M. P. ANDREWS.

BRICKMAKING APPARATUS.

APPLICATION FILED JUNE 4, 1920.

1,374,173.

Patented Apr. 12, 1921.

2 SHEETS—SHEET 1.

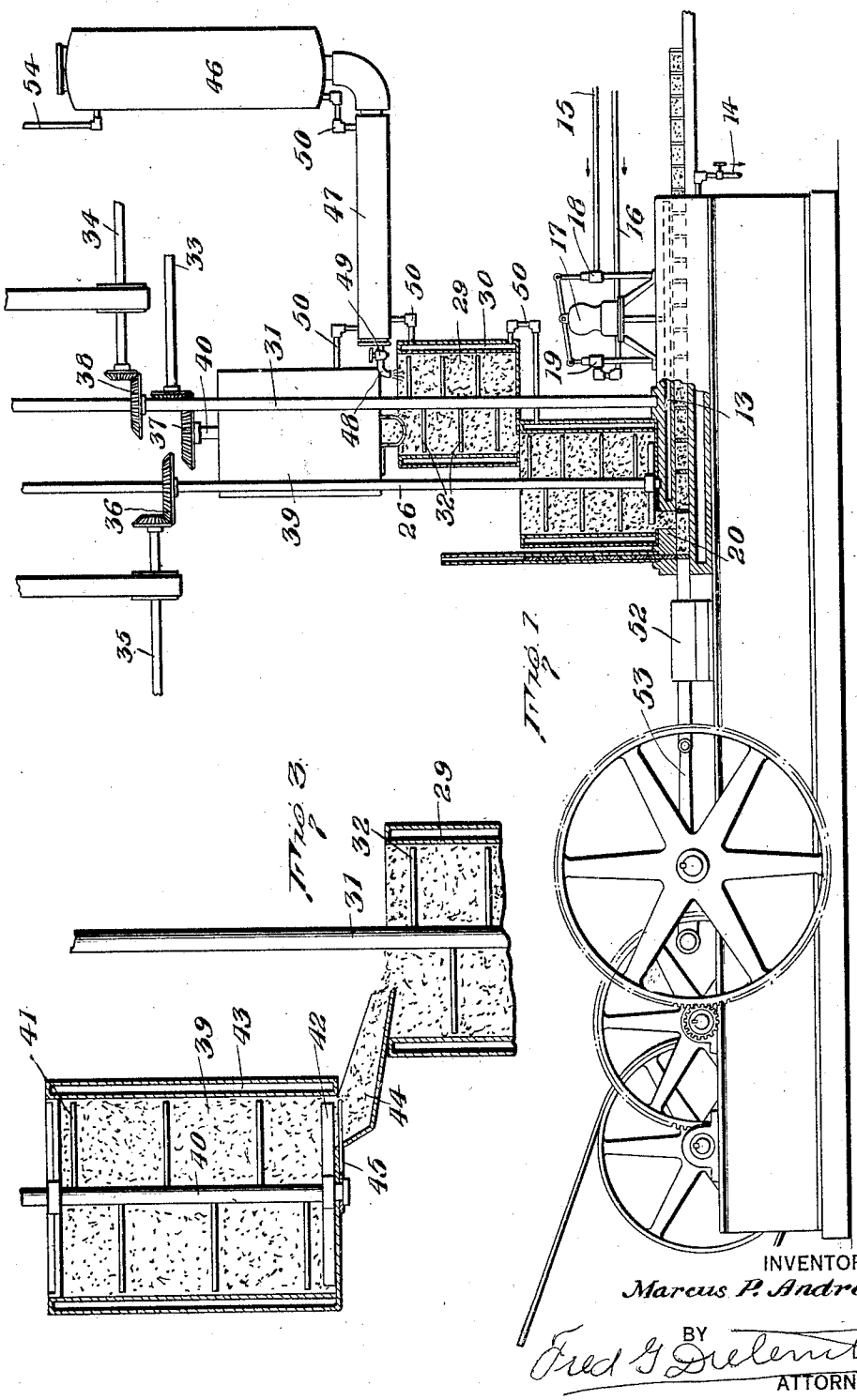


Fig. 1.

