(No Model.)

# F. H. RICHARDS.

## SUPPLY APPARATUS.

No. 559,216. Patented Apr. 28, 1896.

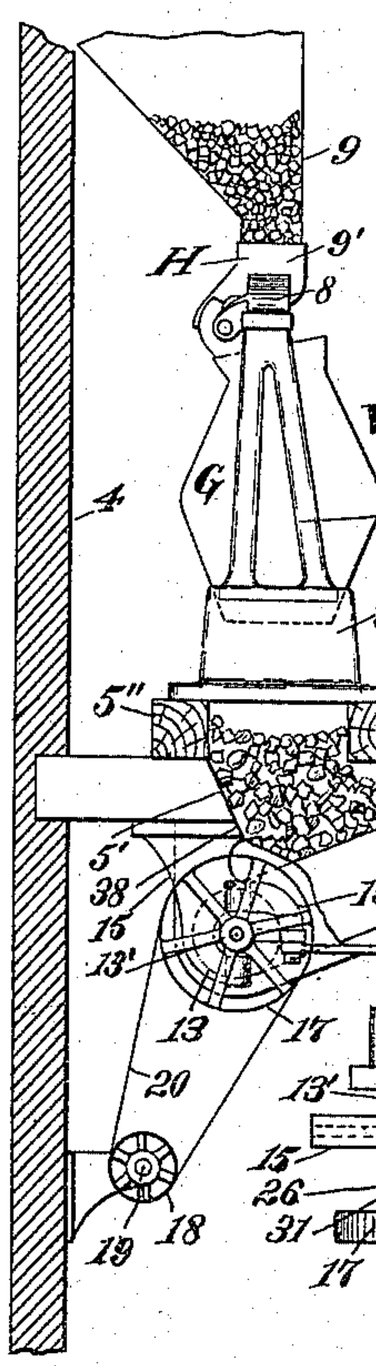


Fig. 1.

Fig. 1a

Fig. 2.

