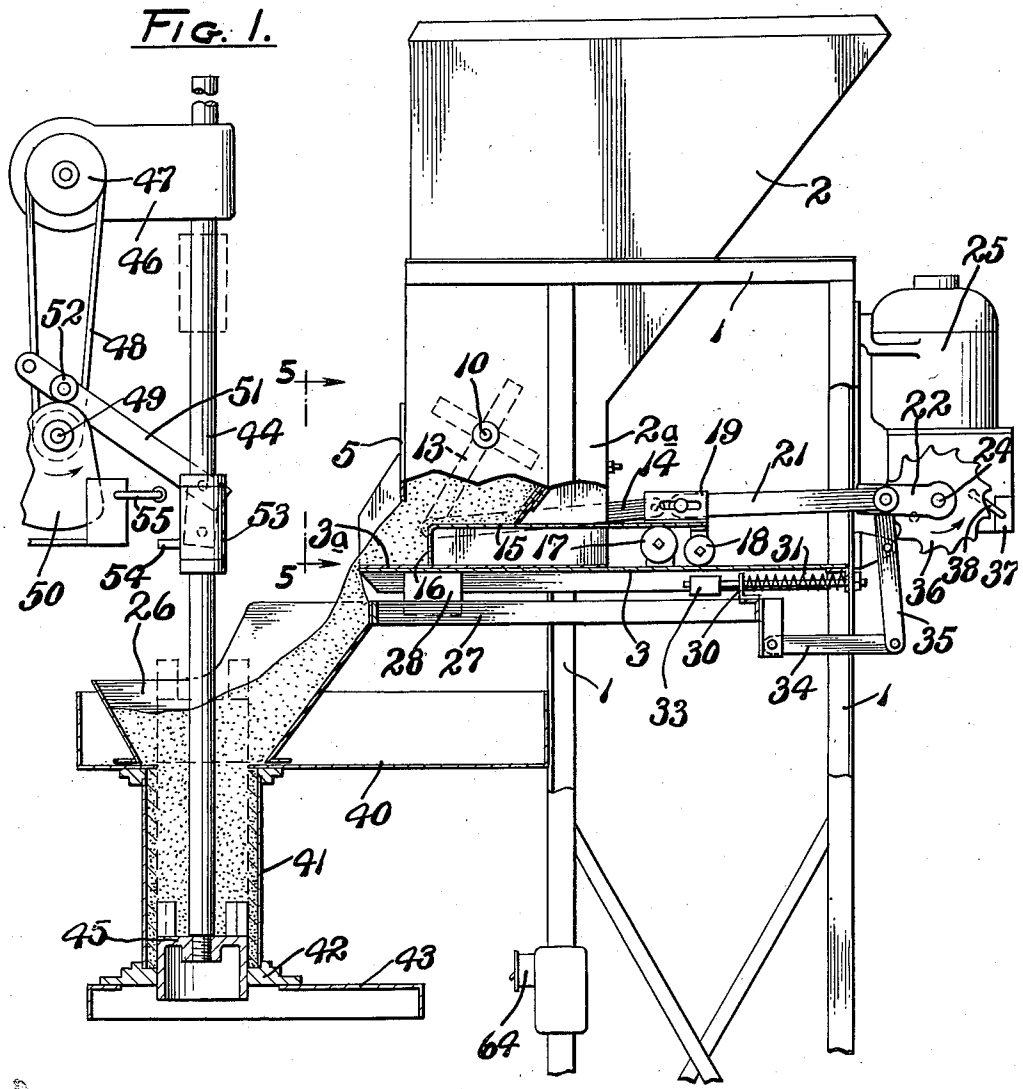
April 22, 1952 C. E. GLASSEN 2,593,665

APPARATUS FOR FEEDING CONCRETE INTO MOLDS

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FIG. 1.



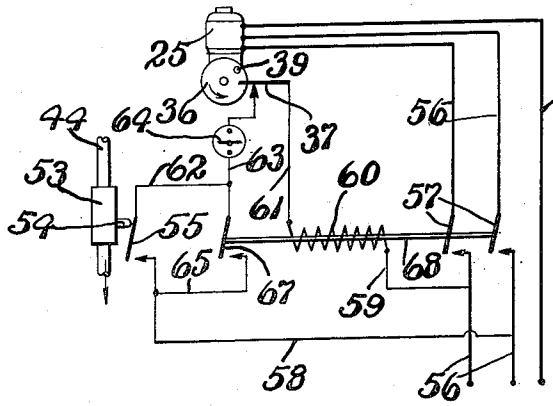


FIG. 6.

