J. DUNN.

METAL SCRAP COMPRESSING MACHINE.

APPLICATION FILED DEC. 4, 1909.

1,033,090. **Patented July 23, 1912.**

2 SHEETS—SHEET 1.

Fig. 7.

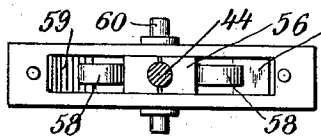

Fig. 8.

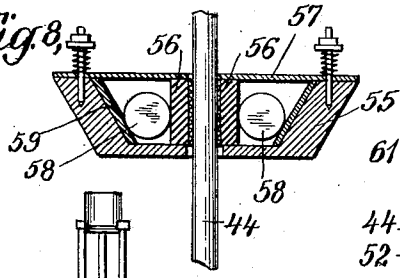

Fig. 1.

WITNESSES

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2 SHEETS—SHEET 2.

Fig. 3,

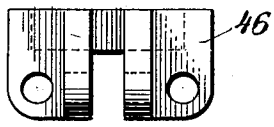

Fig. 4,

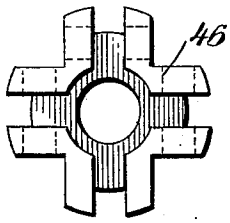

Fig. 2,

Fig. 5, Fig. 6,

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UNITED STATES PATENT OFFICE.

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METAL-SCRAP-COMPRESSING MACHINE.

1,033,090. Specification of Letters Patent. Patented July 23, 1912.

Application filed December 4, 1909. Serial No. 531,351.

To all whom it may concern:

Be it known that I, JOHN DUNN, a citizen of the United States, residing in the city of Streator, county of Lasalle, and State of Illinois, have invented certain new and useful Improvements in Metal-Scrap-Compressing Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to machines for compressing sheet metal scraps, such as detinned scraps, in detinning plants; such machines, for example, as are disclosed in United States patents to Laernoes and Dunn, Nos. 737,424 and 737,425 of August 25th, 1903. It frequently occurs, in such machines, that the compressing plunger becomes caught in the receiving boxes in which the scrap is compressed, by pieces of scrap which work up between the side faces of the plunger and the walls of the receiving box.

The object of the present invention is to provide mechanism such that the compressing plunger may be released when it has been so caught, in order that it may resume its normal operation.

In the drawings Figure 1 is a vertical section through the compressing machine on a plane which passes through the axis of the concentric cylinder; Fig. 2 is a detailed section of the upper end of the compression cylinder showing the tail-rod on the end of the piston, and the tail-rod clutch; Figs. 3 and 4 are respectively an elevation and plan of the rod on which the jaws of the tail-rod clutch are pivoted; Figs. 5 and 6 are respectively a rear and front elevation of one of the clutch jaws; and Figs. 7 and 8 are respectively a plan and central section of the automatic clutch for the lifting rod of the tail-rod clutch.

In Fig. 1 of the drawings the receiving box 1 is shown above an anvil 2, and in operative position above the receiving box, on the platform 3, is the compressing cylinder 4 in which the piston 5, carrying at its lower end the hammer-block 6, reciprocates. The admission and exhaust of motive fluid for this cylinder is controlled by hand lever 40 connected to valve rod 41 which actuates the valves in valve chests 9.

As has been suggested, it sometimes occurs that the hammer-head 6, which necessarily fits closely the interior of the receiving box 1, will be caught therein by a scrap working up between it and the walls of the receiving box, so that the pressure ordinarily employed for lifting the plunger will not be sufficient to effect that purpose, and it is the object of the present invention to supply accessory mechanism for lifting the plunger in such an emergency, the mechanism being of such character that it can readily and effectively be brought into operation when the plunger is caught, but remains out of the way when the plunger is working normally.