Fig. 3.

INVENTOR

Marcus P. Andrews,

BY

Fred G. Dieterich Co

ATTORNEYS

M. P. ANDREWS.

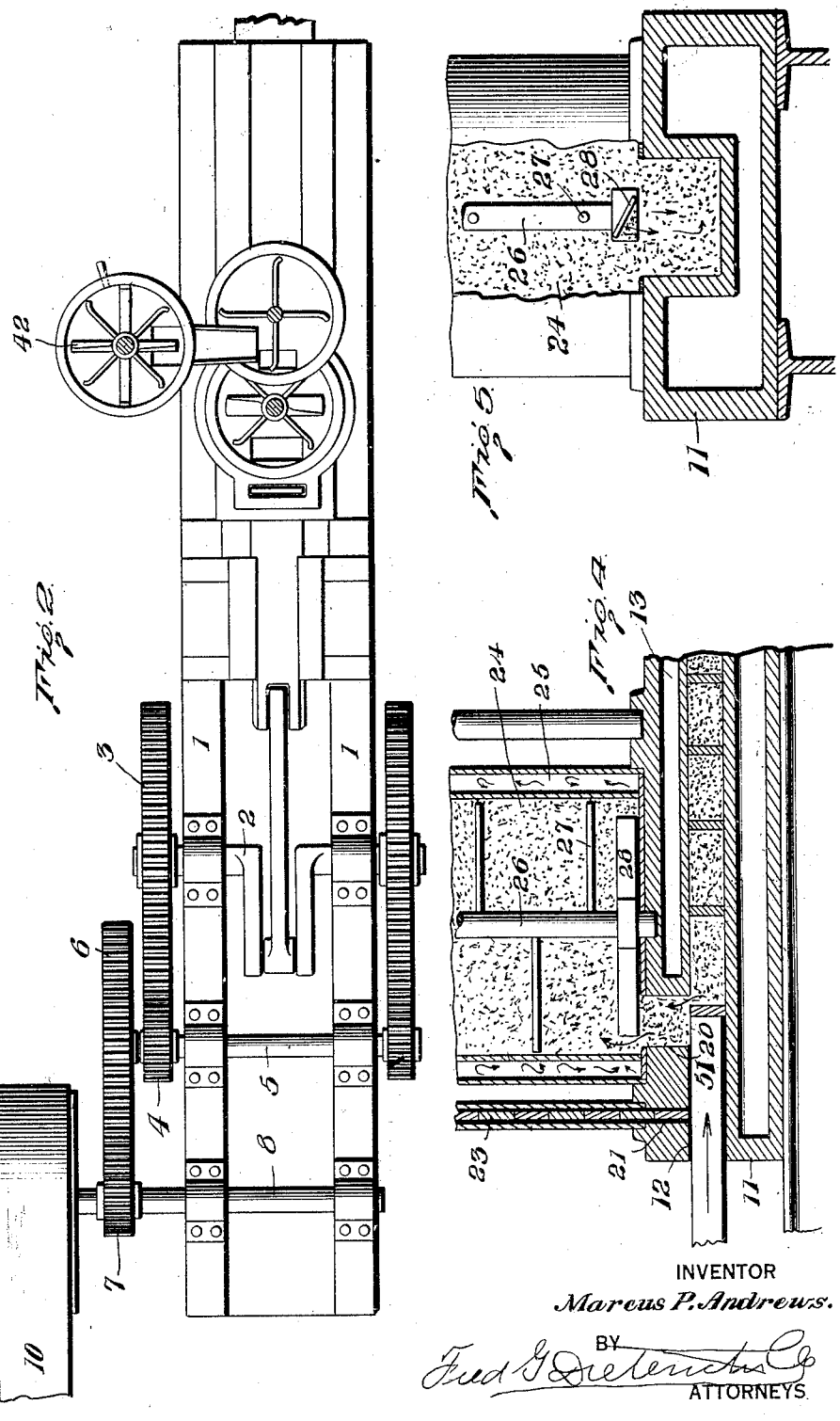
BRICKMAKING APPARATUS.

