No. 852,609. PATENTED MAY 7, 1907.

G. MATTHEWS.

PEAT WORKING MACHINE.

APPLICATION FILED AUG. 20, 1906.

3 SHEETS—SHEET 1.

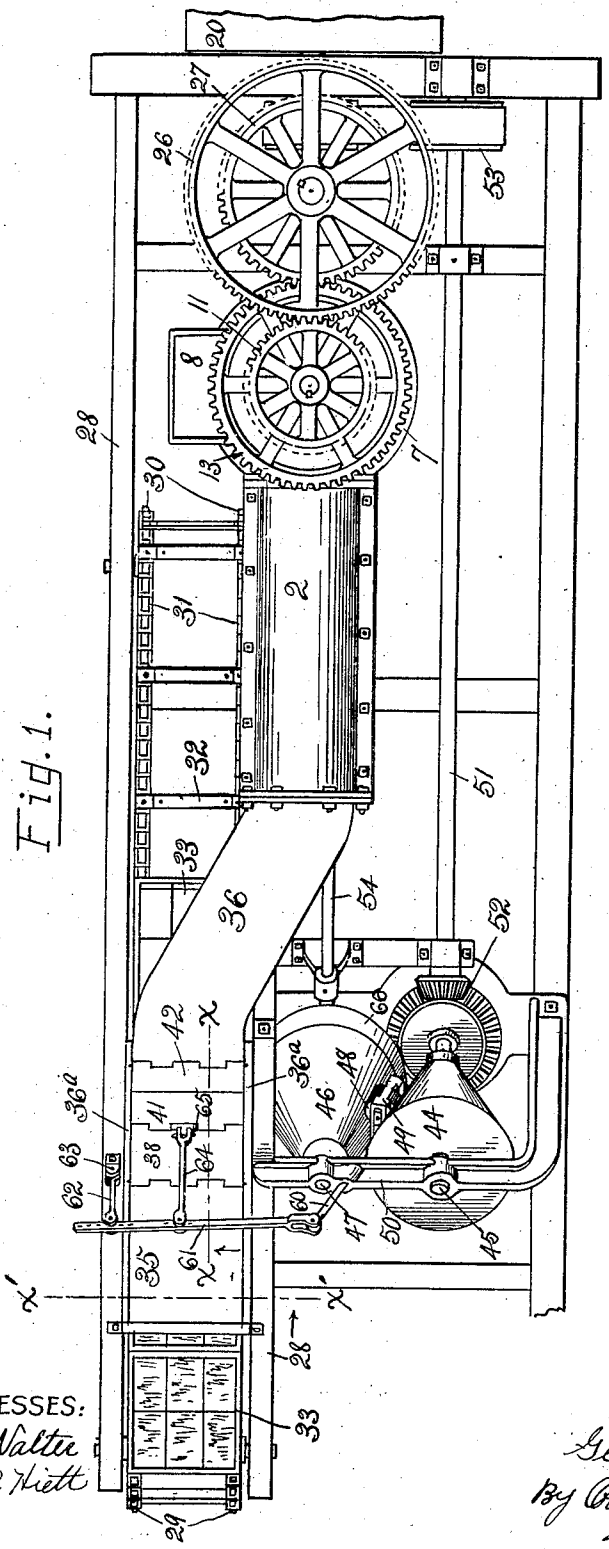

Fig. 1.

