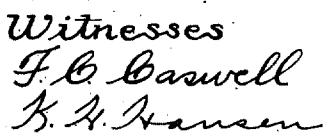


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3 SHEETS--SHEET 1.

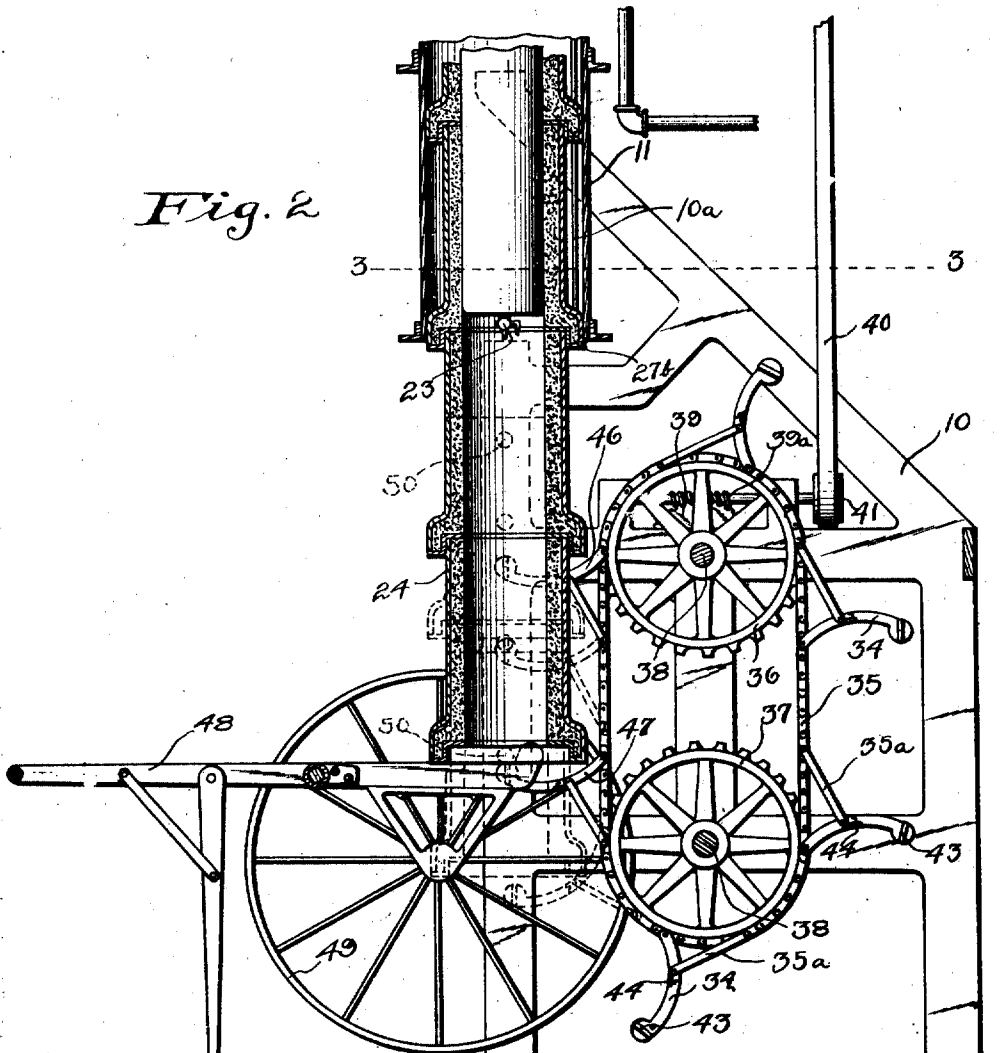


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J. H. STEWART.
SEWER PIPE MACHINE.
APPLICATION FILED OCT. 10, 1910.

Patented Aug. 15, 1911.
3 SHEETS-SHEET 2.

