J. DUNN.

MACHINE FOR COMPRESSING SHEET METAL SCRAPS.

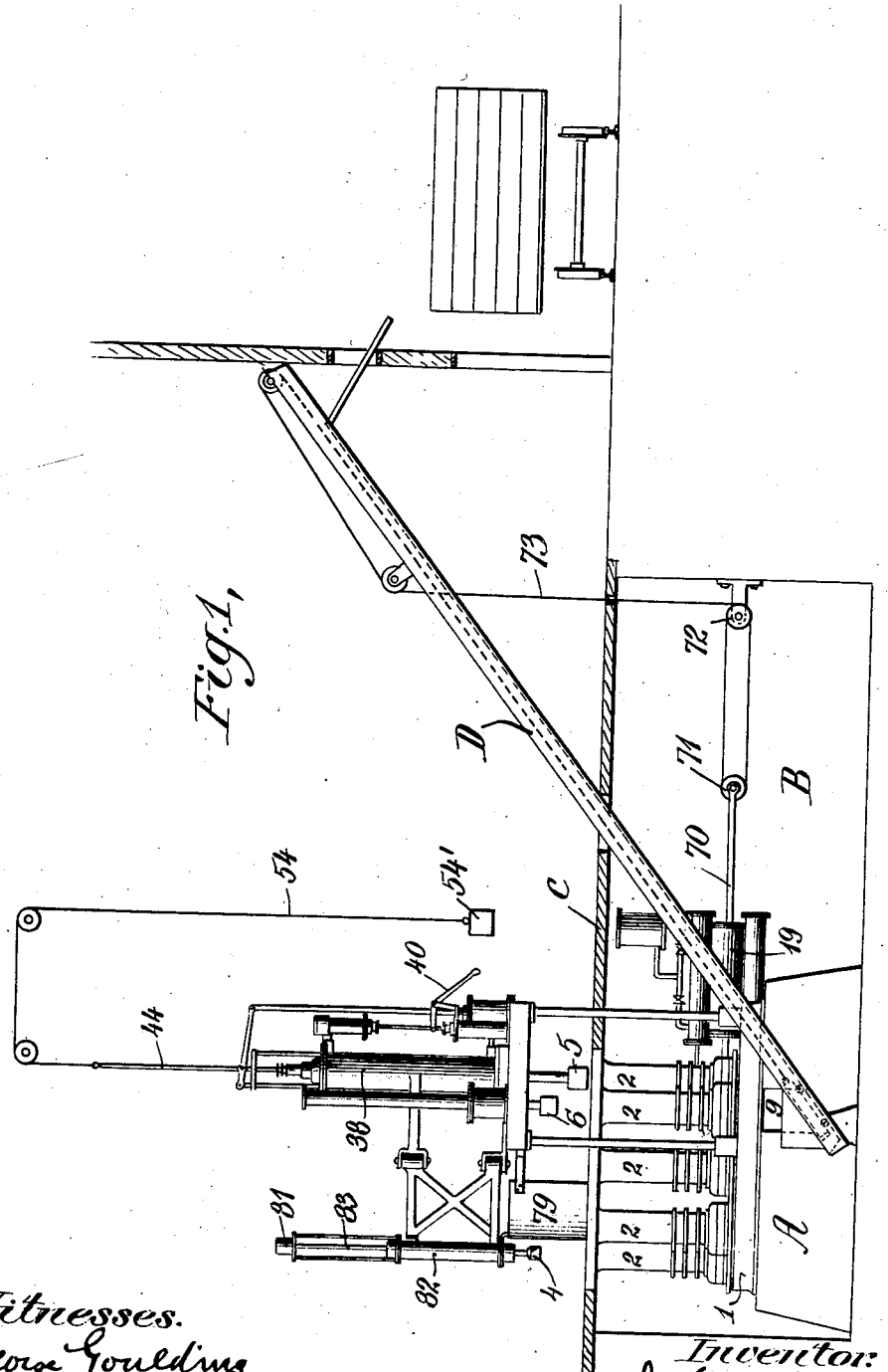
APPLICATION FILED DEC. 4, 1909.

1,033,089.

Patented July 23, 1912.

7 SHEETS—SHEET 1.

Fig. 1.



