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2,061,358

AUTOMATIC DISCHARGING MACHINE

Filed Oct. 7, 1932

2 Sheets-Sheet 1

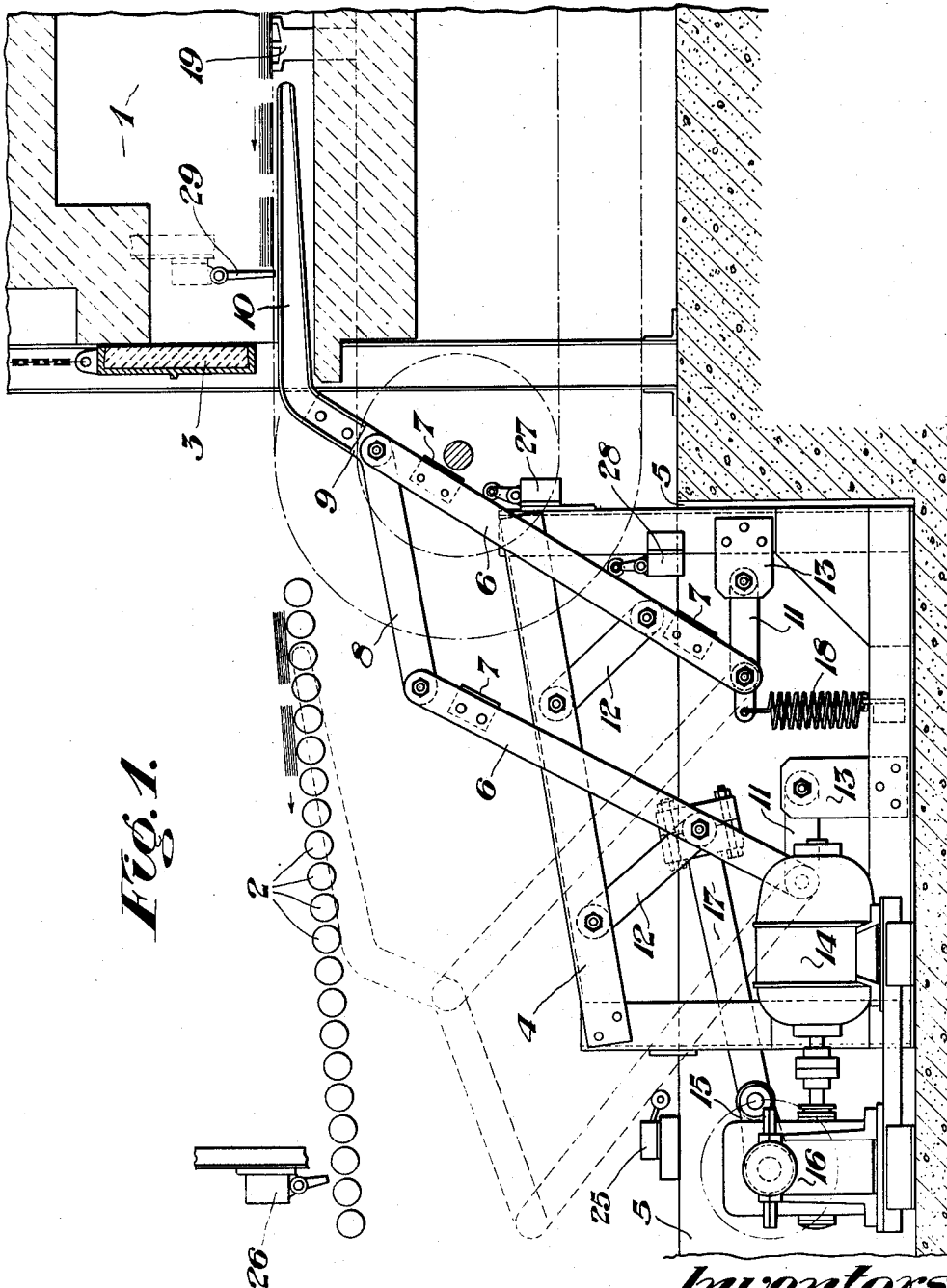


Fig. 1.