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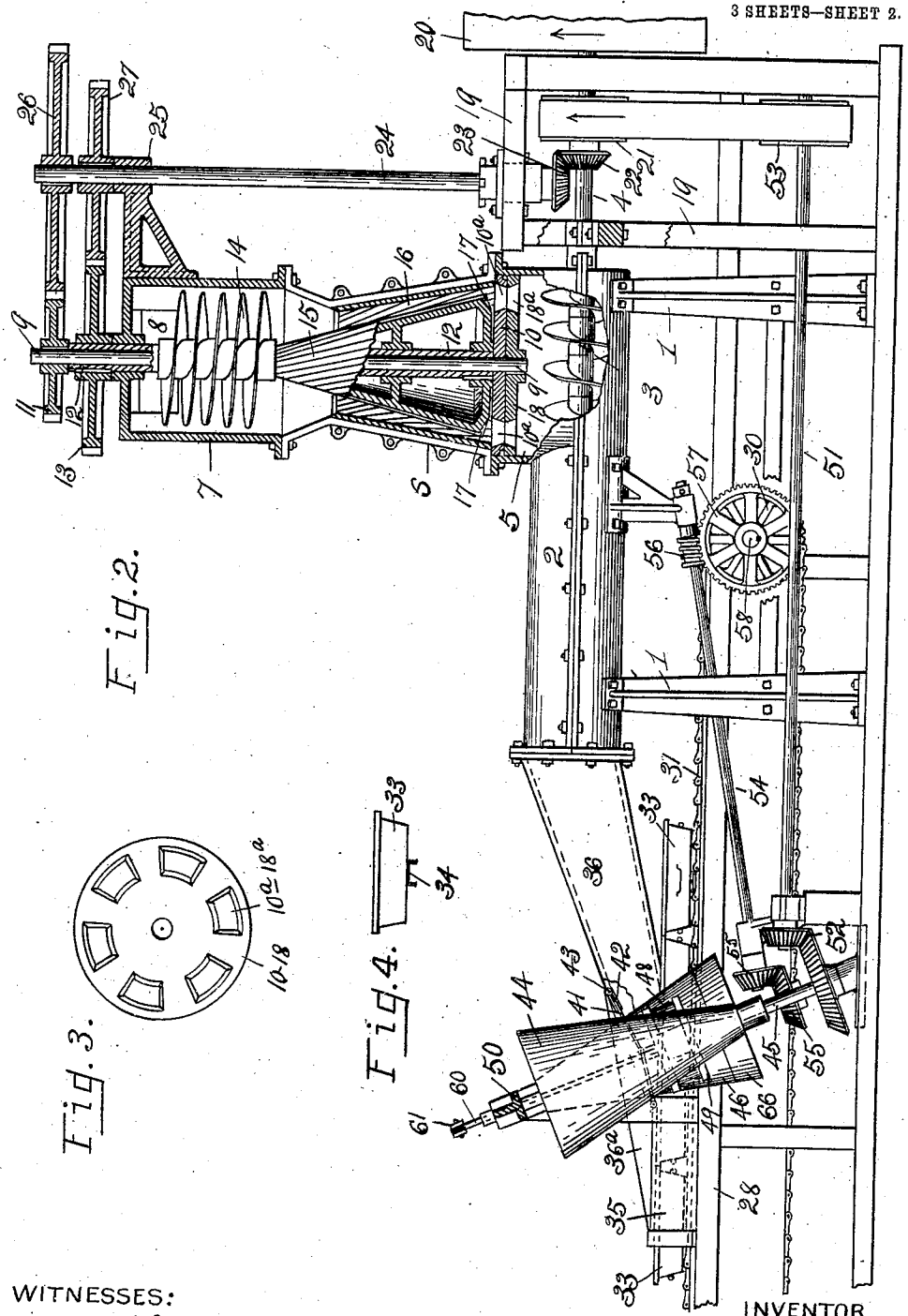

Fig. 2.

Fig. 3.

Fig. 4.

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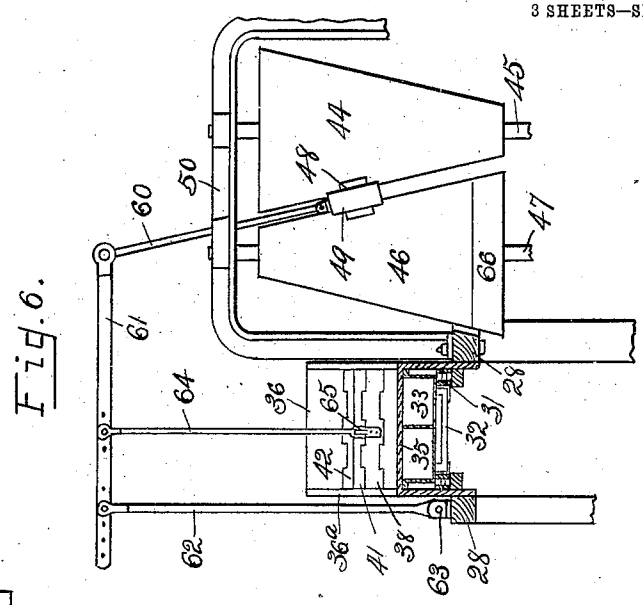

Fig. 6.