Witnesses.
George Goulding
Harry W Lukens

Inventor:
John Dunn

J. DUNN.

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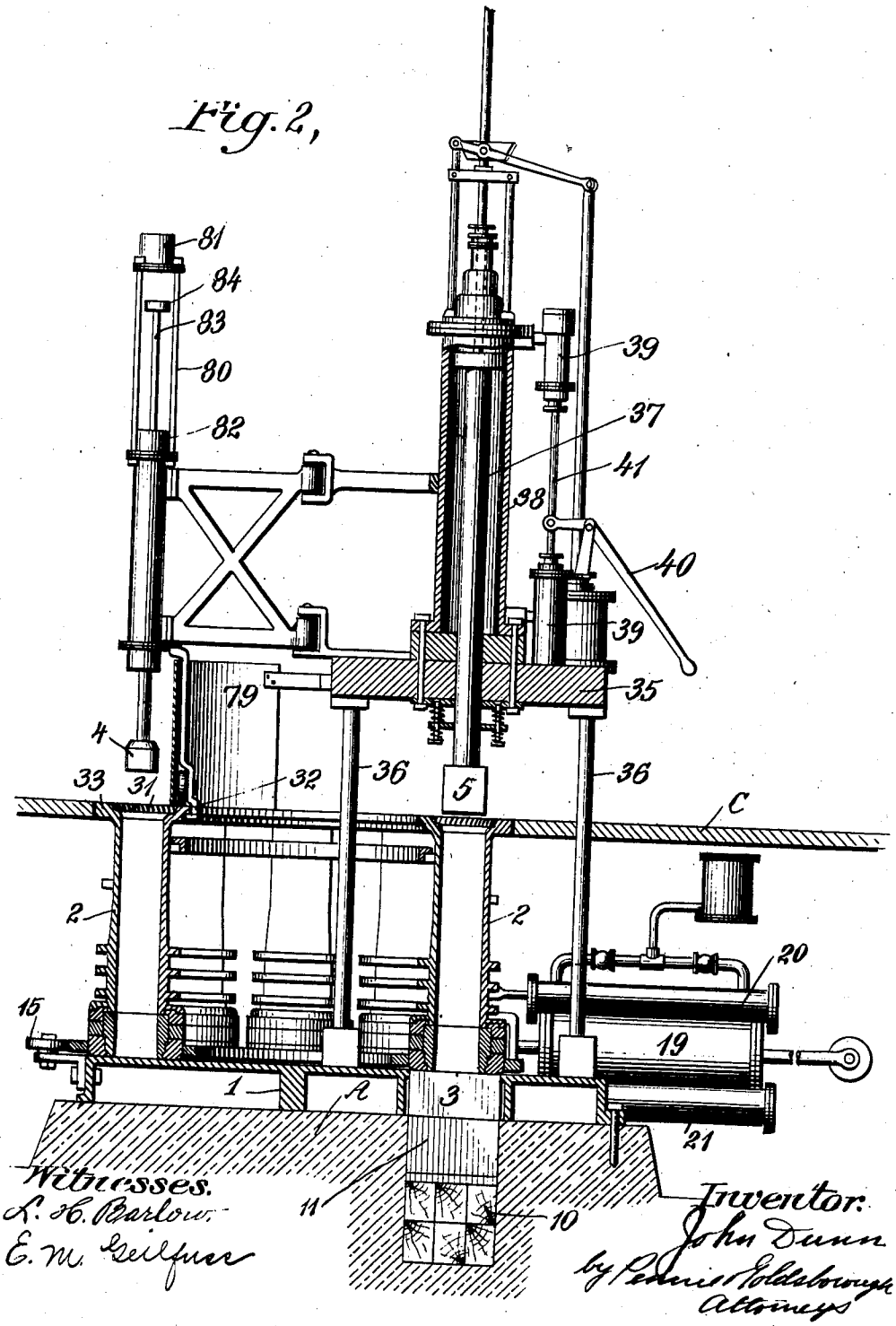
7 SHEETS—SHEET 2.

Fig. 2,



Witnesses.
L. H. Barlow.
E. M. Seilfuss

Inventor.
John Dunn
by Edwin Goldsborough
Attorneys

J. DUNN.

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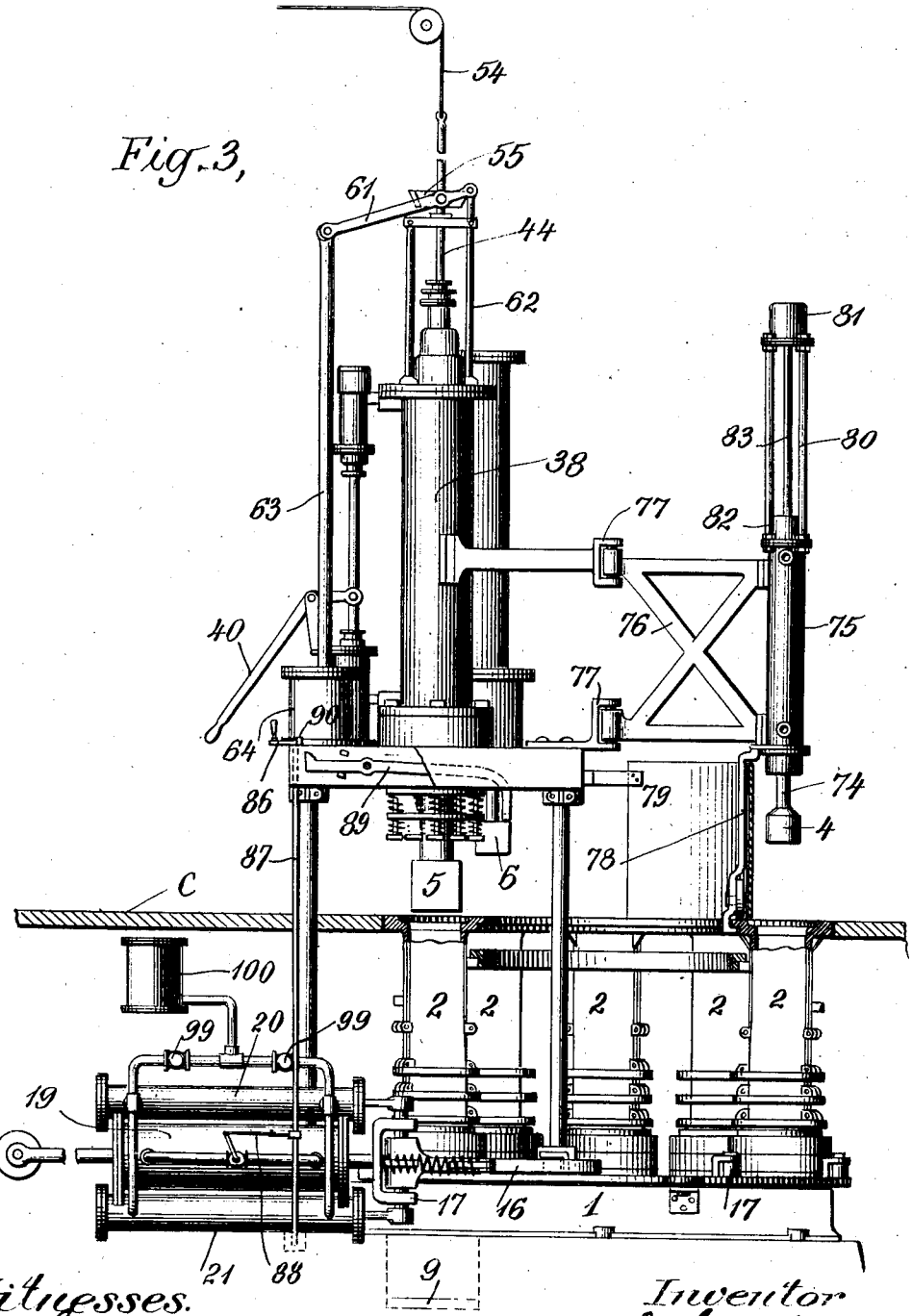
7 SHEETS—SHEET 3.