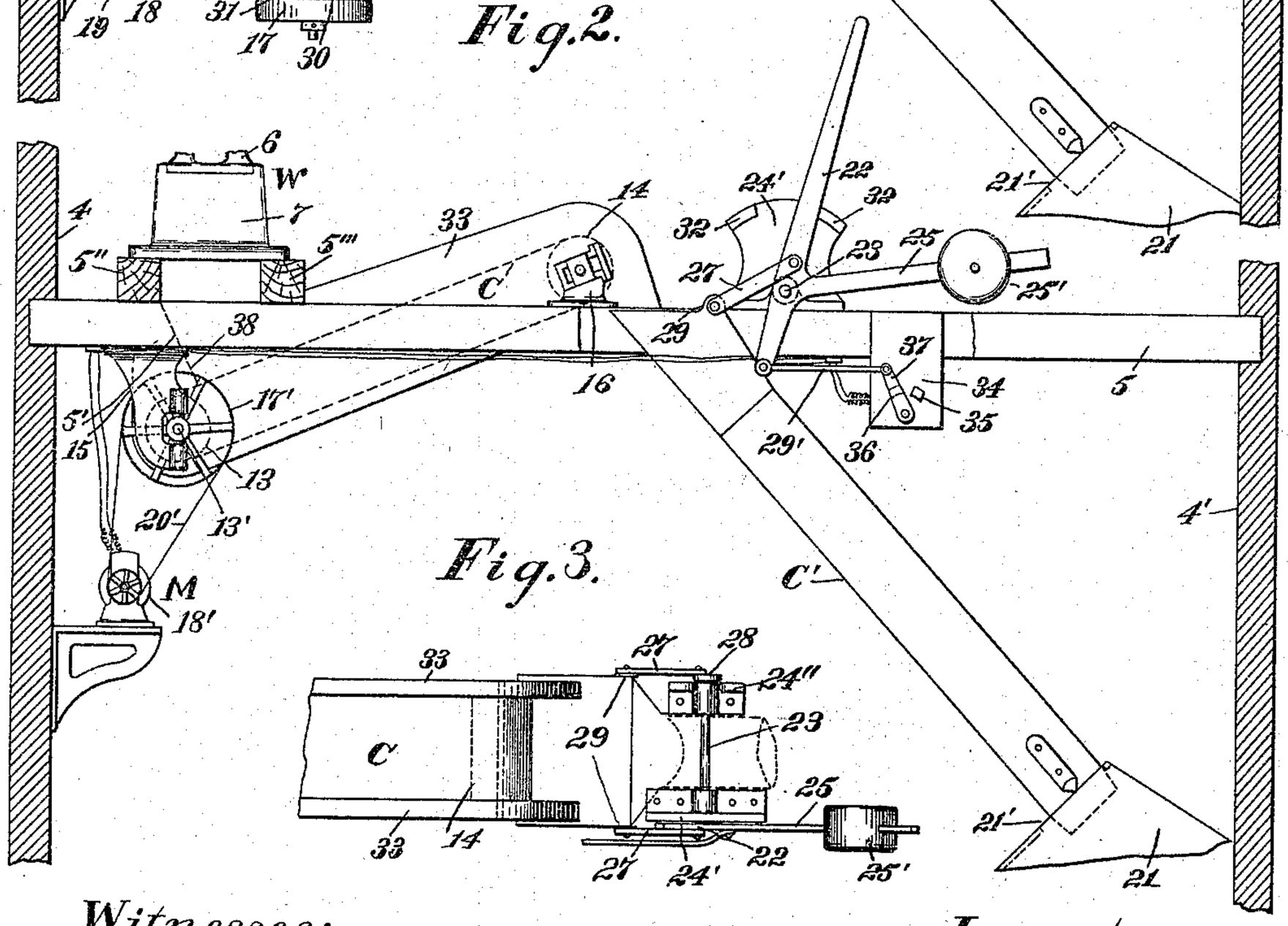


Fig. 3.

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# UNITED STATES PATENT OFFICE.

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## SUPPLY APPARATUS.

SPECIFICATION forming part of Letters Patent No. 559,216, dated April 28, 1896.

Application filed February 25, 1896. Serial No. 580,688. (No model.)

*To all whom it may concern:*

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Supply Apparatus, of which the following is a specification.

This invention relates to supply apparatus.

The object of the invention is to provide an improved organization of coöperating mechanisms embodying means for maintaining a steady uniform supply of materials of various characteristics to a device for subsequent use or treatment thereby, such as the supply of fuel for consumption by a furnace, and means for automatically controlling the supply of such materials.

In the drawings accompanying and forming part of this specification, Figure 1 is a diagrammatic view in right-hand end elevation, illustrating one of the uses of the apparatus. Fig. 1ª is a detail view in plan illustrating part of the supply-controlling means. Fig. 2 is a view similar to Fig. 1, with the operative parts in a different position, and it also illustrates a modified form of the means for controlling the supply; and Fig. 3 is a detail plan view illustrating a part of the supply mechanism and controlling means therefor.

Similar characters designate like parts in all the figures of the drawings.

The walls of a building or structure are shown at 4 and 4′, connected by a floor or platform 5, in which latter is shown formed the opening 5′, the purpose of which will be hereinafter specified.

It is customary in manufacturing plants to weigh coal before it is fed into a furnace; and a weighing-machine, which is designated in a general way by W, is shown located over the opening 5′, formed in the platform 5, and as supported by the beams 5″ and 5‴, resting on the latter.

One of the side frames for supporting the operative parts of the weighing-machine is shown at 6, and with a similar frame is carried by the chambered supporting-base 7. In practice the side frames are connected by a top plate or beam, which is designated by 8, and which is shown carrying a supply chute or hopper located beneath the spout 9′ of a bin or hopper 9, which contains the mass of coal to be supplied to the furnace. The chute H receives the coal in a stream from the bin or hopper 9, and directs said stream into the weighing-bucket G, which latter is supported by beam mechanism. (Not shown.)

The invention embodies, in connection with a power-driven conveyer and with a movably-supported chute located to receive a stream of material from said conveyer, means operated by said chute for automatically limiting and controlling the movement of said conveyer, whereby the supply of material to a particular device, such as a furnace, may be also controlled and regulated with precision.

A conveyer, which is designated in a general way by C, is shown located beneath the bucket G of the weighing-machine for receiving the bucket-loads of material intermittently discharged thereby, a deflecting-plate 38 directing the material to said conveyer. In the form illustrated the conveyer consists of an endless belt or band of suitable width and material supported by the rolls 13 and 14, the direction of movement of said conveyer being indicated by the arrow in Fig. 1.