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Fig. 3

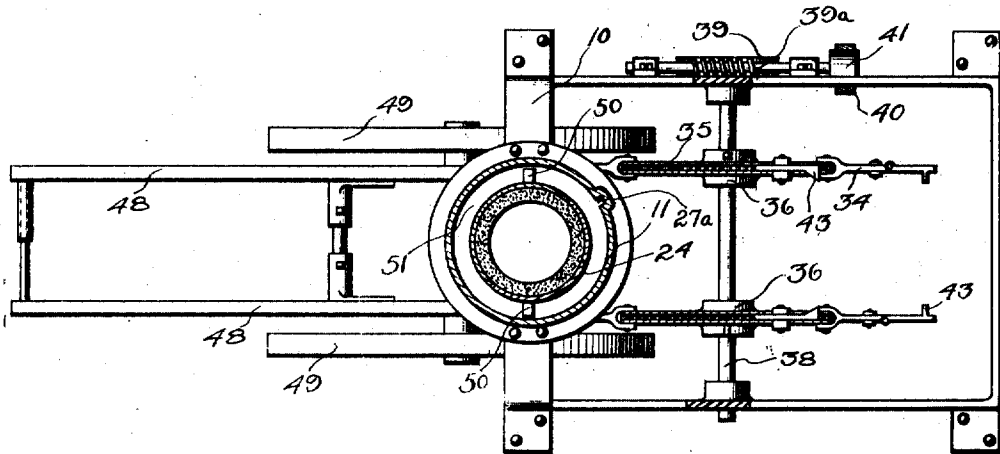


Fig. 9

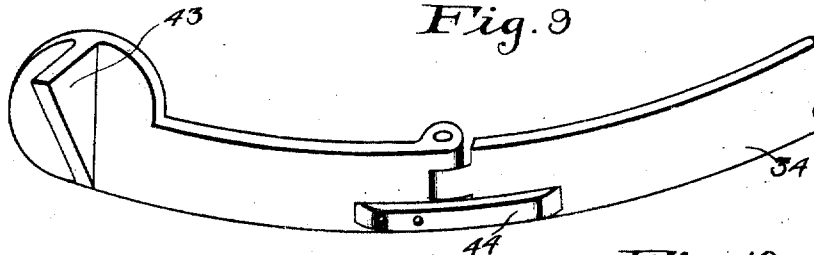
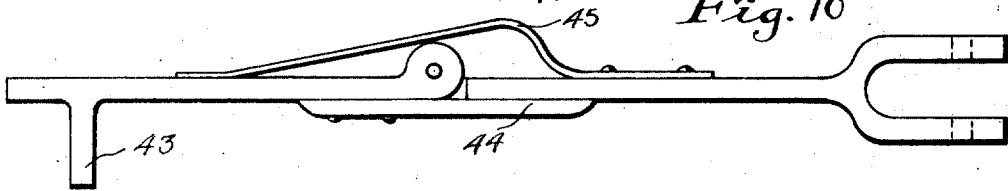


Fig. 10



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UNITED STATES PATENT OFFICE.

JOHN H. STEWART, OF WATERLOO, IOWA.

SEWER-PIPE MACHINE.

1,000,638.

Specification of Letters Patent. Patented Aug. 15, 1911.

Application filed October 10, 1910. Serial No. 588,150.

To all whom it may concern:

Be it known that I, JOHN H. STEWART, a citizen of the United States, residing at Waterloo, in the county of Blackhawk and State of Iowa, have invented new and useful Improvements in Sewer-Pipe Machines, of which the following is a specification.

My invention relates to machines for making sewer pipe or drain tile from concrete and similar materials.

The object of my invention is to provide a machine for molding and delivering such pipe or tile in a partially cured condition.

A further object of my invention is to provide such a machine arranged to be conveniently fed from above, as from the second floor of a building, and to deliver the product at the base of the machine.

A further object of my invention is to provide such a machine capable of efficiently and economically forming large sizes of drain pipe, and delivering the product, with the concrete of which it is composed partially set, so that the pipe may be immediately removed from the molds and pallets, thus obviating the use of the molds and pallets during the period of curing, and thereby limiting the number of the same required in the manufacture of such pipe.

Figure 1 shows a central, sectional view of the upper end of my machine. Fig. 2 shows a central sectional view of the lower end of the same, Fig. 3 shows a sectional view taken on the line 3—3 of Fig. 2, Fig. 4 shows a detail view of the interior steam connection, Fig. 5 shows a detail of the divided pipe mold, Fig. 6 shows a detail view of the pipe pallet, Fig. 7 shows a central sectional view of the same, Fig. 8 shows a detail of the agitator blades for stirring the concrete mixture, Fig. 9 shows a detail view of one of the jointed brackets for receiving the pipe, and Fig. 10 shows a plan view of the same.