Fig. 3,



Witnesses.
George Goulding
W. W. [illegible]

Inventor
John Dunn

J. DUNN.

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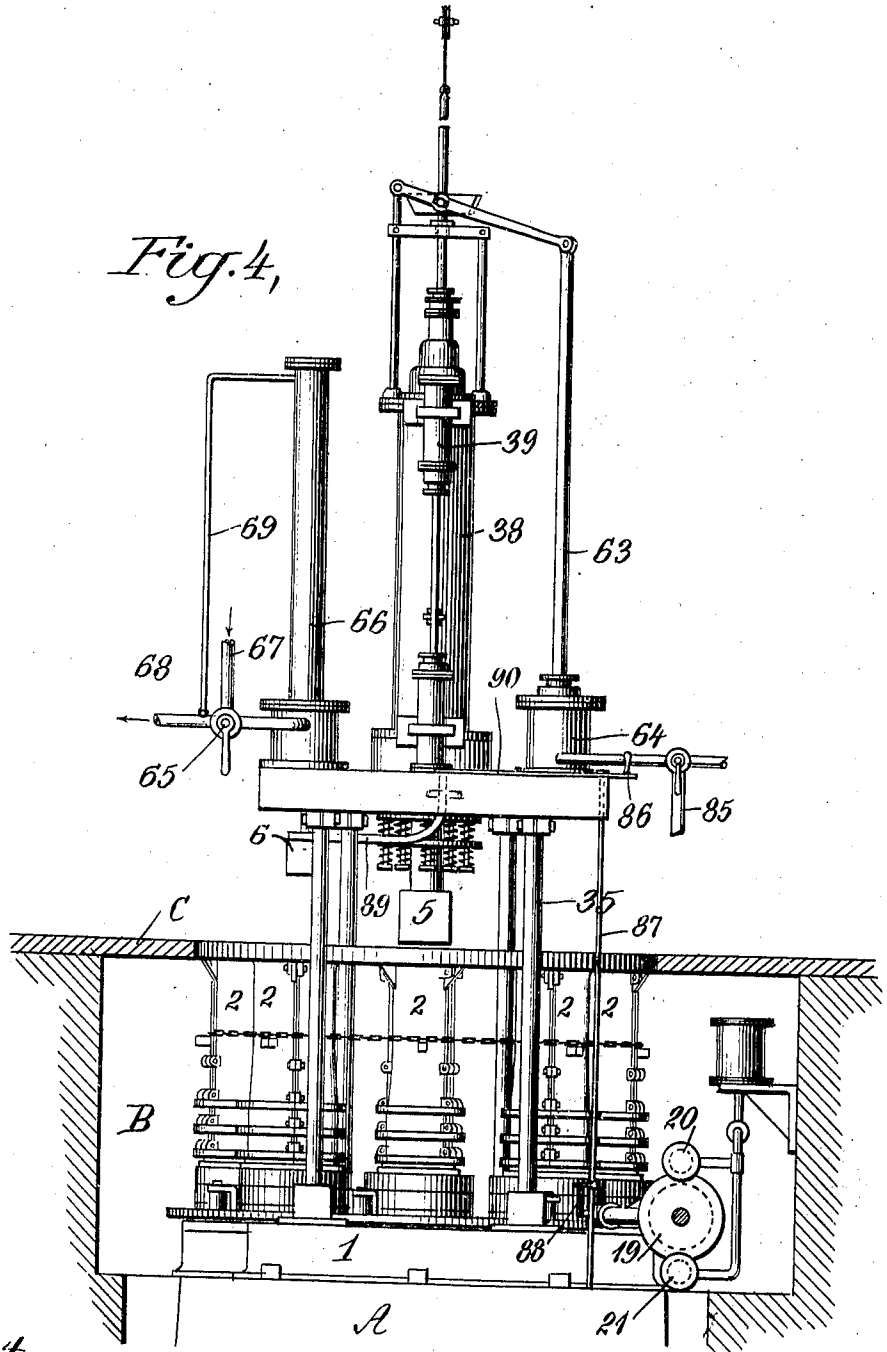
7 SHEETS—SHEET 4.