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APPARATUS FOR FEEDING CONCRETE INTO MOLDS

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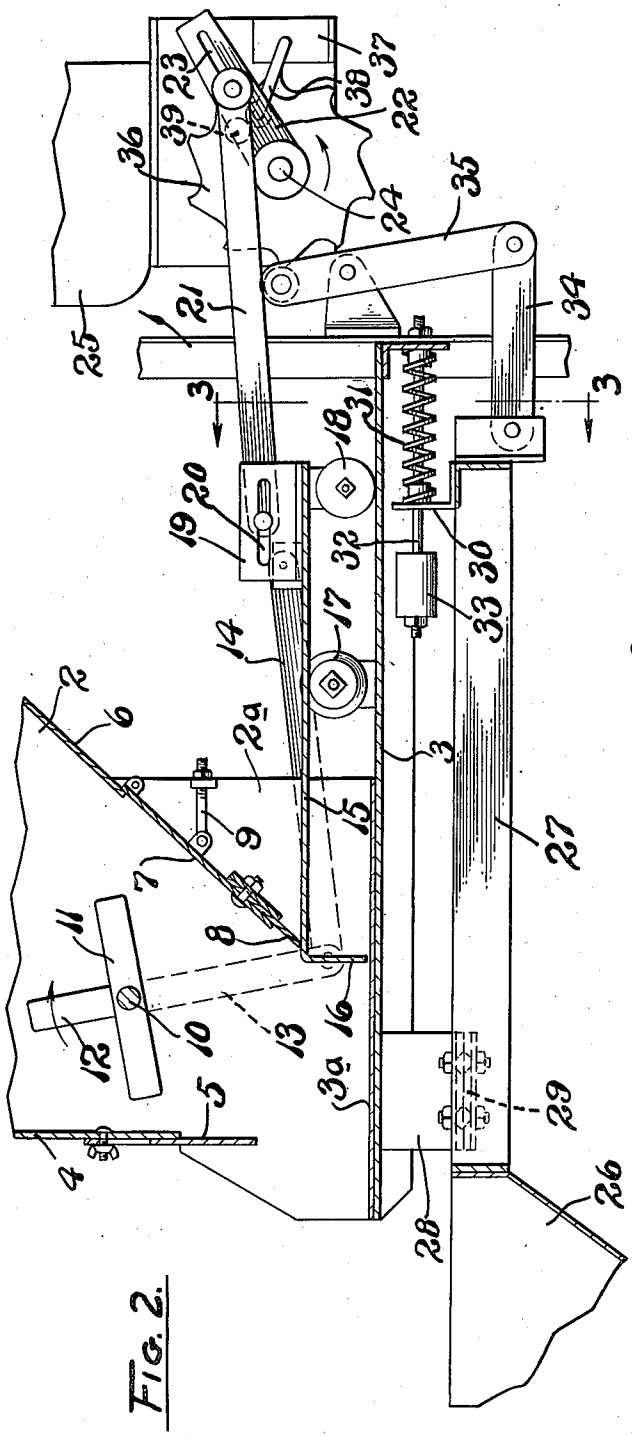


FIG. 2.

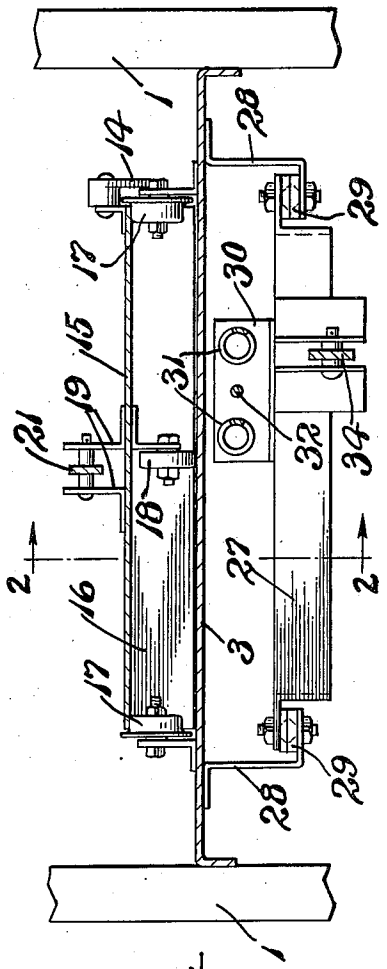


FIG. 3.