Referring to the accompanying drawings, I have used the reference numeral 10 to indicate the supporting frame. The steam casing 11 is mounted on the frame 10, as shown in Fig. 2. The hollow shaft 12 is rotatably mounted in the bearings 13 and 14 on the frame 15, said frame being attached to the ceiling above the machine. The bevel gear wheel 16 is fixed to the upper end of the hollow shaft 12, and is in mesh with the bevel gear wheel 17 on the driving shaft 18. The steam pipe 19 ex-

tends downward through the hollow shaft 12, and admits steam to the former head 20, said former head extending downward through the center of the steam casing 11 and constituting the core of the hereinafter mentioned molds. The cap 21 threaded on the shaft 12 retains the packing 22 and prevents the escape of steam from the shaft 12. A pet-cock 23 at the base of the former head forms an adjustable outlet to regulate the passage of steam therefrom, and also provides a drain for emptying the water of condensation. The molds 24, which form the cylindrical jackets for the sections of drain pipe, are designed to fit slidably into the steam casing 11. These molds or cylindrical jackets are provided with hinges 25 and a catch 26 to hold them in closed position. The pallets 27 fit similarly into the casing to form the bases for the molds and space them apart. A hopper 28, adapted to receive the concrete mixture, is mounted on the frame 15 and opens into the steam casing 11. The pallets 27 are made in two segments to facilitate introducing them about the hopper 28 into the casing. The molds 24 are introduced into the steam casing by opening them upon their hinges and sliding them over the hopper 28, when they are closed and locked. It is desirable that the molds 24 and the pallets 27 should be prevented from rotating while in the steam casing 11. To accomplish this result, I have provided the pallets 27 with lugs 27^a designed to slide in the groove 10^a in said steam casing 11, and with lugs 27^b to engage the notches 24^a in the molds 24. The agitators 29, comprising arms 30 with attached blades 31, affixed to the hollow shaft 12 above the former head and revolving with said shaft, stir the concrete mixture as it enters the molds 24 through the hopper 28.

It will be understood that the mixture of concrete used in pipe of this type is not plastic in the same sense as clay or plaster. The normal initial set does not take place for a considerable time after the dampened material has been placed in the molds, and to hasten this process as well as to eliminate the use of a large number of molds and pallets, I apply heat to the interior and exterior of each section of pipe by means of the hollow former head 20, which receives live steam through the pipe 12, and the steam casing 11 which receives steam through the pipes 32 and 33. Such application of

heat partially cures the material which, when leaving the steam casing 11, is in a condition solid enough to allow the removal of the forms without destroying the integrity of the pipe.

To regulate the passage of the pipe molds 24, which descend by gravity through the steam casing 11, and to receive said molds at the base of the machine, I have provided a series of jointed brackets 34 pivotally connected to chains 35. Each bracket is provided with a brace bar 35^a pivoted at one end to a chain 35 and at the other to the bracket. The chains 35 are mounted on the sprocket wheels 36 and 37. Said wheels are journaled on the shafts 38 and are capable of longitudinal adjustment thereon to accommodate different sized molds. The gear wheel 39 on the shaft 38 in mesh with the worm 39^a is driven by the belt 40, which connects the pulley wheels 41 on the worm 39^a, and the pulley wheel 42 on the power shaft 18. Said gear wheel 39 drives the chains 35 in a counter clock-wise direction as seen in Fig. 2. The jointed brackets are provided at one end with beveled lugs 43, and also with lugs 44 at their joints to prevent the movable ends from swinging inwardly. The springs 45 on the opposite sides of said arms yieldingly hold the free ends of the arms in extended position. The brackets 34 are spaced to engage the lower sides of the pallets 27 when in the position shown at 46, Fig. 2, thus supporting and permitting the molds to descend at a predetermined speed. The speed of the arms 34 is accelerated after leaving the position shown at 47 in Fig. 2, and lowers its particular mold to a position below the following one, as shown in dotted lines Fig. 2. To provide means for receiving the molds when in this position, I use a cart comprising the frame 48 mounted on the wheels 49. Said frame is adjustably connected to accommodate different sizes of molds, and designed to engage the lugs 50 of the molds and support them as they are freed from the following molds.

Assuming the parts to be in position shown in the drawings, the operation of my machine is as follows: Slush material, such as concrete, deposited in the hopper 28, passes into the mold from said hopper, and is stirred by the agitators 31 to prevent too rapid setting and to expel the air therefrom, thus eliminating air holes commonly found in this form of tile. Live steam is admitted to both the former head 20 and the casing 11, thus heating the material both inside and out as the pipe is formed; while