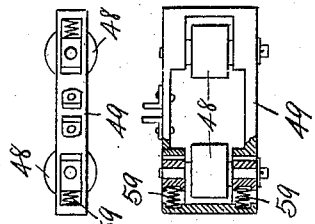

Fig. 7.

Fig. 8.

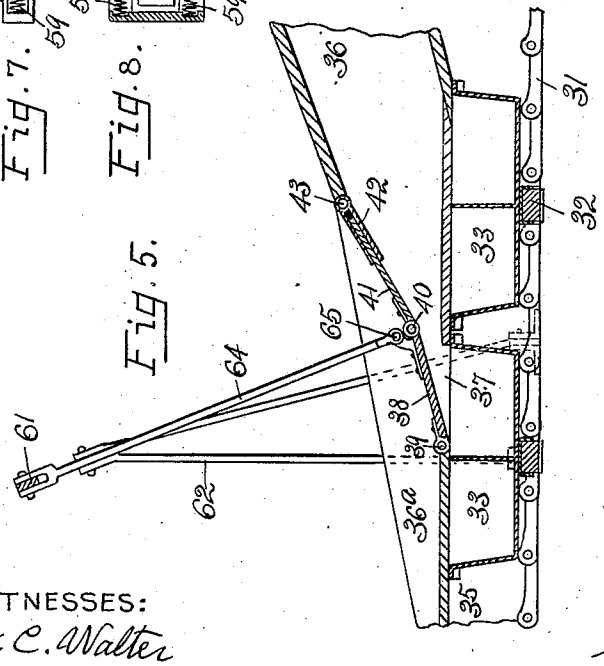

Fig. 5.

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GEORGE MATTHEWS, OF RIGA, MICHIGAN.

PEAT-WORKING MACHINE.

No. 852,609. Specification of Letters Patent. Patented May 7, 1907.

Application filed August 20, 1906. Serial No. 331,229.

To all whom it may concern:

Be it known that I, GEORGE MATTHEWS, a citizen of the United States, and a resident of Riga, in the county of Lenawee and State of Michigan, have invented a certain new and useful Peat-Working Machine; 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, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to machines of the class particularly designed for the reduction of peat or other like substance to pulp form whereby it may be molded into cakes, blocks or the like preparatory to drying.

An object of my invention is the provision in a machine of the class described of simple and efficient means for operating on and reducing the peat or other substance to a fine pulp state devoid of lumps or other bulky objects, which would render the molding thereof into blocks of perfect form difficult and impractical.

A further object of my invention is the provision of means which is automatically operated by the quantity of flow of the substance worked to control the speed of the mold carrier relative to the quantity of such flow, whereby the successive mold-boxes or pans are uniformly filled during a working of the machine even though the flow be not constant.

The operation, construction and arrangement of the parts of one embodiment of my invention is fully described in the following specification and shown in the accompanying drawings, in which,—

Figure 1 is a top plan view of the machine embodying my invention. Fig. 2 is a side elevation thereof with portions in section and broken away. Fig. 3 is a plan of one of the cutter-disks thereof. Fig. 4 is a side view of one of the mold-pans. Fig. 5 is a longitudinal section on the dotted line $x\ x$ in Fig. 1. Fig. 6 is a vertical cross-section taken on the dotted line $x'\ x'$ in Fig. 1, and Figs. 7 and 8 are top and side views, respectively, of the pair of rollers and their carrying frame which coöperate with the cone-pulleys of the variable speed device.