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APPARATUS FOR FEEDING CONCRETE INTO MOLDS

Filed Jan. 18, 1951 3 Sheets-Sheet 3

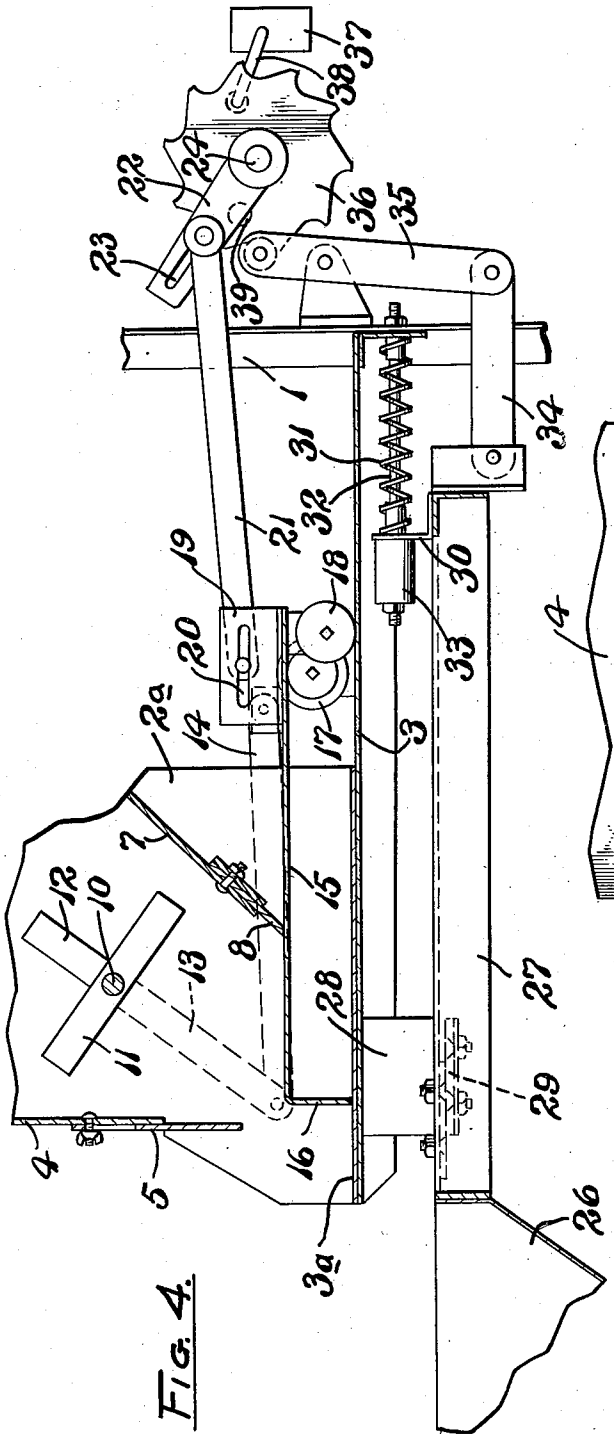
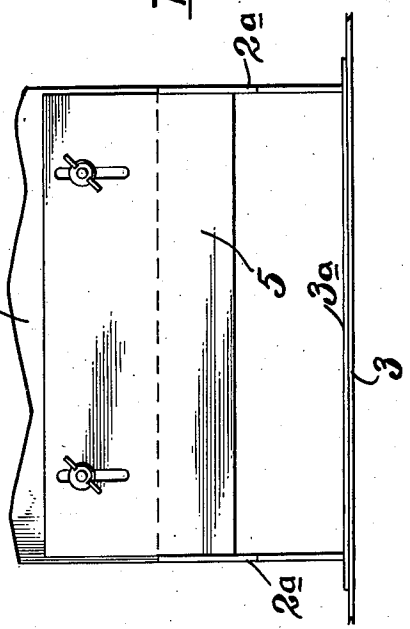


FIG. 4.

FIG. 5.



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Patented Apr. 22, 1952 2,593,665

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2,593,665

APPARATUS FOR FEEDING CONCRETE INTO MOLDS

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Application January 18, 1951, Serial No. 206,679

8 Claims. (Cl. 25—103)

1

The present invention relates to a novel, practical and very useful feeder mechanism for concrete, to supply concrete from a main supply hopper in desired quantities or amounts to machines which mold or otherwise fashion the concrete into preselected forms. In practice, the concrete feeder has been used in conjunction with machines for making concrete drain tile, though it is to be understood that my invention is not limited in use solely to machines manufacturing drain tile, but may be used to feed concrete to other concrete molding, shaping or forming machines.

