thereof, a reservoir for containing a liquid and having communication with said port to normally supply liquid therethrough to the cylinder, a plunger operating in said cylinder and normally standing in uncovering relation to said port, means automatically operable in predetermined relation to each feeding operation of said feeding means to move said plunger to close said port and exert pressure on the liquid in said cylinder, and means connected to said brake and operable by pressure of the liquid in said cylinder to apply an increased predetermined braking pressure to said brake.

7. In a machine of the class described, a plurality of intermittently operated work-feeding means, individual brakes for each of said means, and mechanism automatically operable at a predetermined point in the cycle of operation of said work-feeding means to actuate each brake to prevent overriding of said means, said mechanism including a liquid cylinder and piston for each brake, a pressure cylinder for each brake cylinder, and common means operable to exert pressure in each pressure cylinder.

8. In a machine of the class described, a plurality of intermittently operated work-feeding means, individual brakes for each of said means, liquid pressure operated means to operate each brake at a predetermined point in the cycle of operation of said work-feeding means to prevent overriding of said means, a liquid pressure cylinder for each of said last means, and means common to all of said pressure cylinders to exert pressure in each.

9. In a machine of the class described, a plurality of intermittently operated work-feeding means, individual hydraulically actuated brakes for each of said means, a pressure cylinder for each of said hydraulically actuated brakes and means common to all of said pressure cylinders to exert pressure in each at a predetermined point in the cylinder of operation of said work feeding means.

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