Referring to the drawings, 1 1 designate suitable standards or legs upon which is mounted the horizontal cylindrical trough 2, which incloses the feed-worm 3 that is carried by the main drive-shaft 4, as shown in Fig. 2. Surmounting one end of the trough 2 and communicating therewith, as at 5, is a conical casing 6, which has its upper end contracted and formed with a flaring mouth, which supports the feed-hopper 7 having the side feed-opening 8 at its upper end. Standing vertically within said casing and hopper is the shaft 9, which has its lower end journaled centrally within the fixed cutting-disk 10 and its upper end projecting above the hopper and carrying the gear 11. This shaft is incased by a rotatable sleeve 12, which has its lower end resting on the disk 10 and its upper end journaled in the top of the hopper 7 and carrying the gear 13 without said hopper. Carried by this sleeve within the hopper and conical casing, respectively, are the feed-worm 14 and the conical grinding-drum 15, the surface of the latter of which is corrugated longitudinally in spiral form to coöperate with the oppositely-winding spirally-corrugated surface of the lining 16, which is secured within the conical portion of the casing 6.

The conical shape of the grinding-drum 15 is made somewhat more decided than that of its casing, so as to cause the annular space between the coöperating drum and lining to be gradually narrowed or restricted from top to bottom thereof, as shown in Fig. 2, thus effecting a more perfect grinding of the substances passing therethrough than would otherwise be the case. At the lower edge of the drum 15 is formed an annular row of radially disposed teeth 17, which assist in forcing the ground substance through the annular row of openings 10^a in the fixed cutting-disk 10. Coöperating with the cutting-disk 10 to further cut and disintegrate the substance before it is permitted to drop to the trough 2, is a rotary cutting-disk 18, which is carried at the lower end of the shaft 9 with its upper surface in shearing engagement with the under surface of the disk 10 and is provided with a row of openings 18^a which register with those of the fixed disk. These openings are preferably beveled toward their inner edges to form a more effective cutting-edge, as shown in Figs. 2 and 3.

The main drive-shaft 4 carrying the worm 3 has its outer end journaled in a suitable support 19 and carries the main drive pulley 20, the small pulley 21 and the bevel gear 22,

which latter meshes with and drives the bevel-gear 23 carried by the vertical shaft 24, which shaft has its lower end suitably mounted in the support 19 and its upper end journaled in the bearing-bracket 25, which projects from the side of the hopper 7. Spur-gears 26 and 27 are carried at the upper end of the shaft 24 for meshing with the gears 11 and 13, respectively, said gears preferably being proportioned to drive the shaft 9 and attached cutter-disk 18 at a greater rate of speed than the sleeve 12 and attached worm 14 and grinding drum 15.

At one side and below the plane of the trough 2 but in substantial parallelism therewith is disposed a frame or table 28 carrying the sets of sprocket-wheels 29 and 30 spaced longitudinally thereof. These sets of sprocket-wheels are connected by the two chains 31 31, which are equidistantly connected by the transverse bars 32, thus forming an endless conveyer or carrier-belt upon which mold-boxes or pans 33 are mounted for movement for the purpose of being filled with the peat pulp or other substance operated on by the machine. The mold-boxes or pans 33 are shown as having inverted U-shaped strips 34 secured to their bottoms for seating over the bars 32 of the conveyer and are prevented from tipping due to their ends resting upon the chains 31. Mounted on the top of the frame or table 28 is a shed or housing 35, which is open at its ends and is of suitable height to enable the tops of the mold-boxes or pans 33 to have sliding contact with the upper surface of its top, as shown in Fig. 5, thus adapting it to act as a means for leveling the matter with which the boxes or pans are filled as they are moved thereunder by the action of the conveyer.

A forwardly declining laterally extending pipe or trough 36 is connected to the forward end of the trough 2 and has its mouth or forward end communicating with an opening 37 in the top of the shed or housing 35, through which the peat or other semi-liquid substance operated on is discharged into the mold-box or pan 33 disposed thereunder.

The opening 37 in the shed or housing top is controlled by a gate-valve 38, which has its forward edge hinged, as at 39, to the forward edge of the opening 37, and its rear edge hinged, as at 40, to the wing 41, which has its rear edge mounted for loose sliding movement within the slotted guide-member 42 that is hinged, as at 43, to the forward end of the top of the pipe or trough 36. The ends of the valve, wing and guide fit closely against the side walls 36^a of the pipe or trough 36, said walls being continued beyond the point of termination of the top of the pipe or trough for such purpose. The wing 41, when the valve is closed, presents an inclined surface to the mouth of the pipe or trough 36, and as the peat or other substance forces itself thereunder a raising of the valve is effected, thus permitting such substance to flow through the opening 37 into the mold-boxes or pans.