It is an object and purpose of the present invention to provide a novel feeding mechanism for concrete, wherein the volume or amount of concrete for differing sizes of tile or other articles may be quickly and accurately accomplished by means of novel mechanism for such purpose. A further object is to provide a receiving hopper or funnel for the concrete which is to be delivered to the mold for making the selected concrete articles, said funnel or hopper being secured to a reciprocating carrier therefor which is rapidly moved back and forth over the upper end of the mold, thereby insuring the escape of the concrete from said hopper or funnel into the mold, with a certainty that the requisite amount of concrete will be supplied, and that it also will be more compacted and produce better tile etc. A further object of the invention is to provide means for regulating the volume or amount of concrete fed from the main supply hopper, by means of adjustably varying the stroke of an ejector to push concrete from the bottom front portion of the supply hopper, in conjunction with a vertically adjustable gate through which the outlet passage for concrete from the supply hopper is closely and accurately controlled. And a still further and very important feature of the invention resides in novel means for automatically, operatively controlling the making of the tile or the like and the feeding of the concrete to the molds for such purposes, whereby production is more rapid and expeditious without calling upon workmen to manually operate the machine; though, however, such manual control is possible, and means are provided therefor if wanted.

The novel feeder of my invention, furthermore, is simple in design, economical in operating cost, attains increased production and, by it, an improved product may also be obtained through control of the density of the concrete in the tile or other concrete articles which are made.

An understanding of the invention may be had from the following description, taken in connection with the accompanying drawings, in which,

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Fig. 1 is a side elevation, with parts broken away and shown in vertical section, of a machine embodying my invention.

Fig. 2 is a fragmentary enlarged section and elevation of the lower part of the main supply hopper and the feed mechanism associated therewith, substantially on the vertical plane of line 2—2 of Fig. 3.

Fig. 3 is a transverse vertical section substantially on the plane of line 3—3 of Fig. 2.

Fig. 4 is a view similar to Fig. 2 with the parts of the feeding mechanism shown in a different position.

Fig. 5 is a fragmentary front elevation taken at the plane of line 5—5 of Fig. 1, looking in the direction indicated, and

Fig. 6 is a diagram of the circuits for electrical control of the feeding machine.

Like reference characters refer to like parts in the different figures of the drawings.

The supporting frame for the hopper and feeding mechanism, indicated at 1, is made up of a plurality of vertical posts and horizontal connecting bars. At the upper portion of the frame a main supply hopper having vertical spaced sides 2 is secured, each of said sides 2 at its lower end portion having generally parallel front and rear edges to provide sections 2a which extend downwardly to a horizontal plate 3 below the upper end of the frame, serving as a bottom to the hopper, extending back thereof. The hopper has a vertical front 4 (Fig. 2) which terminates short of the bottom plate 3, and its covering 3a at the front portion of it, providing an opening from which concrete escapes when pushed out. This opening is regulated as to height by means of a plate 5, vertically adjustable by means of bolts and thumb nuts associated with vertical slots in the plate 5, for adjusting such plate to a desired height and releasably securing it in any position to which adjusted.

The rear side of the hopper at its upper portion has an upwardly and rearwardly inclined back 6 (Fig. 2) extending downwardly to the lower extensions 2a of the sides 2. A downwardly and forwardly inclined plate 7 is hingedly connected at its upper edge portion adjacent the lower edge of back 6, and at its lower edge portion has a blade 8 secured thereto which may be replaced at times when necessary because of wear. Such plate 7 and the blade 8 thereon may be adjusted back and forth about the hinge connection of the plate 7 through a threaded rod 9 connected to the plate 7 and passing through a lug on the sec-

tion 2a of the hopper, a nut being threaded onto the rod 9 as shown in Fig. 2.

In the lower part of the hopper, a horizontal transversely located shaft 10 is mounted and extends through and between the sides 2, on which spaced bars 11 are mounted substantially at their centers and from which intervening spaced bars 12 of shorter length are connected at one end, extending upwardly. At an outer end of the shaft 10 an arm 13, shown in dashed lines in Fig. 2, is secured, extending downwardly, to the lower end of which a link 14 is pivotally connected at its forward end. At its rear end it has a pivotal connection to a bracket secured at the upper side of a horizontal plate 15 which, together with its downwardly turned front ledge 16, provides an ejector to push concrete from the hopper at the outlet thereof below the plate 5. The plate 15 adjacent its side edges, rides upon rollers 17 mounted on brackets extending upwardly from the plate 3, and at its rear end is supplied with a roller 18 on a bracket which rides directly upon the plate 3 (Fig. 4).