Fig. 4,



Witnesses.
George Goulding
Harry W Lutens

Inventor.
John Dunn

J. DUNN.

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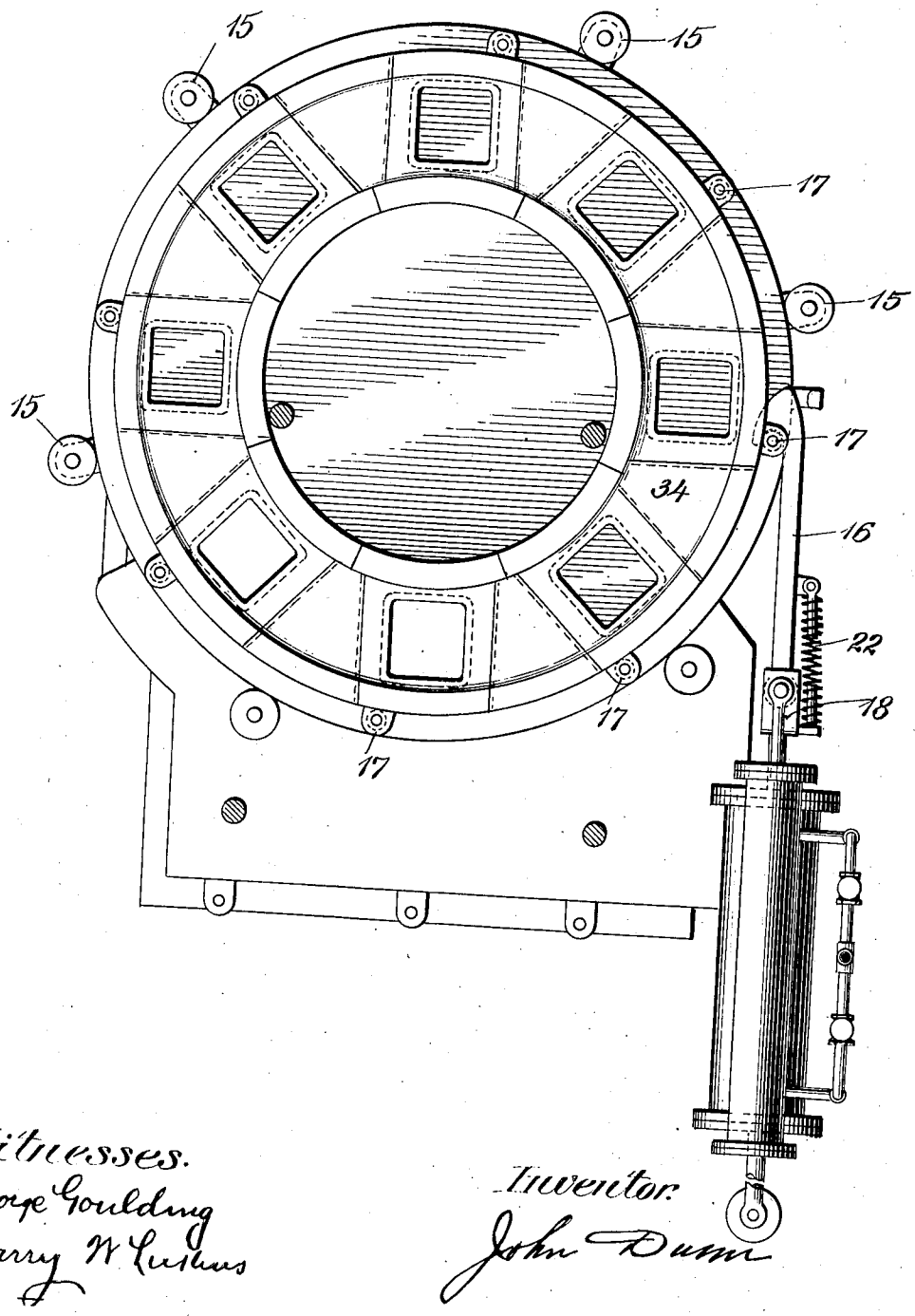
7 SHEETS—SHEET 5.

Fig. 5.



Witnesses.
George Goulding
Harry W Lustus

Inventor.
John Dunn

J. DUNN.

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7 SHEETS—SHEET 6.

Fig. 6,

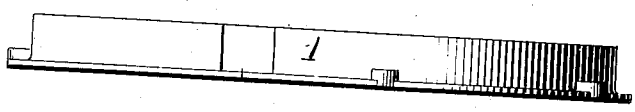


Fig. 7,

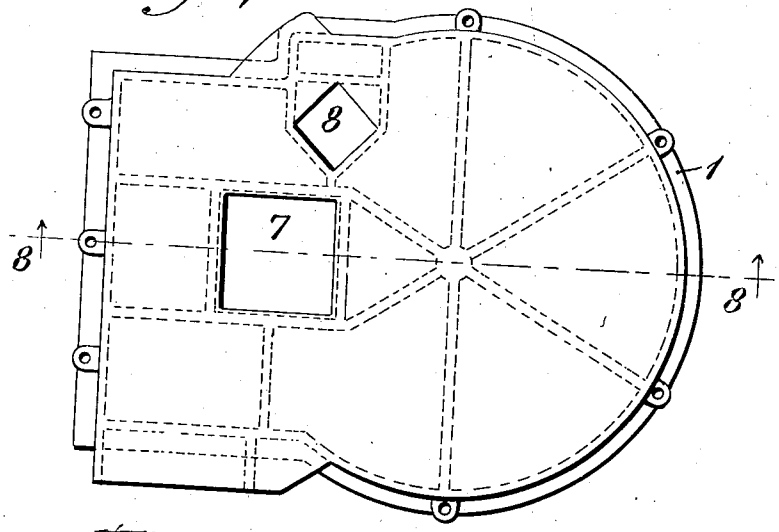


Fig. 8,

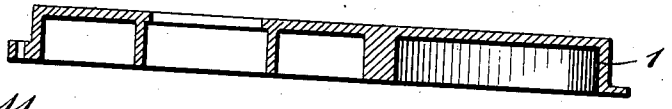
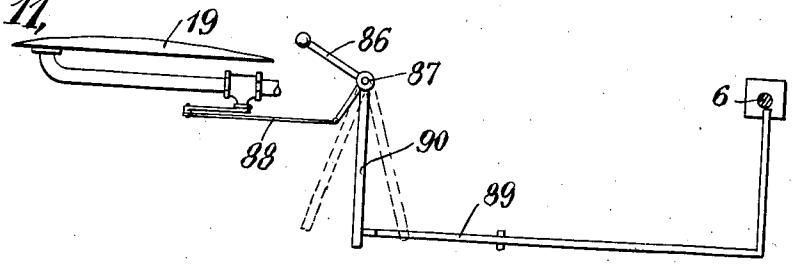


Fig. 11,



Witnesses.
George Goulding
Harry W Lyons

Inventor
John Dunn

J. DUNN.

MACHINE FOR COMPRESSING SHEET METAL SCRAPS.