APPLICATION FILED JUNE 1, 1920.

1,374,173.

Patented Apr. 12, 1921.

2 SHEETS—SHEET 2.



INVENTOR

Marcus P. Andrews.

BY

Fred G. Dieterich Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

MARCUS PEYTAN ANDREWS, OF PETERSBURG, VIRGINIA.

BRICKMAKING APPARATUS.

1,374,173. Specification of Letters Patent. Patented Apr. 12, 1921.

Application filed June 1, 1920. Serial No. 385,503.

To all whom it may concern:

Be it known that I, MARCUS P. ANDREWS, a citizen of the United States, residing at Petersburg, in the county of Dinwiddie and State of Virginia, have invented certain new and useful Improvements in Brickmaking Apparatus, of which the following is a specification.

My invention relates to the art of manufacturing paving and building blocks which are composed of saw dust, or other wood fiber, and asphaltum, or other binder, and the invention has for its object to provide an apparatus for the purpose stated of a simple and effective construction whereby provision is made for commercial manufacture of paving blocks of the character stated at a minimum expense and in as nearly a uniform manner as it is possible to do.

Another object of the invention is to provide an apparatus for the purposes stated in which the saw dust and the binder are kept at a uniform temperature and by the use of which apparatus it becomes unnecessary to use special drying ovens for removing the volatile matter from the saw dust.

Another object of the invention is to provide means for effectively mixing the saw dust with the binder in such manner that a minimum quantity of binder need be employed and a maximum impregnation of the binder with the saw dust particles is attained; it being another object of the invention to provide means whereby the temperature of the forming tunnel through which the bricks are pressed, may be kept uniform so as to cause bricks of uniform density and dimensions to be delivered from the machine.

Another object of the invention is to provide a special feeding device for delivering the mixture from the final mixing vat into the tunnelway in such manner that an excess of material is always delivered to the tunnelway, the excess being forced back into the mixing vessel by the action of the press plunger so as to cause a regurgitation of the material, thus preventing the mixture from hardening or blocking up in the throat from the final mixing vessel to the forming tunnel.

The invention further resides in those novel details of construction, combination and arrangement of parts, all of which will be first fully described, then be specifically pointed out in the appended claims and illustrated in the accompanying drawings, in which:

Figure 1 is a side elevation and part longitudinal section, the view being largely diagrammatic, illustrating the preferred embodiment of the invention.

Fig. 2 is a top plan view of the saw dust container and the primary and final mixing vessels, the binder melting pot and duct being removed.

Fig. 3 is an enlarged detail sectional view illustrating the manner of delivering the saw dust from the saw dust reservoir into the first mixing vat.

Fig. 4 is an enlarged detail section showing the manner in which the excess material is forced back into the final mixing vat from the forming tunnelway as the plunger moves forwardly.

Fig. 5 is a cross section and part elevation of the structure shown in Fig. 4.

In the drawings, in which like letters and numerals of reference indicate like parts in all of the figures, 1 represents the bed of the press, in suitable bearings of which the crank shaft 2 is journaled and receives its motion from a main shaft 8 through a train of gears 7—6—4 and 3, the pinions 4 of the gear train being carried on a countershaft 5. The main shaft 8 receives its motion in any suitable way from the power plant as by a belt 10 and pulley 9.