By reference to the drawings, it will be observed that there projects beyond the piston head a tail-rod 42 which has, screwed on to its extremity, a rounded cap 43 adapted to be engaged by the tail-rod clutch. This clutch comprises a stem 44 having at its lower end a head 45 upon the shoulder of which, and surrounding the stem, is a four-arm yoke 46 (see Figs. 3 and 4) in which the four clutch jaws 47 (see Figs. 5 and 6) are pivoted as shown. The yoke 46 is confined in place by a sleeve 48 surrounding and screwed onto the stem and which also serves as an abutment to engage the head plate 49 of the shock-absorbing spring 50 to stop the upward movement of the stem. In Fig. 2, the tail rod clutch is illustrated in the position in which it is about to be unclutched, if the upward movement is continued, and it will be observed that each of the clutch jaws 47 has an arc-shaped upstanding continuation 51 adapted to engage the beveled edge of chamber 52 in the head plate of the cylinder, the chamber being of such diameter at its open end that the upward movement of the stem presses inwardly the continuations 51 and thereby throws out the clutch jaws against the action of coiled spring 53 to free the clutch.

Stem 44 is conveniently attached to the end of a rope 54 running over suitably positioned sheaves (see Fig. 1) and brought into proximity to the lever 40 so that it may be manipulated by the controlling operator, and this rope may conveniently be counterweighted as indicated at 54′, so that the counter-weight, and the friction of projections 51 against the wall of chamber 52, will withhold the clutch at the upper end of the cylinder until the counter-weight is lifted

by the operator in order to lower the tail rod clutch 47 into engagement with the cap 43 for the purpose of assisting the disengagement of the hammer block 6 when it is tightly wedged in the cylinder 1 by scrap. The stem 44 passes through an automatic clutch 55 (see Figs. 7 and 8) comprising, in the form illustrated, a roller clutch consisting of a pair of clutch blocks 56 almost completely embracing the stem and confined within a housing by spring-pressed cover plate 57 and pressed against the stem by rollers 58 lying between it and the inclined walls 59 of the housing. This automatic clutch has trunnions 60 which are journaled in a yoke forming part of the lever 62 which is pivoted at its short end to an upstanding support 61 rising from the head of cylinder 4, and is connected at its other end to a strong lifting rod 63 operated by a piston in the cylinder 64, which may be of large diameter. This cylinder may be actuated by any suitable motive fluid, and should preferably have a controlling valve in position to be readily manipulated by the operator without changing his position from which he can reach the lever 40.

The operation will be understood to be as follows:—If the hammer block 6 becomes caught in the receiving box, so that it will not move under the ordinary steam pressure employed, the operator manipulates the rod 44, by means of the rope 54 to lower the tail-rod clutch until the beveled faces of its descending jaws engage the cap 43 on the tail-rod and are opened thereby, and again closed into the clutching position illustrated in Fig. 2 by the coiled spring 53. The operator thereupon admits the motive fluid beneath the piston in cylinder 64 to lift the rod 63, which, acting through the long leverage of lever 62, tends to lift the automatic clutch 55, which thereupon clutches the stem 44 and lifts it. In this way the steam pressure tending to lift the plunger is supplemented by the lifting effect of the tail-rod clutch and the hammer block 6 is disengaged. As soon as the hammer-block is free its further upward movement may be produced by the pressure of the motive fluid within its own cylinder 4 so that the necessary extent of movement of lever 62 is but slight. As soon as the piston 5 is lifted to a point where the projections 51 engage the edge of chamber 52, the clutch is automatically released and the operation proceeds in the normal manner, the operator fastening the tail-rod clutch in its elevated position by means of the rope 54.

I claim:

1. In a metal-scrap compressing machine, a receiving box in which the metal scrap is compressed, a compressing plunger working in said box and power mechanism for actuating said plunger, in combination with auxiliary lifting mechanism adapted to grasp and lift the plunger to free it when it is stuck in the receiving box, substantially as described.

2. In a metal-scrap compressing machine, a receiving box in which the metal-scrap is compressed, a compressing plunger working in said box, and a power cylinder and piston associated with said plunger to reciprocate it, in combination with mechanism for supplementing at will the power of said piston to impart a jerk to the plunger to free it when it is stuck in the receiving box; substantially as described.