As the flow of matter through the trough 2 and pipe 36 is not at all times constant, it is important that the speed of the conveyer be controlled so that it will move faster or slower as the flow of matter is heavy or light, thus effecting a positive filling of the mold-boxes or pans irrespective of the amount of flow of the matter. This I accomplish by connecting the valve 38 to any suitable variable speed device, which is mounted to control the driving of the conveyer, thus causing a rising and falling of the valve, due to a variation in the quantity of matter passing thereunder, to effect a proper change of speed of the conveyer so that the mold-boxes will be uniformly filled.

A double cone-pulley variable speed device is shown in the drawings, and consists of the drive-cone 44 carried by the shaft 45, the driven cone 46 carried by the shaft 47, and the connecting friction rollers 48 48 which latter are carried by a frame 49. The shafts 45 and 47 are mounted in substantially vertical position within a frame 50, and the former has connection with the drive-shaft 51 through the medium of the bevel-gears 52, said shaft being driven from the main shaft 4 by a belt connecting the pulley 21 thereon with the pulley 53 on the shaft 51, while the shaft 47 connects with the worm-shaft 54 through the bevel-gears 55, the worm 56 of which shaft meshes with and drives the gear 57 mounted on the shaft 58 with the set of sprocket-wheels 30.

The friction-rollers 48 have their bearing-blocks slidingly mounted in the frame 49 and are yieldingly retained in contracted relation so as to hug the surfaces of the cone-pulleys due the provision of expansion springs 59 between the bearing-blocks and outer ends of the frame, as shown in Figs. 7 and 8. The frame 49 is carried at the lower end of a rod 60, which projects through a guide-opening in the top of the frame 50 and has its upper end pivoted to the horizontal rod or lever 61, which projects over the shed or housing 35 and is pivotally supported at its other end by the support 62, which is pivoted to the outer side of the frame or table 28 for lateral movement relative thereto, as shown at 63 in Fig. 6. A rod 64 connects the valve 38 with the lever 61, it being pivoted at its lower end to the valve, as at 65, and its upper end to the lever intermediate the points of connection therewith of the rod 60 and support 62, thus causing a raising of the valve to effect a raising of the rollers 48 toward the small end of the driven cone 46 and a consequent slackening of speed of the conveyer belt.

When the valve 38 is seated the rollers 48

are lowered in position to coact with a loose pulley 66 on the shaft 47 at the lower enlarged end of the driven cone 46, so that the conveyer is then at rest.

I wish to be understood that I do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

The operation of the machine is as follows:—The peat or other substance is fed to the hopper 7 through the feed-opening 8 therein and forced by the revolving worm 14 down between the coöperating corrugated surfaces of the grinding-drum 15 and lining 16, which operate to reduce it to a pulpy mass of semi-liquid state. The provision of the grinding-drum and coöperating lining in machines of this class is of special importance, as the substance when fed to the hopper contains pieces of wood and other large substances, which it is necessary to break up and reduce to a pulp before passing it to the trough 2. This breaking up and pulp reducing process is further aided by the forcing of the substance through the opening in the coacting fixed and rotary cutter-disks 10 and 18 prior to its dropping into the trough 2, said rotary disk being preferably driven at a greater speed than the worm 14 and grinding-drum 15, due to the proportioning of the gears 11—26 and 13—27, as above described. As the pulley substance is forced through the trough 2, pipe 36, and under the inclined wing 41 of the valve 38, said valve is raised and causes the friction-rollers 48 to move upwardly out of their normal contact with the loose pulley 66 on the shaft 47 and into frictional engagement with the cone 46, thus communicating motion to the conveyer belt and mold-boxes or pans 33 carried thereon, which motion is increased or diminished as the valve is further raised or lowered due to a greater or less quantity of pulp passing thereunder and through the opening 37 in the top of the shed or housing 35. The speed of the conveyer is so regulated and controlled relative to the amount of flow of the substance through the opening 37 that the mold-boxes as they pass under such opening are caused to be uniformly filled whether the flow be heavy or light.