11 designates the forming bed of the press which is provided with a tunnelway 12 of such shape and dimensions as to produce a brick of the required longitudinal section the tunnelway 12 being jacketed at 13 and provided with an outflow duct 14 and inflow ducts 15—16, one of the ducts 15 being designed to convey hot water or steam into the jacket 13 while the other duct 16 is designed to convey cold water into the jacket 13, the supply of hot or cold water being controlled respectively by valves 18—19 that are automatically operated by a suitable thermostat 17. I have not illustrated in detail the construction of the thermostat 17 as the same, *per se*, constitutes no part of the present invention, as any of the standard types of thermostats employed for similar purposes in this and other arts may be used in connection with my invention.

20 is the throat or passage through which

the material passes from the final mixing vat 24 into the tunnel 12, the throat 20 being so designed that the material may be forced downwardly through the same by means of the propeller blades 28 on the lower end of the mixing shaft 26, the mixing shaft 26 carrying mixing rods or arms 27 which agitate the materials in the vat or tank 24. 21 is the plate aperture through which the separating plates 23 are passed into the tunnel 12 in advance of the piston 51 in the usual way. When the piston 51 is at the back part of its stroke, the piston 51 is guided in ways 52 and is connected to the crank shaft 2 by a connecting rod 53 in the usual manner.

It will be observed, especially by reference to Fig. 4, that the propeller 28 is of a length less than the diameter of the vat 24 so as to leave an appreciable space between the ends of the propeller blades and the wall of the vat, thus the propeller 28 does not project entirely across the throat 20 but a portion of that throat is left out of the influence of the propeller blade, the purpose of which will be presently explained.

29 is the primary mixing vat into which the saw dust and asphaltum or hydrolene are deposited and thoroughly mixed by an agitator consisting of a rotatable shaft 31 having mixing rods 32 and driven through gears 38 from a suitable line shaft 34. The shaft 26 of the final mixing vat agitator and feeder is also driven through a gear connection 36 with a line shaft 35, or in any other suitable way, and at a relatively high speed.

The vat 29 is steam-jacketed at 30 while vat 24 is similarly steam-jacketed at 25, the steam jackets being connected by a steam pipe 50 so as to maintain steam at even temperature in the jackets of both vats 29 and 24.

37 is a gear connection with a line shaft 33 and the shaft 40 of the agitator and feeder contained in the saw dust receiving tank or vat 39. The shaft 40 is also provided with a propeller 42 which forces the material out of the discharge opening when the gate 45 is opened into a chute 44 by which it is delivered into the mixing vat 29. The vat 39 is steam-jacketed at 43 and connected with the steam jacket 47 of the asphaltum duct by a pipe 50, as best shown in Fig. 1. The asphaltum or other binder used is placed in a melting tank 46 that is steam-jacketed and supplied with steam by a supply pipe 54, it being understood that the steam jackets of the vats 39, 29, 24, 46 and duct 47 are kept supplied with steam at approximately the same temperature. The binding material is passed into the mixing vat 29 through a spout 48 which is controlled by a valve 49.

In the operation of my machine, after the plunger 51 has been set into operation and the shafts 26, 31 and 40 have begun to turn, the saw dust is placed into vat 39 (if desired, in the condition in which it is received from the mill) and is thoroughly agitated by the agitator 40—41 and raised to a high temperature, by reason of the steam jacket of the vat, thus driving out from the saw dust the moisture it contains. By the time the saw dust has reached the bottom of the vat 39 it will have become sufficiently dry to become usable and it is fed out of the receiving vat 39 by the propeller 42 and delivered by the spout 48 into the first mixing vat 29. At the same time, a definite quantity of the melted asphaltum is permitted to flow into the vat 29 and the saw dust and binder are then thoroughly mixed in the vat 29, the temperature of the mass being kept up to the desired degree. In practice, a temperature of approximately 350° F. is found to operate satisfactorily. The primary mixed material from the vat 29 is then passed into the final mixing and feeding vat 24 in which it is further stirred and mixed while being maintained at the desired temperature by the steam jacket 25 and is forced through the throat 20 into the tunnelway when the plunger 51 is withdrawn. As before stated, the propeller 28 turns at a comparatively rapid speed, say at about 30 or 35 revolutions per minute, thus causing the material to be forced down through the throat 20 but not with a positive or unyielding pressure. Experience has demonstrated the fact that by making the area of thrust or force exerted on the material in the throat 20 less than that of the area of the throat excess material works back in the manner indicated by the arrows in Fig. 4, and thus prevents the throat 20 from being clogged with material while the plunger is forcing the material in the tunnelway 12 forwardly toward the discharge end of the tunnelway. Not only does this action result in the prevention of clogging the throat 20 but it results in a more thorough mixing of the material for on each stroke of the plunger there is a regurgitation of the material into the vat 24.