APPLICATION FILED DEC. 4, 1909.

1,033,089.

Patented July 23, 1912.

7 SHEETS—SHEET 7.

Fig. 9

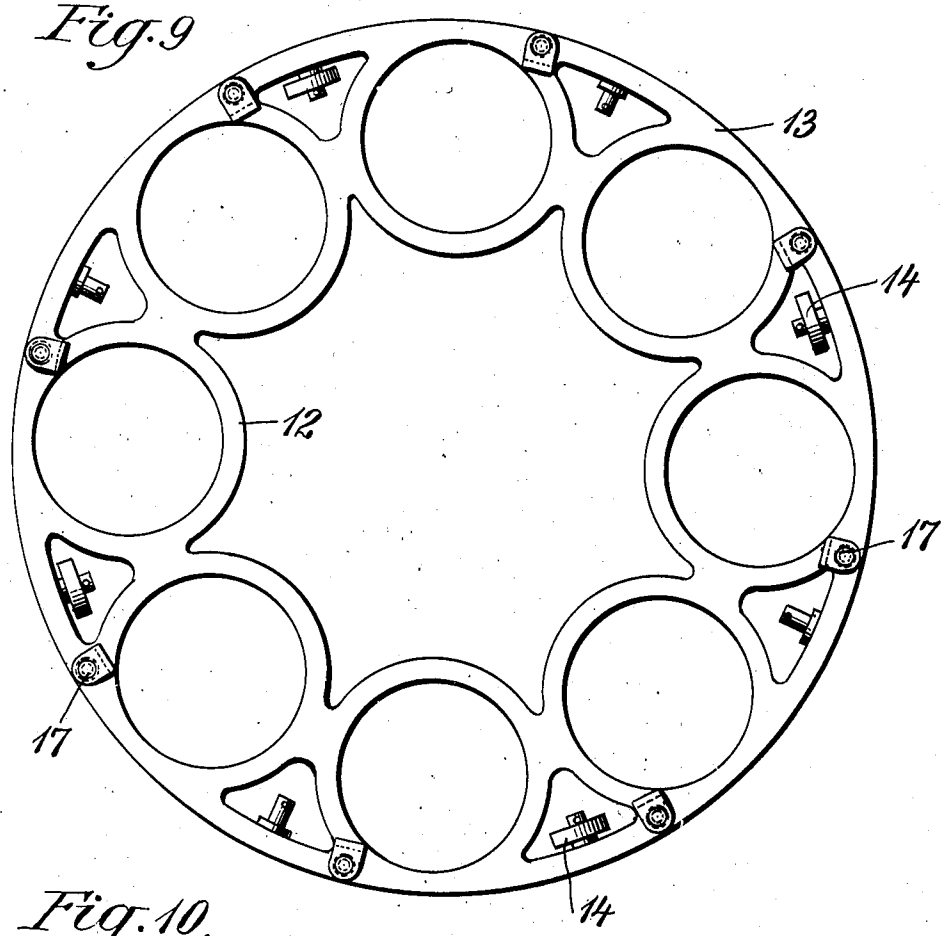
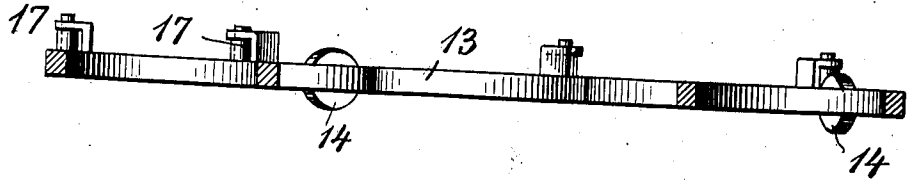


Fig. 10.



Witnesses.
George Goulding
Harry W Custus

Inventor:
John Dunn

UNITED STATES PATENT OFFICE.

JOHN DUNN, OF STREATOR, ILLINOIS, ASSIGNOR TO THE VULCAN DETINNING COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

MACHINE FOR COMPRESSING SHEET-METAL SCRAPS.

1,033,089. Specification of Letters Patent. Patented July 23, 1912.

Application filed December 4, 1909. Serial No. 531,350.

To all whom it may concern:

Be it known that I, JOHN DUNN, a citizen of the United States, residing at Streator, county of Lasalle, and State of Illinois, have invented certain new and useful Improvements in Machines for Compressing Sheet-Metal Scraps; 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 object of the invention is to improve the construction and operation of machines for compressing sheet-metal scraps, particularly detinned scraps; and the improved machine of the present invention is a development from the machines of the same general character disclosed in U. S. patents to Laernoes and Dunn, Nos. 737,424 and 737,425, of August 25th, 1903.

The improvements are in details of the old machines, and in supplementary mechanisms, the nature and functions of which will be best understood from the following description and the accompanying drawings.

In the drawings, Figure 1 shows in elevation the machine as a whole, with the mechanism for dumping the compressed blocks into a car; Fig. 2 is a vertical section, partly in elevation of the compressing machine and its foundation; Fig. 3 is an elevation of the compressing machine from the rear of Fig. 1 with the feed platform in section; Fig. 4 is a similar elevation from the left of Fig. 1; Fig. 5 is a plan through a plane just above the feed platform but with that platform removed; Figs. 6, 7 and 8 are respectively a side elevation, a plan and a central section on line 8—8 of Fig. 7, of the foundation plate; and Figs. 9 and 10 are respectively a plan and central section of the ring-shaped frame for the receiving boxes; and Fig. 11 is a detail of the interlock between the ejecting plunger and the hook-actuating cylinder, which moves the receiving boxes.