One of a pair of brackets or hangers for supporting the extended shaft 13′ of the roll 13 is shown at 15, the shaft of the other roll being supported by standards, one of which is shown at 16 as resting on the floor 5. The roll 13 constitutes a power or driving roll, its shaft 13′ being extended beyond the bracket 15 and loosely carrying the pulley or belt wheel 17, operatively connected with driving mechanism. The pulley 17 is shown operatively connected with the pulley 18 on the line-shaft 19 by means of the endless band or belt 20, said shaft being operatively connected with a suitable motor, as shown in Fig. 2.

A movably-supported chute or closed conduit is shown at C′, with its receiving-opening approximately in alinement with the descending stream or mass of material from the conveyer C.

The storage-compartment of a furnace or other device is shown at 21, having a feed-opening 21′, (see dotted lines, Figs. 1 and 2,) through which the lower end of the chute C′ is passed, whereby the latter may supply the material to said storage-chamber as it is fed thereinto by the conveyer C.

The end walls of the chute C′ are shown

provided with pivots or like devices which rest on one of the walls of the storage-compartment 21, whereby freedom of movement of said chute C′ is insured. The chute C′ is normally adapted to receive the supply of material from the conveyer C and is depressible from normal position on the accumulation therein of a certain quantity of material or when nearly filled, whereby said chute C′, when depressed from its normal position, is adapted to instantly stop the conveyer C, to thereby also stop the supply of material to the chute C′ until a certain portion of the mass has gravitated therefrom, when said chute (in the manner hereinafter described) will resume its normal position and also again start the conveyer C in action.

Means will be employed for maintaining the chute C′ in its normal position for receiving the stream of material from the conveyer C and for also returning the same to such position, and the means shown for this purpose is a counterbalanced lever 22, provided with the laterally-extending rock-shaft 23, which is journaled in the end plates 24′ and 24″ of the standard or frame 24.

The lever 22 is shown provided with the forwardly-extending weight-carrying arm 25, the weight 25′ of which is preferably adjustable along said arm. The counterbalanced lever 22 is also shown operatively connected with the chute C′, the link 27 being employed for this purpose, said links being pivotally connected, respectively, one directly to the lever and the other with a rock-arm 28 on the lever-supporting shaft 23 at points above the fulcrum of said lever and with lugs 29, formed on the chute C′.

On the accumulation of a certain amount of material in the counterbalanced chute C′ the weight of said material will depress said chute from its normal position, as indicated in Fig. 2, to the position shown in Fig. 1, and when a part of said material has run from said chute into the compartment 21, the excess having been consumed by the furnace, the counterbalanced lever operates to return said chute C′ to its normal or stream-receiving position.

It will be remembered that the chute C′ has been described as depressible from its normal position and that on such movement it is adapted, through operative connections, for stopping the movement of the conveyer C and thereby also the supply of material.

A clutch, constituting part of the conveyer-driving mechanism, is shown at 26, comprising two members 26′ and 26″, the first-mentioned of which is carried by the loose pulley 17 and the other of which is splined to the drive-shaft 13′, and hence is rotative therewith. The movable part of the clutch is adapted to be engaged or disengaged from its mate on the pulley 17 to either stop or start the conveyer C in a well-known manner.

For sliding the movable clutch member toward and from its mate I prefer to employ the clutch-actuator illustrated, which is in the form of an angle-lever 27×. (Shown pivotally supported by an arm 15′, formed on the bracket 15.) One member, 28×, of said angle-lever is illustrated pivotally connected with the connecting-rod 29×, the rear end of the latter being also shown pivotally connected with the lower arm of the counterbalanced lever 22. The other member, 30, of the angle-lever 27× is shown provided with the downwardly-projecting pin 31, seated in a peripheral groove formed on the clutch member 26″, whereby as the angle-lever is oscillated by its connections with the chute C′ said clutch member may be moved along said shaft to either stop or start the conveyer C.

The conveyer C being in motion and supplying a stream of material (illustrated as coal) to the chute C′ the latter will direct said stream to the compartment 21, which is illustrated as the storage-compartment of a furnace. If at any time the mass fills the said compartment and chute, owing to the failure of the furnace to rapidly consume the accumulated coal, the chute will be depressed by the weight of said mass from its normal position, Fig. 2, to the position shown in Fig. 1. As the chute C′ is thus depressed the weight of the counterbalanced lever 22 is overcome, and the upper arm thereof will be drawn to the left through the operative connections with said chute, and the lower arm of said lever, the connecting-rod 29×, and the angle-lever arm 28 will be moved in opposite directions, so that the angle-lever arm 30 will move the clutch member 26″ along the shaft 13′, disengaging it from its mate on the pulley 17 to thereby stop the conveyer C.