It is evident that when the ejector plate 15 and its forward pushing face or ledge 16 is moved back and forth, the shaft 10 is rocked and the radially extending fingers or bars 11 and 12 are moved back and forth so as to agitate and break up concrete in the lower portion of the hopper, which may be packed to a greater density than desired by reason of the weight of concrete above it or when concrete is dumped in a considerable quantity into the open upper end of the supply hopper. The lower edge of the blade 8 is closely adjacent the upper side of the plate 15 and bears thereagainst. Such lower edge of the blade 8 may be worn because of the abrasive material, such as sand or the like mixed in water coming from the concrete. The wear may be compensated for a time by adjusting the plate 7; and eventually the blade 8 when worn substantially to its limit will be replaced.

At the rear end and upper side, substantially midway between the side edges of plate 15, two spaced L-brackets 19 are permanently secured, each in the vertical leg thereof having a horizontal slot 20. A link 21 at its forward end lies between the brackets 19 and has connection therewith by a cross pin passing through it and through the slots 20. Link 21 at its rear end has an adjustable connection to an arm 22 which, at its outer end portion, has a slot 23 through which a bolt or pin from link 21 passes and which may be secured at different positions in the length of the slot 23 to govern the length of the stroke of link 21 and, therefore, likewise govern the extent of the movement forward and back of the concrete ejector, 15—16. And of course, the adjustable securing of the connection of the front end of the link 21 provided by the slots 20 may also be utilized in controlling the position to which the concrete ejector may be moved on its out stroke.

The arm 22 is secured to and radially extends from a shaft 24 driven at reduced speed by an electric motor 25, suitable reduction gearing being between said motor and the shaft 24.

Below the forward edge of the bottom plate 3 and its covering 3a, a receiving funnel 26 is located (Figs. 1 and 2), which is substantially of an inverted frusto-conical form open at both its upper and lower ends. At its rear, at its upper end, it is permanently secured to a horizontal frame 27, mounted for slidable movement near its front on inwardly extending flanges of Z-bars 28 permanently connected at their upper flanges to the upper side of the plate 3. The carrying flanges of the Z-bar brackets 28 at their upper sides carry wear bars 29 of short length, and lateral ears on the frame 27 supplied at their under sides with complementary wear bars or shoes are used in mounting the frame 27 and its funnel 26 for the short reciprocatory movements which they have when the machine is operated.

On the rear cross bar of the frame 27 an L-shaped bracket 30 is secured, between the upper leg of which and a rear bar of the frame 1 of the machine coiled compression springs 31 are placed. Such springs are of ample strength that normally they push the frame 27 and the hopper 26 outwardly. A rod 32 connected at its rear end to the frame 1 of the machine passes through the vertical leg of bracket 30 and forwardly, beyond it, at its forward end has a bumper 33 of rubber or other resilient material which is adjustable for a limited distance on the bar 32. When the carrier frame 27 and the hopper 26 reach their outermost position the bracket 30 strikes against the cushioning bumper 33.

A link 34 is pivotally connected at its forward end to a bracket at the rear end of the carrier frame 27. A lever 35 pivotally mounted between its ends on a bracket on the frame 1 is pivotally connected at its lower end to the rear end of link 34. It carries a laterally positioned roller at its upper end which rides against a ratchet wheel 36, shown in the drawing as having ten spaced ratchet teeth of the shape best shown in Fig. 2, and which is fastened on the previously mentioned shaft 24. Therefore, with each rotation of the shaft 24, the lever 35 is swung back and forth ten times, withdrawing the frame 27 and funnel 26 against the force of springs 31 until the roller on lever 35 passes over a tooth, springs 31 being thereupon released to exert their force to move the funnel 26 outwardly when such roller drops into a recess behind a tooth. The funnel is rapidly moved back and forth short distances, shaking and vibrating the funnel so that its concrete contents is shaken down toward the lower smaller open end thereof, and compacted from such shaking.

A switch 37, located in a circuit in which motor 25 is included, has an actuating arm 38 therefor movement of which opens and closes the switch. The arm 38 at its free end is provided with a projection in the path of movement of a pin 39 on the ratchet wheel 36 located outwardly from the shaft 24. With each revolution of the wheel 36, switch arm 38 is operated by the engagement of the member 39 against it. Such operation will open the switch 37 and control breaking the circuit which supplies motor 25 with electric current.