The compressing machine rests on a solid foundation A, which may conveniently be located in a foundation-pit B, covered by the feed platform C, having a large circular opening in which the annular top plate or deck of the compressing machine fits, and a smaller square opening through which the elevator chute D passes.

The compressing machine comprises generally a foundation plate 1, supporting a circular series of receiving boxes 2 in which the scraps are compressed, mechanism for moving the receiving boxes step by step above an anvil 3, a plunger 4 for pounding down the scraps preparatory to compressing them, a compressing plunger 5 for compressing the scraps, an ejecting plunger 6 for ejecting the compressed block into the elevator, and mechanism for properly actuating the several plungers and the elevator.

The foundation plate 1 is bolted to foundation A as shown, and has two openings (see Figs. 2, 6, 7 and 8), a larger one 7, below the compressing plunger 5 to receive the anvil 3, and a smaller one 8 below the ejecting plunger 6 and above an inclined chute 9 in the foundation leading to the elevator. A level and durable support for the anvil 3 is secured by forming a cavity in the cement of the foundation with its bottom leveled off as evenly as possible, laying on the bottom of the cavity rectangular wooden beams 10 preferably two layers, and placing on top of these beams a heavy cast metal block or blocks 11 filling the cavity flush with the surface of the foundation. On this filling 11 the anvil 3 rests, and is held in position by the edges of openings 7 into which it fits. The wooden beams not only give a bearing surface for filling block 11, but they are to some extent yielding and serve to lessen the jar.

On the foundation plate 1 the receiving boxes 2 are arranged in circular series, each receiving box fitting within one of the index rings 12 of the ring-shaped frame 13 (Figs. 9 and 10) which frame carries a series of rollers 14 running on the face of the foundation plate, and is guided by a series of lateral rollers 15 supported in brackets attached to the foundation plate (Figs. 2 and 5). In this manner the receiving boxes are held in their proper relative positions equally spaced apart; and they are given a step by step rotary motion, when desired, by means of the hook 16 engaging the upstanding studs 17 on frame 13. Hook 16 is pivoted on a cross-bar in cross-head 18 (Fig. 3) and is biased toward the hooking position (Fig. 5) by coiled spring 22 which yields to permit the hook to turn aside, as its nose strikes a stud 17 in the outward

movement, sufficiently to pass the stud. The hook is actuated, to move the receiving boxes, by a piston in cylinder 19, the movement of which is cushioned in known manner by pistons connected to the cross-head and moving in oil cylinders 20 and 21, supplied from reservoir 100 through suitable control valves 99. It will be understood that the extent of movement of hook 16 is such that on each actuation of it a new receiving box is brought immediately beneath compressing plunger 5.

The upper end 31 of each receiving box has upstanding flanges 32 and 33 on the inside and outside respectively, the outer flange conforming to the circular opening in the cover plate C, and the inner flange being concentric therewith; and between the portions 31 of adjacent boxes are fitted segmental plates 34 completing the continuous annular deck at the level of the cover plate C and containing the filling openings of the receiving boxes.

The operating cylinders of the compression plunger, the ejecting plunger, and the plunger for pounding down the scraps, are mounted on a platform 35 supported several feet above the cover-plate C by pillars 36 rising from foundation-plate 1. The compressing plunger 5 is fixed to the lower end of a heavy piston rod 37 in cylinder 38, which is connected with the valve chests 39 and controlled by lever 40 which actuates the valve rod 41. It will be observed that this lever is in a position to be conveniently manipulated by an operator on the cover-plate C immediately in front of the compressing plunger, and in practice this operator controls the operation of the machine and sees to it that a sufficient number of blows are given by the compressing plunger to thoroughly compact the tin scraps. Thus in a machine in which the receiving boxes are five feet deep, for example, it will usually take not more than three or four blows of the plunger 5 to compress the scrap when the box is filled. The first or the first and second blows will compress the scrap well down into the receiving box to about the level of the joint between the upper portion of the receiving box and the base-box, and two more blows will usually compact the scraps into a solid block about six inches thick in the very bottom of the base-box. After the scrap is thus compressed into a solid block in the lower flaring portion of the base-box, the operator manipulates his valves to actuate the piston in the cylinder 19 and advance the hook 16 until it engages the next succeeding stud 17 on the ring-shaped frame, and then retracts the piston and hook to advance the receiving boxes one step. By this movement the receiving box in which the scrap has just been compressed is brought above the discharge opening 8 in the base-plate and the discharge plunger 6 is dropped to knock out the compressed block through the opening 8 and down the sliding-way through opening 9 into the car in the elevating chute D.

The cylinder for operating the discharge plunger 6 may be of any convenient form and is best shown in Fig. 4 as connected at the lower end to a three-way cock 65 by which the lower chamber of the cylinder, beneath the piston which moves in the reduced portion 66, can be put into communication either with the steam pipe 67 or the exhaust 68. From the upper end of the reduced portion 66 of the cylinder a by-pass pipe 69 leads to the exhaust pipe 68. With this arrangement steam is used only to lift the plunger 6 and in its downward movement the chamber at the lower end of the cylinder is connected to the exhaust and the pressure equalized through pipe 69 so that the plunger drops of its own weight, which is sufficient to knock the block of compressed scrap from the lower end of the base-box. From Figs. 1 and 3 it will be observed that there extends from the rear end of cylinder 19 a piston rod 70 carrying a bunch of sheaves 71 connected to corresponding stationary sheaves 72 by the rope 73 which is connected at its free end to the carrier in the elevating chute so that on each movement of the piston and cylinder 19 the previously compressed block, which has been ejected and dropped into the carrier, is elevated and dumped into a car for transport.