3. In a metal-scrap compressing machine, a receiving box in which the metal-scrap is compressed and a compressing plunger working in said box, in combination with a clutch normally out of engagement with the plunger but mounted to be brought into engagement therewith at the will of the operator, and power mechanism for pulling on the clutch to free the plunger when the plunger is stuck in the receiving box, substantially as described.

4. In a metal-scrap compressing machine, a receiving box in which the metal-scrap is compressed and a compressing plunger working in said box, in combination with a clutch normally out of engagement with the plunger but mounted to be brought into engagement therewith at the will of the operator, power mechanism for pulling on the clutch to free the plunger when the plunger is stuck in the receiving box, and automatic mechanism actuated by the plunger in its upward movement after it has been freed to release and withhold the clutch, substantially as described.

5. In a metal-scrap compressing machine, a receiving box in which the metal-scrap is compressed, a power cylinder vertically alined with the receiving box and having a piston and piston-rod, a hammer head carried at the lower end of the piston-rod and working in said box as a compressing hammer, and a tail-rod projecting beyond the piston within the cylinder in combination with a tail-rod clutch in the upper end of the cylinder and having a lifting rod extending through that end, a rope connected to the clutch rod by which the clutch may be suspended out of action or lowered into clutching engagement with the tail-rod, a lifting lever fulcrumed above the cylinder and carrying an automatic clutch associated with the clutch rod, and a power piston associated with said lever to lift it and cause the automatic clutch to grip and lift the tail-rod clutch to free the hammer head when it is stuck in the receiving box, substantially as described.

6. In a metal-scrap compressing machine, a receiving box in which the metal-scrap is compressed, a power cylinder vertically

alined with the receiving box and having a piston and piston-rod, a hammer head carried at the lower end of the piston-rod and working in said box as a compressing hammer, and a tail-rod projecting beyond the piston within the cylinder, in combination with a tail-rod clutch in the upper end of the cylinder and having a lifting rod extending through that end, a rope connected to the clutch-rod by which the clutch may be suspended out of action or lowered into clutching engagement with the tail-rod, and power mechanism adapted to exert a pull on the clutch lifting rod to free the hammer head when it is stuck in the receiving box, substantially as described.

7. In a metal-scrap compressing machine, a receiving box in which the metal-scrap is compressed, a power cylinder vertically alined with the receiving box and having a piston and piston-rod, a hammer head carried at the lower end of the piston-rod and working in said box as a compressing hammer, and a tail-rod projecting beyond the piston within the cylinder, in combination with a tail-rod clutch in the upper end of the cylinder and having a lifting rod extending through that end, a rope connected to the clutch-rod by which the clutch may be suspended out of action or lowered into clutching engagement with the tail-rod, power mechanism adapted to exert a pull on the clutch lifting rod to free the hammer head when it is stuck in the receiving box, and mechanism for automatically releasing the tail-rod clutch as the piston reaches the upper limit of its travel, substantially as described.

8. In a metal-scrap compressing machine, a receiving box in which the metal-scrap is compressed, a power cylinder vertically alined with the receiving box and having a piston and piston-rod, a hammer head carried at the lower end of the piston-rod and working in said box as a compressing hammer, and a tail-rod projecting beyond the piston within the cylinder, in combination with a tail-rod clutch in the upper end of the cylinder and having a lifting rod extending through that end, a rope connected to the clutch-rod by which the clutch may be suspended out of action or lowered into clutching engagement with the tail-rod, power mechanism adapted to exert a pull on the clutch lifting rod to free the hammer head when it is stuck in the receiving box, and mechanism for automatically releasing and buffing the tail-rod clutch as the piston reaches the upper limit of its travel, substantially as described.

9. In a metal scrap compressing machine, a receiving box in which the metal scrap is compressed, and a compressing plunger working in said box, in combination with a clutch adapted to engage and disengage the plunger, a clutch rod connected to said clutch, and an automatic clutch adapted to freely permit the movement of the clutch rod but to tightly grasp and hold the rod upon its own movement; substantially as described.

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

JOHN DUNN.

Witnesses:
GEORGE GOULDING,
HARRY W. LUKINS.