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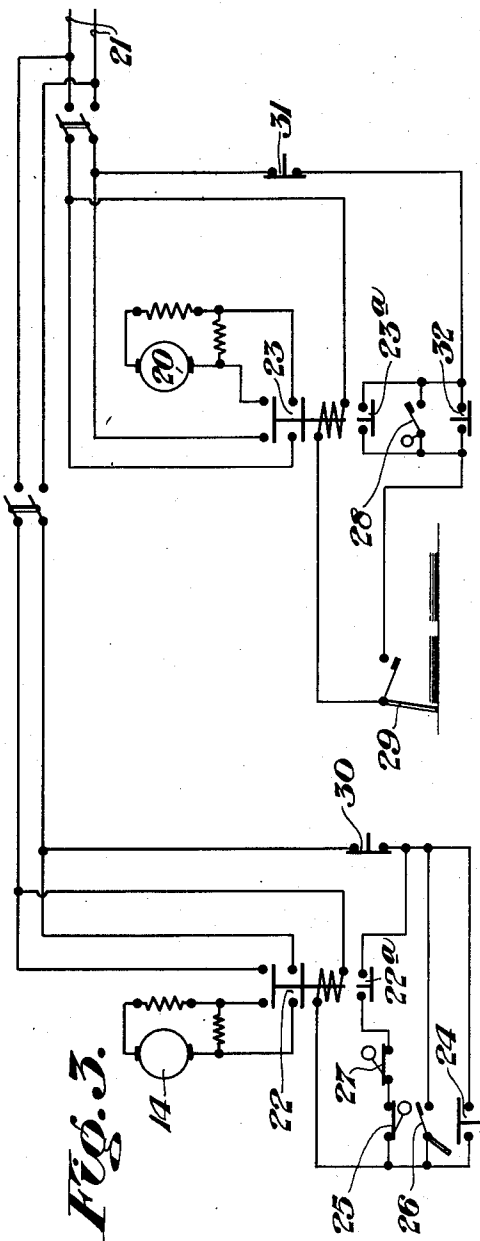
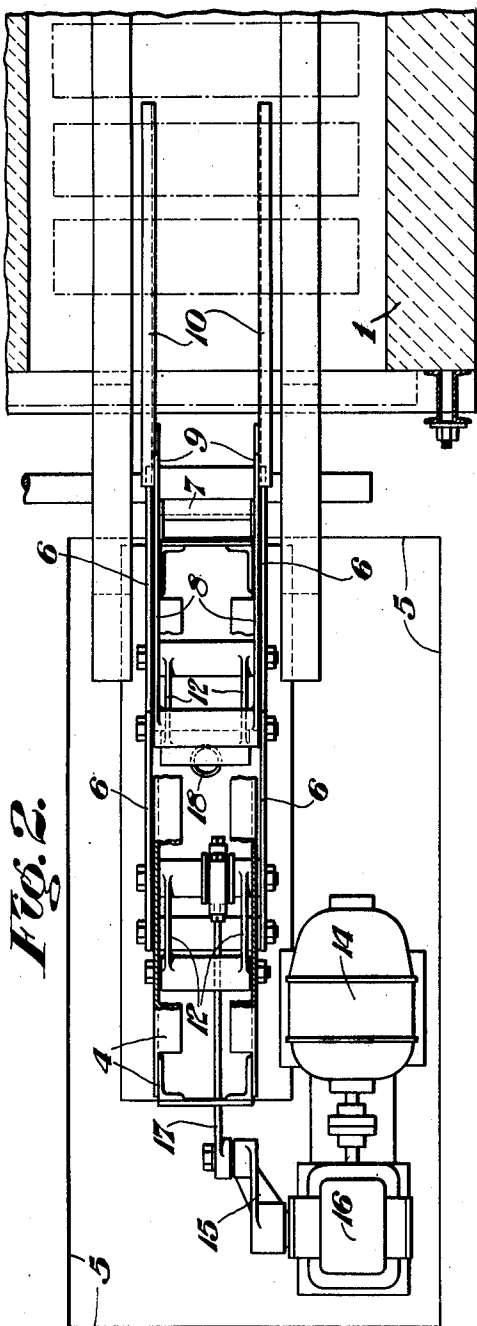
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UNITED STATES PATENT OFFICE

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AUTOMATIC DISCHARGING MACHINE

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2 Claims. (Cl. 214—18)

This invention relates to furnace discharging machines, one of the objects being the mechanical removal of objects from the furnace and preferably their automatic transfer to an adjacent table or conveyer. Other objects may be inferred from the following disclosure of an illustrative machine embodying the invention.

Referring to the drawings:

Figure 1 is a side elevation.

Figure 2 is a top plan.

Figure 3 is a diagram of an electrical control.

This machine is arranged to remove sheet bars from the exit end of a continuous furnace 1 and transfer them to a gravity roller conveyer 2. This conveyer is assumed to supply pairs of sheet bars to a mill located at its end. A vertically sliding door 3 closes the exit of the furnace.

The machine includes a frame 4 in a pit 5 arranged between the furnace and conveyer. This frame mounts substantially parallel levers 6. There are four of these levers interconnected by cross-bars 7 to form two parallel pairs. They are linked together at their upper ends by members 8 having upstanding ends 9 to which carrier arms 10 are bolted. The arms form a carrier for the sheet bars.

In each instance the lower ends of the levers 6 are mounted by links 11 and 12 which are pivoted thereto at spaced points. The links 12 depend directly from the frame 4, and the links 11 are mounted on plates 13 bolted to the frame.

The links 11 are of equal lengths. The links 12 are properly proportioned so that the carrier arms 10 follow a substantially elliptical path when reciprocated from the furnace to the conveyer. That is to say, the carrier arms have a lifting and transverse outgoing motion from the furnace which changes to a declining or curvilinear lowering motion upon approaching the conveyer. When in the furnace the carrier arms lie in a substantially horizontal plane, and when at the conveyer they are slightly therebelow and substantially parallel therewith. The individual rollers forming this conveyer are short enough so that the carrier arms may straddle them and thus assume the secondly named position.