The apparatus above described is further supplemented, in accordance with the invention, for the purpose of facilitating the operation of filling the boxes with the scrap, by the plunger 4 for pounding down the scrap in the receiving boxes before they reach the compressing plunger 5. This plunger is preferably considerably smaller than the square chamber in the receiving box and cylindrical in outline with a top portion having the shape of a truncated cone merging into the stem 74 which constitutes the piston rod of the piston cylinder 75. The purpose of giving this shape and size to the plunger is that a square plunger fitting closely the interior of the receiving box would become caught by the scraps, and even if it were smaller than the chamber would tend to catch under and lift the scrap on the upward movement. With the shape shown this tendency is overcome. This tamping plunger is under the control of an operator on the side of the machine opposite to that on which the controlling lever 40 projects, and its function is to tamp down the loose scrap in the boxes so as to get them as full as possible when they reach the compressing plunger. In order that this may be effectively accomplished the cylinder 75 carrying the plunger 4 is mount-

ed so that it may be swung about the axis of the machine. That is, it is mounted on a hinge gate 76 swinging on trunnions journaled in the brackets 77 and concentric with the ring of receiving boxes, as illustrated in Figs. 2 and 3, and it is also preferably provided with the guide arm 78 carrying a roller which travels on the upper edge of the box deck, as shown in these figures, and behind a curved screen 79 which serves to prevent the loose scraps from falling into the pit of the machine. It is intended that this plunger should have a comparatively rapid reciprocating movement so that it may deal quick blows to the scrap in the boxes and for this reason it is important to cushion the movement of the piston so that it may be quickly and easily reversed. For this purpose there is mounted on the upper end of cylinder 75 a frame-work 80 connecting two dash-pots 81 and 82, and a tail-rod 83 extending through the head of the cylinder 75 carries a piston 84 which when the piston in cylinder 75 reaches the end of its movement fits into one or the other of the dash-pots 81 and 82 to cushion the reversal.

The foregoing description is intended to make clear the construction of the different parts of the machine and their modes of operation, and the entire operation of compressing the scrap will now be reviewed as follows. The loose scrap is dumped upon the platform formed by cover-plate C on the left-hand side of the machine, as viewed in Fig. 1, and is prevented from falling into the pit of the machine by the apron 79. From this platform it is pitched into the receiving boxes 2 as they rotate in the step by step manner by pitch-forks or the like and is packed in by the workmen as tightly as can conveniently be done. At the same time the operator who has charge of the tamping plunger 4 brings this plunger above the several boxes being filled in turn and tamps down the scrap as it is being thrown in by the fillers, and by swinging the plunger 4 on the central axis of the machine it will be understood that the operator can follow a box around and divide his attention among several boxes. Soon after the tin has thus been compacted in the box it is brought by the succeeding step by step movements beneath the compressing plunger 5, whereupon the controlling operator manipulates the handle 40 to deal the necessary number of compressing blows in the manner above described. After the scrap is thus fully compressed the operator moves the receiving boxes on another step and the block is ejected by the plunger 6 and drops into the carrier in chute D upon the next movement of the piston in cylinder 19 is elevated and the block is dumped into the car for transport.

It will be observed that the master operator has his position in front of the machine on platform C where he can easily reach the control handle 40 of the compression plunger and the control handle 65 of the ejecting plunger, which is brought to the front of the machine for that purpose. The step by step advance of the machine is dependent primarily on the completion of the compression of the scrap in the receiving box beneath the compressing plunger 5, and it is the first duty of the master operator to see that this compression is properly effected. It is, however, convenient to provide within easy reach of the master operator a control handle 86, (see Figs. 3 and 11) which controls the actuating cylinder 19 of hook 16, through rod 87 and link 88.

In view of the fact that the master operator's first attention is given to plunger 5, or in case it is desired to have the ejecting plunger under the control of another operator, I provide, as a further refinement of the invention, an interlock between the ejecting plunger and the control handle 86 of the hook-actuating cylinder, so that it is impossible to advance the receiving boxes except when the ejecting plunger is in its elevated position. A convenient form of this mechanism is illustrated in Figs. 3 and 11 and comprises a pivoted stop 89 lying normally with one end in the path of a projection 90 of control handle 86 and with the other end in the path of ejecting plunger 6, so that as the ejecting plunger reaches its elevated position it strikes stop 89 and turns it on its pivot to remove its other end from the path of control handle 86, and prevents the movement of that handle to actuate cylinder 19 and move the receiving boxes.

In the drawings there is shown a clutch-rod 44 passing through the upper end of the cylinder 38 and having attached to it a rope 54 with counterweight 54′ brought down into position to be reached by the master operator; and associated with this rod 44 is an automatic lifting clutch 55 carried by lever 61 fulcrumed on frame 62 and connected at its free end to lifting rod 63 actuated by a piston in cylinder 64 which is controlled by valve handle 85, also within reach of the master operator. These parts, together with a tail-rod clutch (not shown) within cylinder 38, constitute mechanism for freeing the compressing plunger if it is caught by the scraps in the receiving box. This mechanism is not further described because it forms no part of the present invention, but is fully described and claimed in my copending application filed of even date herewith.

What I claim is:—

1. A machine for compressing detinned and other scraps having a masonry founda-

tion, a foundation plate thereon having an anvil opening and a discharge opening, an anvil block in the anvil opening and an inclined discharge runway, communicating with the discharge opening, a circular series of receiving boxes on the foundation plate, mechanism for moving the receiving boxes step by step, a compressing plunger supported above the receiving boxes in position to aline with one of them at their periods of rest, and an ejecting plunger supported above the receiving boxes in position to aline with that box which is immediately above the discharge opening in the foundation plate; substantially as described.