The lower end of the funnel 26 is provided with a horizontal ring flange which rides upon the bottom of a supporting receptacle 40 connected to and extending outwardly from the frame 1. Such bottom has an opening therein of circular outline and at the under side thereof around such opening a cylindrical tile mold 41 is adapted to be replaceably located, ringed at its upper end and lower end with rings 42 into which the upper ends of the cylindrical mold 41 are received the lower ring 42 resting upon a support 43 as shown in Fig. 1.

The tile forming machine with which this invention may be used is of an old and well-known structure. It includes an elongated vertical shaft 44 which in practice is both rotated and vertically

reciprocated. At its lower end it has a head 45 which, through its rotation and upward and downward movements, interiorly shapes a tile wall between it and the inner sides of the cylindrical mold 41. Including in the machine is an over head support 46 which guides the rod 44 in its upward and downward movements, and which is supplied with a motor having a drive wheel 47 for driving an endless belt 48 which, in turn, through a driven pulley thereon, drives a shaft 49 having a cam 50 thereon. The cam actuates a lever 51 pivotally mounted at its upper end and having between its ends a roller 52 riding on the cam. The lever 51 has a link connection with a sleeve 53 mounted on the rod or shaft 44. Thus with each rotation of the shaft 49, the rod 44 and head 45 thereon are raised and lowered, stopping for a period of time at both the uppermost and lowermost positions of said rod and head, the opposite ends of the cam 50 being in arcs concentric with the axis of the shaft 49.

From the sleeve 53 a pin 54 projects which, in its movements, actuates a switch 55 which, as later described, upon such actuation in one direction closes a circuit which initially supplies the motor 25 with current for operating the machine until other switches are closed to supply the motor with current to drive it after switch 55 which is momentarily closed, is opened.

In Fig. 6 a wiring diagram for a control of the operation of the machine in accordance with my invention is shown. Current is supplied to the motor 25. The current is circulated by two lead wires 56, interposed in each of which is a switch 57. A branch wire 58 from one of the wires 56 terminates in a contact of the switch 55, such switch being closed on the down movement of rod 44. Such closure is momentary only, the switch returning to open position when the pin 54 passes by such switch 55. A second branch wire 59 is connected with the other wire 56, joins with one end of a magnetic switch structure indicated at 60 with which, at the other end is a wire 61 leading to the switch 37. From the other side of the switch 55 a wire 62 leads to and is connected with a wire 63 between the ends of the latter wire, which terminates at one end in a contact of the switch 37. In the length of wire 63 between the wire 62 and said switch a manually operated snap switch 64 is located. A wire 65 leads from the wire 58 between its connection to one of the wires 56 and its terminal contact, and terminates in a contact with which switch 67 connected with the opposite end of the wire 63 is associated. A connection 68 joins all of the switches 57 and 67 for longitudinal movement to close such switches simultaneously when the magnetic switch 60 is operating, and which diagrammatically may be illustrated as a solenoid winding at 60 the armature being on the connecting member 68. The wire 69, not necessarily essential for the operation of the motor 25, is a third wire used for example with a three phase motor for increase in voltage or power for operating the motor when needed.

In the operation, the manual switch at 64 being closed, the wheel 47 and belt 48 running continuously periodically raises and lowers the shaft 44 with its attached head 45. In the down movement thereof, pin 54 engaging the switch 55 momentarily closes a circuit from one of the wires 56 through wire 58, wires 62, 63, thence through switch 37 and wire 61, winding 60 and wire 59 to the other wire 56, whereupon all of the switches 57 and 67 are closed and motor 25 is driven, being included in the circuit of the wires 56, which circuit is completed by closure of the switches 57. The motor thereupon runs and shaft 24 is rotated through one complete revolution. By adjusting the bar or link 21 on the crank arm 22 and on the brackets 19, the extent and position of movement of the concrete ejector 15, 16 is regulated. On its outward movement, a substantially predetermined amount of the concrete is pushed over the outer edge of the bottom of the hopper and falls into the funnel 26 and is delivered therefrom into the mold 41. During all of the rotation of the shaft 24, funnel 26 is moved a short distance back and forth by reason of the ratchet wheel 36 and the action of its teeth upon the lever 35. The short jerky movements vibrate the funnel 26 and cause concrete delivered thereto to settle toward the open lower end of said funnel to pass into the tile mold 41.