The above motions of the carrier arms are accomplished by making the left-hand links 12 slightly longer than the right-hand links and the links 11 of equal lengths. The positions are accomplished by mounting the right-hand links 12 slightly above the left-hand links 12 as well as the right and left-hand links 11. This linking system may be varied so that the proportions of the lifting and lowering movements with respect

to the transferring movement may be changed to meet the requirements of the size of the furnace's exit and the relative positions of the furnace and conveyer.

A motor 14 drives a crank 15 through a gear reduction unit 16. This crank 15 is connected to the left-hand levers 6 at their point of connection with the links 12 by a connecting-rod 17. This reciprocates the carrier arms through their respective motions and to the various positions prescribed by their mounting lever or linkage system. A spring 18 may be fixed to the end of one of the links 11 for the purpose of partially counterbalancing the weight of the arms 10 and the carrier load.

The operation of the machine as so far described is so obvious as to need little comment. The lifting motion of the carrier arms 10 is rather slight when compared to their transferring motion. They approach the conveyer with a declining or curvilinear motion which not only deposits the sheet bars thereon but gives them a slight forward motion which starts them down the conveyer. This is important when it is considered it is possible for one of the conveyer's rollers to become stuck and prevent proper carriage of bars merely laid thereon.

The motions of the carrier are throughout a gentle removal of the work from its position in the furnace which blends into a deposit on the conveyer with a slight forward urge.

In a continuous furnace of the type to which the machine is applied the work is carried by conveyer blades 19 driven by a motor 20 and connected for operation immediately upon the opening of the door 3. This motor and its mechanical connections are not shown except as indicated on the wiring diagram.

Inasmuch as it is very desirable to further this automatic operation, the invention also embodies an electrical control for the motor 14 designed for this purpose.

A control suitable for providing the roller of the mill served by the conveyer 2 with a means for effecting a completely automatic discharge and delivery of the sheet bars as needed is illustrated by the diagram. This diagram does not include the motor operating the door, but it is to be understood that it may be interconnected to open at the proper time in the usual manner.

In this control the motor 14 is connected to a power line 21 through an electromagnetic switch 22. The motor 20 is connected to the line through an electromagnetic switch 23. The electromagnetic switch 22 is energized by a foot 55

treadle switch 24. This switch 22 includes a holding contact 22^a which maintains the circuit closed upon releasal of the foot treadle switch. Energization of the motor 14 is thus maintained until the carrier reaches its opposite reciprocation extreme when it is broken by a limit switch 25.

The sheet bars having now been deposited on the conveyor 2 will roll thereover and trip a switch 26. This reenergizes the electromagnetic switch 22 and causes the lever system to reciprocate to its other extreme when it operates a limit switch 27 which breaks its circuit and allows its holding contact 22^a to open.

When the switch 27 opens another limit switch 28 is simultaneously closed. This energizes the electromagnetic switch 23 and starts the motor 20 which drives the conveyor blades 19. This switch also includes a holding contact 23^a which maintains its circuit when once energized. The motor 20 continues to operate until the conveyor blades move a sheet bar into contact with a trigger switch 29 in the furnace which breaks the circuit to the electromagnetic switch 23 and stops the motor. A pair of sheet bars will now be over the carrier arms 10 ready for removal when the roller again operates the foot treadle switch 24. Although not shown, the trigger switch 29 may be provided with a solenoid which is energized simultaneously with the first energization of the motor 14, whereby it is drawn out of the way to permit removal of the sheet bars.

Preferably emergency stop push buttons 30 and 31 are arranged to break the circuits to the electromagnetic switches 22 and 23. This will provide an immediate control in case of accidents. A starting push button 32 which energizes the electromagnetic switch 23 is also preferably provided so that the sheet bar moving motor 20 may be controlled in such an emergency.

Although a specific form of this invention has

been shown and described in accordance with the patent statutes, it is not intended to limit its scope exactly thereto, except as defined by the following claims.

We claim:

1. In combination with a furnace and an adjacent conveyer, a machine including a carrier, means for mounting said carrier for reciprocation from a work receiving point in said furnace to a work depositing point at said conveyer, a motor for reciprocating said means, and manually operated means for starting said motor when said carrier is at said receiving point, means operable by the reciprocation of said carrier to said depositing point for stopping said motor, means operable by the passage of work over said conveyer for starting said motor and means operable by the reciprocation of said carrier to said receiving point for stopping said motor.

2. In combination with a continuous furnace having a work moving motor and an adjacent conveyer, a machine including a carrier, means for mounting said carrier for reciprocation from a work receiving point in said furnace to a work depositing point at said conveyer, a motor for reciprocating said means, and manually operable means for starting said reciprocating motor when said carrier is at said receiving point, means operable by the reciprocation of said carrier to said depositing point for stopping said reciprocating motor, means operable by the passage of work over said conveyer for starting said reciprocating motor, means operable by the reciprocation of said carrier to said receiving point for stopping said reciprocating motor and starting said furnace's work moving motor, and means operable by the movement of work in said furnace for stopping said work moving motor.

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