The pet-cock 23 is employed to permit the expulsion of dead steam from the former head 20 and the same result is secured in the casing by reason of the fact that the

steam incased in the cell between the casing 11 and the lowermost mold 24 is expelled with said mold. To secure the beneficial results intended, it will not be necessary to maintain steam under pressure in the casing or even to have said casing air tight. The brackets 34 in reaching the position at 46, Fig. 2, operate as follows: The outer ends of the brackets 34 in passing over the wheels 36 travel faster than when descending vertically, and before reaching the position at 46 intercept and pass the particular molds which they are intended to support. The beveled lugs 43 engage the mold flange 51, and swing the free ends of the brackets outwardly against the action of the springs 45. After the brackets 34 have passed below the mold flange, the springs 45 return the free ends of the brackets to a position for supporting said mold. The movement of the molds at the base of the machine is as follows: As the outer ends of the brackets 34 pass from the position at 47, Fig. 2, their speed is increased thus separating a particular mold from the following one. The cart frame 48 then engages the lugs 50 on the mold and support it, freed from the brackets and following mold, when said mold may be hauled away on the cart. The product having by this time become sufficiently hard, the molds may be stripped from the pipe and again inserted in the machine.

Having described my invention, what I claim as new and desire to protect by Letters Patent is:

1. In a drain pipe machine, the combination of a vertical casing adapted to receive steam, a plurality of molds centrally arranged therein and adapted to pass therethrough, pallets for said molds, a former head in the casing, and means for rotating the former head.

2. In a drain pipe machine, the combination of a vertical casing, a plurality of molds centrally arranged therein and adapted to pass therethrough, pallets for said molds, a former head in the casing adapted to receive steam, and means for rotating the former head.

3. In a drain pipe machine, the combination of a vertical steam casing, a plurality of molds centrally arranged therein and adapted to pass therethrough, pallets for said molds, a former head adapted to receive steam, means for regulating the passage of steam through the former head, and means for rotating said former head.

4. In a drain pipe machine, the combination of a vertical steam casing, a plurality of molds centrally arranged therein and adapted to pass therethrough, pallets for said molds, a former head in the casing adapted to receive steam, means for rotating said former head, and means for pre-

venting the rotation of said molds and pallets.

5. In a drain pipe machine, the combination of a vertical steam casing, a plurality of molds centrally arranged therein and adapted to pass therethrough, pallets for said molds, a hollow former head constituting a core for said molds and adapted to receive steam, means for rotating said former head, and means for supporting the pallets in their passage through the casing.

6. In a drain pipe machine, the combination of a vertical casing adapted to receive steam, a plurality of molds centrally arranged therein, pallets for said molds, a former head in the casing constituting a core for the molds and adapted to receive steam, means for rotating said former head, means for receiving and supporting the molds in their passage through the casing, and means for delivering said molds from said supporting and receiving means.

7. In a drain pipe machine, the combination of a steam casing, divided molds for the casing, divided pallets for the molds, a hopper leading to the molds, a hollow former head adapted to receive steam, means for rotating the former head, and means for supporting and receiving said molds.

8. In a drain pipe machine, the combination of a steam casing, a plurality of molds centrally arranged therein, pallets for the molds, a hollow former head constituting a core for the molds adapted to receive steam, agitators above the former head, and means for rotating and supporting the agitators and former head.

9. In a drain pipe machine, the combination of a grooved casing adapted to receive steam, a hopper leading into the casing, molds for the casing, divided to pass around said hopper, divided pallets for the molds, lugs on the pallets to engage the grooved casing, lugs on the pallets to engage the molds, a hollow former head adapted to receive steam, means for supporting and rotating the former head, and jointed brackets to receive and support the molds in their passage through the casing.

10. In a drain pipe machine, the combination of a casing adapted to receive steam, molds for the casing, pallets for the molds, a hopper leading to the molds, a hollow former head constituting a core for the molds adapted to receive steam, agitators above the former head, a shaft for supporting and rotating said agitators and former head, two sets of sprocket wheels slidably mounted on the frame, one above the other, sprocket chains supported by said sprocket wheels and driven by one of them, hinged brackets pivoted to the chains and adapted to support the molds, and means for operating said sprocket wheels.

11. In a drain pipe machine, the combina-

tion of a casing adapted to receive steam, molds for the casing, pallets for the molds, a hopper leading to the molds, a hollow former head adapted to receive steam, a shaft for supporting and rotating the agitators and said former head, a frame, two horizontal shafts on the frame, one above the other, two sprocket wheels slidably mounted on each shaft, vertically arranged chains connecting said sprocket wheels, jointed brackets on the chains arranged to engage opposite sides of a mold, braces pivotally connected to the brackets and chains, springs to yieldingly hold the movable ends of said brackets in position, and means for rotating said sprocket wheels.

12. In a drain pipe machine, a vertical casing, a plurality of molds in the casing, pallets for the molds, a former head constituting a core for the molds, means for rotating the former head, a frame, two horizontal shafts on the frame, one above the other, two sprocket wheels slidably mounted on each shaft, endless chains carried by said sprocket wheels, jointed brackets correspondingly arranged on each of said chains to engage opposite sides of a mold, braces pivotally connected to the brackets and chains, springs to yieldingly hold the free ends of said brackets in extended positions, and means for rotating said sprocket wheels.