It is thus apparent that I provide a machine which not only effects a perfect reduction of the matter fed thereto to a pulpy state, but is provided with means which is automatically operated by the quantity of flow of the substance worked to control the speed of the mold carrier so that the mold-boxes or pans are uniformly filled irrespective of the constancy of the flow.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is,—

1. In a machine of the class described, a pulp reducing part having a grinding-drum, a coöperating incasing wall for the drum, and fixed and rotary cutting-disks having registering openings and disposed to operate on the substance after it has been operated on by the drum and wall, said drum and rotary disk being geared to rotate at different speeds.

2. In a machine of the class described, a pulp reducing part comprising a hopper, a worm and a corrugated grinding-drum disposed in superimposed relation to operate in the hopper, a corrugated incasing wall cooperating with the drum, a fixed and a rotary disk disposed below the drum and having a plurality of registering openings provided with oppositely beveled walls whereby to form coacting shearing surfaces, and mechanism for driving the rotary disk at a greater speed than the drum and worm.

3. In a machine of the class described, a discharge trough, a feed-worm therein, a hopper disposed above and communicating with the receiving end of the trough, a vertical shaft within said hopper, a loose sleeve on the shaft, a worm and a conical grinding-drum keyed in superimposed relation to the sleeve, a corrugated conical wall coöperating with the drum, a cutting-disk fixed intermediate the drum and trough, a rotary cutting-disk carried at the lower end of the shaft and coacting with the under surface of the fixed disk, said disks having a plurality of registering openings, and means for driving the shaft and sleeve.

4. The combination with a machine of the class described, of an endless conveyer, a shed or housing over a portion of the conveyer and having an opening in its top communicating with the machine discharge, and a mold-box carried by the conveyer, said box being of suitable height to pass under but have sliding contact with the top of the shed or housing.

5. The combination with the discharge-pipe or trough in a machine of the class described, of a member movable by the flow of the substance worked, a conveyer for carrying molds, means for operating the conveyer, and a variable speed mechanism having connection with and controlled by the movement of said member whereby to regulate the speed of the conveyer relative to the quantity of flow of the substance.

6. The combination with the discharge-pipe of trough in a machine of the class described, of a member movable by the flow of the substance worked, a conveyer for carrying molds disposed to receive the discharge of the substance, means for driving the conveyer, and a variable speed device in connection with the driving means and member and operated by movement of said member to effect a change of speed of the conveyer to suit the quantity of flow of the substance.

7. The combination with the discharge-pipe in a machine of the class described, of a valve associated therewith and having an inclined part in the path of flow of the substance worked whereby the valve is raised more or less as the quantity of flow increases or diminishes, a conveyer for carrying mold-members for receiving the discharge of the substance, and means for driving the conveyer having a variable speed device in connection with the valve whereby the movement thereof controls the speed of the conveyer.

8. The combination with the discharge in a machine of the class described, of a gate-valve associated therewith and movable by the flow of the substance worked, a conveyer for carrying mold members in position to receive the discharge of the substance, means for driving the conveyer having a variable speed device associated therewith, a lever having connection with the variable speed device whereby a movement thereof effects a change of speed of the conveyer, and a rod connecting said valve and lever for communicating a greater or less movement to the lever as the flow of the substance increases or diminishes.

9. The combination with the discharge in a machine of the class described, of a conveyer for carrying mold-members, a shed or housing over a portion of the conveyer having an opening in its top in communication with said discharge and under which the mold-members pass, means for driving the conveyer having a variable speed device associated therewith, a valve controlling the opening in the shed or housing relative to the discharge, said valve having operative connection with the variable speed device and being automatically operated by the flow of the substance worked to change the speed of the conveyer to suit the quantity of flow.

10. The combination with the discharge in a machine of the class described, of a conveyer for carrying mold-members, a shed or housing over a portion of the conveyer having its top disposed in contiguous position to the tops of the mold-members as they pass thereunder and provided with an opening communicating with the discharge, means for driving the conveyer having an associated variable speed device, which is operative to vary the speed of the conveyer, and means operated by the flow of the substance worked to control the speed of the conveyer relative to the quantity of such flow.

In testimony whereof I have hereunto signed my name to this specification in the presence of two subscribing witnesses.

GEORGE MATTHEWS.

Witnesses:
C. W. OWEN,
HAZEL B. HIETT.