2. A machine for compressing detinned and other scraps having a masonry foundation, a foundation plate thereon having an anvil opening and a discharge opening, an anvil block in the anvil opening and an inclined discharge runway in the masonry foundation communicating with the discharge opening, a circular series of receiving boxes on the foundation plate, mechanism for moving the receiving boxes step by step, a compressing plunger supported above the receiving boxes in position to aline with one of them during their periods of rest, an ejecting plunger supported above the receiving boxes in position to aline with that box which is immediately above the discharge opening in the foundation plate, an elevator into which the discharge runway leads, and connections between the mechanism for moving the receiving boxes and the mechanism for lifting the elevator, whereby the elevator is raised and lowered upon each movement of the receiving box; substantially as described.

3. A machine for compressing detinned and other scraps having a foundation sunk in a foundation pit, a circular series of receiving boxes supported on the foundation, mechanism for moving the boxes step by step, the receiving boxes being of a height to extend just out of the foundation pit, a pit cover surrounding the series of boxes and flush with the tops thereof, and mechanism for compressing the scraps in the boxes and for rejecting the compressed scrap therefrom and elevating it out of the foundation pit; substantially as described.

4. A machine for compressing detinned and other scraps having a circular series of receiving boxes supported on a foundation sunk in a foundation pit, the boxes being united at their upper ends by a deck having a circular outline, a pit cover flush with the said deck, mechanism for moving the boxes step by step, and a compressing plunger for compressing the scraps in the boxes; substantially as described.

5. A machine for compressing detinned and other scraps having a series of receiving boxes for the scraps, a compressing plunger adapted to work in said boxes, and mechanism for moving the receiving boxes step by step to present them in succession to the compressing plunger, in combination with an auxiliary tamping plunger mounted in position to tamp the scraps in the receiving boxes before they reach the compressing plunger; substantially as described.

6. A machine for compressing detinned or other scraps having a series of receiving boxes for the scraps, a compressing plunger adapted to work in said boxes and mechanism for moving the boxes step by step to present them in succession to the compressing plunger, in combination with an auxiliary plunger mounted to have a limited range of movement along the series of boxes and adapted to tamp the scraps in any one of several of said boxes before they reach the compressing plunger; substantially as described.

7. A machine for compressing detinned or other scraps, having a circular series of receiving boxes for the scraps, a compressing plunger adapted to work in said boxes, and mechanism for moving the receiving boxes step by step to present them in succession to the compressing plunger, in combination with an auxiliary tamping plunger mounted to travel along the circular series of receiving boxes, whereby the tamping plunger may be swung along the series of boxes to tamp the scraps in any one of several of them before they reach the compressing plunger; substantially as described.

8. In a machine for compressing detinned and other scraps, a circular series of receiving boxes for the scraps having their upper ends united to form an annular deck, a compressing plunger adapted to work in said boxes, and mechanism for moving the receiving boxes step by step to present them in succession to the compressing plunger, in combination with an auxiliary tamping plunger and a carrying frame therefor hinged on pintles in alinement with the axis of the circular series of receiving boxes, and a guiding arm for the tamping plunger engaging the inner edge of the annular deck; substantially as described.

9. In a machine for compressing detinned and other scraps, a circular series of receiving boxes for the scraps having their upper ends united to form an annular deck, a compressing plunger adapted to work in said boxes, and mechanism for moving the receiving boxes step by step to present them in succession to the compressing plunger, in combination with an auxiliary tamping plunger and a carrying frame therefor hinged in plintles in alinement with the axis of the circular series of receiving boxes, a guiding arm for the tamping plunger engaging the inner edge of the annular deck, and a curved, upstanding screen between the

mouths of the receiving boxes and the inner edge of the annular deck; substantially as described.

10. A machine for compressing detinned and other scraps, having a series of receiving boxes for the scraps, a compressing plunger adapted to work in said boxes, power mechanism for moving said boxes step by step to present them in succession to the compressing plunger, and power mechanism for reciprocating the compressing plunger, in combination with an ejecting plunger arranged in position to aline with the receiving boxes after they have left the compressing plunger, and an interlock between the ejecting plunger and the power mechanism for moving the boxes, to prevent the movement of the boxes until the ejecting plunger is out of its box; substantially as described.

11. A machine for compressing detinned and other scraps having a series of receiving boxes for the scraps, a compressing plunger adapted to work in said boxes, power mechanism for moving said boxes step by step to present them in succession to the compressing plunger, an ejecting plunger mounted in position to aline with the receiving boxes after they have left the compressing plunger, and an elevator into which the compressed block passes when it is ejected, the power mechanism for moving the boxes and the elevating mechanism being so interconnected that upon every actuation of the power mechanism to move the boxes the elevator is automatically raised and lowered.

12. In a machine for compressing detinned and other scraps, a circular series of receiving boxes united at their tops by an annular deck surrounding their top openings; substantially as described.

13. In a machine for compressing detinned and other scraps, a circular series of receiving boxes each having its upper end extended to form an apron about the mouth of the box and segmental plates uniting the aprons into an annular deck; substantially as described.

14. In a machine for compressing detinned and other scraps, a circular series of receiving boxes each having its upper end extended to form an apron about the mouth of the box, each apron having at its inner and outer edge an upstanding flange, the flanges conforming to concentric circles, and flanged segmental plates uniting the aprons into an annular deck; substantially as described.

15. In a metal scrap compressing machine, an anvil and foundation therefor, comprising a masonry foundation, heavy wooden beams embedded therein, a heavy metal filling block embedded in the foundation and resting on the beams, and an anvil block resting on said filling block; substantially as described.

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

JOHN DUNN.

Witnesses:
GEORGE GOULDING,
HARRY W. LUKINS.