At the time that such ejection of the concrete is taking place, the head 45 is at its lowermost position, as in Fig. 1, filling the central opening in the ring 42, and at rest, the roller 52 riding upon the upper arc of the cam 50 (Fig. 1). The arc is less than 180° and greater than 90°, approximating 135°. That is, through approximately 3/8 of the revolution of the cam 50, head 45 stays at its lower position. During this time concrete is supplied to the hopper. All of the time that the head 45 is at its lowermost position and afterward while it is being elevated the reciprocation and vibration of the funnel 26 continuous until and after the head has been lifted to its uppermost position, indicated in dash lines in Fig. 1, and is there at rest while the roller 52 is against the arc at the lower end of cam 50 in Fig. 1. The vibration and shaking down of the concrete in the funnel 26 is continuous all of the time that the machine is in operation, as the shaft 24 and the wheel 36 thereon rotate for the entire time of operation of motor 25.

In the upward movement of the shaft 44, such shaft continuously rotating as in well-known tile machines of this character, concrete above the head 45 is lifted with it and is carried upwardly into the hopper 26 or moved laterally into the space between the head and the tile mold 41, the tile being smoothed at its inner sides and concrete compressed by rotation of the head 45. Such rotation of the head as it traverses the tile, and the forcing of concrete laterally so as to compact it against the mold or form 41, caused by reason of the spaced projections extending upwardly from the head as shown, insures that an excellent quality of tile is produced and that excess concrete will be lifted into the funnel 26, the lower side of the head 45 not being elevated sufficiently that space is provided for the passage of concrete underneath it to fall through the tile.

When the ratchet wheel 36 has completed one revolution, switch 37 is actuated by the pin 39 reaching it to break the circuit through the magnetic switch or solenoid winding at 60, whereupon both the switch 67 and the switches 57 are released for opening. The switch 67 completes the circuit so as to maintain the magnetic switch in operation when switch 55 opens after its momentary closing. The pin 39 which has been moving in the direction indicated by the arrow in Fig. 2 passes by the actuating arm for the switch 37, so that a succeeding cycle of operations is repeated on downward movement of the rod 44 and closure of the switch 55.

While the head 45 is in its uppermost position (dash lines in Fig. 1), and is held therein while

the arc at the lower end of the cam 50 passes underneath the roller 52, the tile form or mold 41 with its tile therein is removed and another form or mold 41 put in place for the fabrication of the succeeding tile.

As thus operating, the machine works continuously, operating automatically, and tile will be produced in succession, generally one every 15 seconds. The workmen attending the machine remove the finished tile with their surrounding forms 41 and replacing them with new forms. The machine will not work or operate to feed concrete to the tile forming mechanism unless the snap switch at 64, which is readily accessible at the front of the machine (Fig. 1), is in closed position. The machine, accordingly, may be converted to a manually controlled machine by opening the switch 64, closing it for operating the machine and opening it again at the end of a cycle of operations for removal of a tile and its form and replacement by succeeeding form or mold, and then again manually closing switch 64. During such time that the feeding mechanism may be at rest and inoperable until the manual snap switch 64 is moved to closed position, the tile machine may continue its operation, shaft 44 rotating continuously and being periodically moved up and down but accomplishing nothing in the absence of concrete fed to the mold.

For different dimensions of tiles it is apparent that the amounts of concrete, which varies in tile of different sizes, may be controlled by regulating the extent of movement of the concrete ejector or feeding member 15—16 as previously described. The rapid back and forth reciprocation and consequent vibration of the funnel 26 results in a vibration compacting of the concrete before it enters the form or mold, thereby providing a better and more dense concrete tile product.

The machine described is very practical and useful in connection with concrete tile machines as disclosed and described. Such concrete feeder may be used with many other types of machines producing concrete products other than tile. The feeder mechanism is not to be restricted to a single use therefor. It is simple in design, production is increased by the feeder machine of my invention, the cost of operating is low, and an improved product is obtained.

The invention is defined in the appended claims and is to be considered comprehensive of all forms of structure coming within their scope.

I claim:

1. In a concrete feeding machine, a main supply hopper having a bottom and upwardly extending sides, the outer side thereof having an outlet opening extending upwardly for a distance above said bottom, means mounted for back and forth movements passing over the bottom of said hopper from its rear side outwardly and back for ejecting a predetermined amount of concrete from said hopper, a funnel for receiving the ejected concrete mounted at the outer end portion of and below the bottom of said hopper, having an open lower end adapted to be located over a concrete receiving form or mold, a reciprocating member to which said funnel is secured slidably mounted on and below the bottom of said hopper, means for quickly bodily moving said reciprocating member and attached funnel back and forth on operation thereof, and a common means for operating said concrete ejector means and said reciprocating member.