While I have disclosed the preferable embodiment of the invention, yet it is obvious that slight changes in the details of construction, arrangement and combination of parts may be readily made without departing from the spirit of my invention or the scope of the appended claims.

In conclusion I wish to call attention to the fact that in starting the machine in cold weather the thermostat 17 is designed to admit either steam or hot water through the duct 15 to warm up the walls of the tunnelway and thus free it from the clinging of the material left in it when the machine was shut down, and by regulating the action of the thermostat 17 the temperature in the

tunnelway, taking into consideration the temperature of the material being operated upon, may be kept uniform and thus produce a brick of uniform size and density. By changing the temperature in the jacket 13 variations in the size of the brick can be produced, depending upon whether the temperature is raised or lowered beyond the normal.

From the foregoing description, taken in connection with the accompanying drawings, it is thought the complete construction, operation and advantages of the invention will be readily understood

What I claim is:—

1. In an apparatus of the class described, the combination with the agitating and feeding vat into which the mixture is deposited, of a tunnelway having a throat connected with the vat, a plunger for forcing the material through the tunnelway, a plate feeding mechanism for delivering separating plates to the tunnelway on the recession of the plunger, means for reciprocating the plunger, an agitator and mixer in the vat, said agitator and mixer including a feed propeller extending partly across the throat so as to leave a portion of the throat out of the influence of the propeller substantially as shown and for the purposes described.

2. In brick making apparatus, the combination with the forming tunnel and plunger and the delivery throat into the tunnel, of an agitating and feeding vat having its outlet in register with the throat to the tunnel, means continuously tending to force material from the vat through the throat into the tunnel and having provision for regurgitation of the material through the throat back into the vat at times.

3. In apparatus of the class described, a molding and forming mechanism for receiving the composition and shaping it into blocks, said mechanism comprising a tunnel, means for supplying separating elements for the blocks in the tunnel, a plunger device for pressing the blocks and forcing the same through the tunnel, a throat for delivering the material into the tunnel and a mixing and feeding vat having a discharge opening delivering into the throat and a feeding propeller rotatable in the vat adjacent to the throat and projecting partly across the throat substantially as shown and for the purposes described.

4. In an apparatus of the class described, a saw dust receiving vat, a primary mixing vat, means for transferring the saw dust from the receiving vat into the primary mixing vat, a binder tank, means for melting the binder in said tank, means for delivering the molten binder into the primary mixing vat, means for mixing and agitating the material in the primary mixing vat, a final mixing vat into which the material is delivered from the primary mixing vat, a combined agitator and feeder rotatably mounted in the final mixing vat, said final mixing vat having an outlet aperture at one side, a forming and pressing mechanism including a tunnelway and plunger, and a throat connecting the tunnelway with the outlet of the final mixing vat, said combined agitator and feeder of said final mixing vat including a feed propeller rotatable in close proximity to the bottom of the vat and of a length less than the diameter of the vat whereby to project but partly over the discharge outlet of the vat so as to leave a free passage through which the excess material may be forced back into the vat on the final stroke of the plunger and when the throat is closed by the plunger, substantially as shown and for the purposes described.

MARCUS PEYTAN ANDREWS.