As the furnace (not shown) consumes the coal in the storage-compartment 21 a certain portion of the material in the chute C′ flows by gravity therefrom into the storage-chamber 21, and the counterbalanced lever 22 then overcomes the weight of the partially-filled chute C′ and is operative for returning said chute to the normal position thereof, whereby said chute may move the clutch member 26″ along its shaft 13′ and into engagement with its mate 26′ on the pulley 17 to thereby again start the conveyer through the operative connections therebetween.

The end walls of the standard 24 are shown provided with stops 32, formed thereon, which are adapted for limiting the throw or stroke of the lever 22, and hence the movement of the chute C′, which is operatively connected thereto, and of the other connected operative mechanisms.

Passed through openings formed in the floor 5 are the plates 33, suitably secured in place, and which are adjacent to the rolls 13 and 14 and serve as a guide for maintaining the belt 12 in its operative position on said rolls, and also as a guard for preventing lateral flow of the material while on said belt.

In Fig. 2 I have illustrated a modified

means for controlling the movement of the conveyer C. An electric motor is shown at M, the power-wheel 18′ of which is connected with the pulley 17′ by means of the belt 20′, said last-mentioned pulley being fixedly connected with the shaft 13′ of the rear roll of the conveyer. A switchboard is shown at 34, having the contact-points 35 and 36 electrically connected with the motor M. A switch for making and breaking the electrical circuit is shown at 37 in the form of a lever pivotally supported on the switchboard 34 and as connected by the link 29′ with the lower arm of the counterbalanced lever 22, so that as said lever 22 is rocked in the manner previously described the circuit may be opened and closed for either stopping or starting the motor, and through said motor the conveyer C.

Having thus described my invention, I claim—

1. In an apparatus of the class specified, the combination with a conveyer, and with driving mechanism therefor; of a movably-supported chute normally adapted to receive a stream of material from said conveyer; and means operated by said chute for limiting the movement of the conveyer.

2. In an apparatus of the class specified, the combination with a conveyer, and with driving mechanism therefor; of a movably-supported, counterbalanced chute normally adapted to receive a stream of material from said conveyer; and means operated by said chute for limiting the movement of said conveyer.

3. In an apparatus of the class specified, the combination with a conveyer, and with driving mechanism therefor; of a movably-supported chute normally adapted to receive a stream of material from said conveyer; a counterbalanced lever operative for maintaining said chute in its normal position; and means operated by said counterbalanced lever for limiting the movement of said conveyer.

4. In an apparatus of the class specified, the combination with a conveyer and with driving mechanism therefor embodying a clutch; of a movably-supported chute normally adapted to receive a stream of material from said conveyer; a counterbalanced lever operatively connected with, and for maintaining, said chute in its normal position; and a clutch-actuator operatively connected with said chute.

5. In an apparatus of the class specified, the combination with a pair of rolls, of an endless belt connecting said rolls; driving mechanism embodying a clutch for one of said rolls; a guide for said belt; a movably-supported chute normally adapted to receive a stream of material from said belt; a counterbalanced lever; a link or links operatively connecting said lever and chute; and a clutch-actuator operatively connected with said counterbalanced lever.

6. In an apparatus of the class specified, the combination with a pair of rolls, of an endless belt connecting said rolls; driving mechanism embodying a clutch for one of said rolls; a movably-supported chute normally adapted to receive a stream of material from said conveyer; a counterbalanced lever operatively connected with said chute; a standard provided with a stop or stops; and a clutch-actuator operatively connected with said chute.

7. In an apparatus of the class specified, the combination with a pair of rolls, of an endless belt connecting the same; a guide for said belt; driving mechanism embodying a clutch for one of said rolls; an angle-lever constituting a clutch-actuator connected with the clutch; a movably-supported chute normally adapted to receive a stream of material from said belt; a counterbalanced lever; a link or links operatively connecting said lever and chute; a lever-supporting standard provided with a stop or stops; and a connecting-rod operatively connected with said angle-lever and counterbalanced lever.

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