2. In a structure as defined in claim 1, said common means comprising a motor having a continuously driven shaft, a crank arm on said shaft, a link connected at one end to said crank arm a distance from said shaft and at the other end to said concrete ejecting means, a ratchet wheel having a plurality of teeth around it secured to and turning with said shaft, said means for moving said reciprocating member and attached funnel back and forth comprising, a link attached at one end to the said reciprocating member, and a lever having pivotal connection at one end to the other end of said link and mounted for pivotal movement between its ends, its opposite ends engaging the teeth of said ratchet wheel.

3. In a concrete feeder, a main supply hopper for concrete, a supporting frame which carries said hopper, a horizontal plate providing a bottom for the hopper at its lower end secured to said frame the front side of said hopper at its lower edge terminating a distance above said plate, a concrete ejector comprising a horizontal plate having a downwardly turned front flange located over said first mentioned plate, anti-friction mountings for said ejector for riding thereon over the said first plate, a link connected at one end at the rear of said ejector member and extending therefrom rearwardly, a driven shaft, a crank arm on the shaft, means for adjustably securing the opposite end of said link to said crank arm for releasably fixing the link at different distances from the axis of the shaft, a horizontal shaft located in the lower portion of the hopper between sides thereof, fingers extending from said shaft radially, an arm at an outer end of said shaft and a link connecting said arm with the ejector member.

4. In a machine of the class described a supporting frame, a main supply hopper for concrete mounted on and extending above said frame, said supply hopper having upwardly extending sides, a horizontal plate carried by said frame forming the bottom of said hopper, said hopper at its lower end and at its front side having a concrete passing opening, means mounted upon said plate and movable back and forth thereover movable from a position at the rear of the hopper toward the front thereof and back to initial position for ejecting concrete from the hopper, a funnel underneath said plate extending forwardly of the front edge thereof into which ejected concrete is received, means for mounting said funnel for forward and rearward bodily movements to vibrate and condense concrete therein, means for reciprocating said concrete ejecting means and means for bodily moving said funnel back and forth simultaneously with said reciprocating movement of the concrete ejecting means, said bodily movements back and forth of the funnel being shorter than and a multiple of the reciprocating movements of said concrete ejecting means, and a single driving means for both reciprocating said concrete ejecting means and moving said funnel back and forth.

5. A structure as defined in claim 4, and means connected with said concrete ejecting means and operated by the movements thereof for stirring and agitating concrete in the lower portion of said main supply hopper, said agitating means being located within said hopper.

6. In a structure as described, a supported concrete supply hopper, means for periodically ejecting concrete in substantially preselected amounts from the lower end of said hopper, a funnel for receiving said concrete on ejection, said funnel being open at both ends and adapted to have its

lower end located over a concrete receiving form, means for bodily rapidly moving said funnel back and forth short distances simultaneously with the reception of concrete therein and for a period of time after it has been received, a single electric motor for operating said concrete ejecting means and for moving said funnel back and forth, an electric circuit in which said motor is included, said funnel being adapted to have a vertical shaft of a molding machine moved upwardly and downwardly therethrough and into said mold, and switch means in said electric circuit operated by vertical movements of said shaft for closing said switch means for motor operation, combined with other switch means opened after a predetermined length of operation of said concrete ejecting means and funnel moving means to stop said motor, until again operated by closing the circuit on a succeeding vertical movement of said shaft.

7. In a structure as described, a concrete main supply hopper, an ejecting means for ejecting a predetermined amount of concrete from the lower end of the hopper on operation thereof, rotatable means for operating said concrete ejecting means, a funnel having downwardly and inwardly inclined sides open at its upper and lower ends for receiving the concrete ejected, said funnel being adapted to have its lower end located over a concrete receiving form, means actuated by said rotatable means for bodily moving said funnel back and forth in a horizontal direction short distances simultaneously with receiving concrete therein and for a period of time after it has been received, through the time of a single rotation of said rotating means.

8. A structure as defined in claim 7, an electric motor for driving said rotating means, a current supplying circuit in which said motor is included, and means for periodically starting and stopping said motor, stopping said motor at the termination of a single revolution of said rotating means.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
106,424	Stockwell	Aug. 16, 1870
2,275,398	Koppers	Mar. 3, 1942