13. In a drain pipe machine, the combination of a casing adapted to receive steam, flanged molds for the casing, pallets for the molds, a hollow former head adapted to receive steam, means for regulating the passage of steam through said former head, agitators in the casing above said head, a shaft for rotating and supporting the agitators and former head, a hopper leading to the casing, a frame, two longitudinal shafts on the frame, one above the other, a gear wheel on one of the shafts, a worm in mesh with the gear wheel for driving it, sprocket wheels slidably mounted on each shaft to accommodate different sized molds, chains connecting said sprocket wheels, jointed brackets on the chains to support the molds in their passage through the casing, lugs on the free ends of the jointed brackets to limit their inward movement, springs on the stationary ends of said brackets to yieldingly hold the free ends in straight extended positions, and beveled lugs on the free ends of the brackets to move said ends outwardly while passing the mold flanges.

14. In a drain pipe machine, the combination of a casing adapted to receive steam, flanged molds within the casing, pallets for the molds, a hollow former head adapted to receive steam within the molds, agitators in the casing above said head, a shaft attached to the agitators and former head, a power shaft geared to said shaft, a hopper

leading to the casing, a frame, two longitudinal shafts on the frame, one above the other, a gear wheel on one of the last mentioned shafts, a worm in mesh with said gear wheel 5
operatively connected to said power shaft, sprocket wheels slidably mounted on each shaft, chains connecting said sprocket wheels, jointed brackets on the chains arranged to engage opposite sides of the bases 10
of said molds to govern their passage in the casing, lugs on the free ends of the jointed brackets to limit their inward movement, springs on the stationary ends of said brackets to yieldingly hold the free ends in 15
straight extended positions, beveled lugs on the free ends of the brackets to move said ends outwardly while passing the mold flanges, and means for receiving and delivering molds from said jointed brackets. 20
15. In a drain pipe machine, the combination of a vertical casing adapted to receive steam, a plurality of flanged molds centrally arranged in said casing and adapted to pass therethrough by gravity, pallets 25
beneath said molds, a rotatable, vertical shaft centrally arranged in said casing and molds, a hollow former head adapted to receive steam and attached to said shaft, means for regulating the passage of steam 30
through said former head, agitators upon the shaft above said former head, a hopper above the casing, a frame, two longitudinal shafts on the frame, one above the other, a gear wheel on one of the shafts, a worm in 35
mesh with the gear wheel, means for driving said worm, sprocket wheels slidably mounted on each of the last mentioned shafts, chains connecting said sprocket wheels, jointed brackets on the chains arranged in pairs to engage the opposite sides 40
of a mold and to support the molds in their passage through the casing, lugs on the movable ends of the jointed brackets to limit their inward movement, springs on the stationary ends of the said brackets to 45
yieldingly hold the movable ends in extended position, beveled lugs on the free ends of the brackets adapted to move said ends outwardly while passing the mold flanges, and 50
means for receiving and delivering molds from said jointed brackets.

16. In a sewer pipe machine, the combination of a casing adapted to inclose a plurality of molds, divided molds for said casing, divided pallets for said molds, a former 55
head within the casing, a hopper leading to

the casing, means for supporting and rotating the former head and a movable support for the molds in the casing and for receiving the same as they pass therefrom. 60

17. In a sewer pipe machine, the combination of a casing, a plurality of molds arranged in vertical series in said casing and adapted to pass therethrough by gravity, pallets for said molds, a former head adapted to receive steam, agitators, means for supporting and rotating the former head 65
and for supporting and rotating said agitators and means adapted to regulate the speed of the molds through the casing and 70
to receive the same and separate them as they pass therefrom.

18. In a sewer pipe machine, the combination of a casing, molds adapted to pass through the casing by gravity, pallets for 75
said molds, a former head adapted to receive steam, a hollow shaft for supporting and rotating the former head, means for introducing steam through said shaft into the former head and means for governing 80
the speed of the molds through the casing and for receiving the same therefrom.

19. In a sewer pipe machine, the combination of a casing, molds adapted to pass through the casing by gravity, pallets for 85
said molds, a hollow former head adapted to receive steam, a hollow shaft communicating with, supporting and rotating the former head, means for preventing the escape of steam between the hollow shaft and 90
said steam pipe and means for governing the speed of the molds through the casing and for receiving the same therefrom.

20. In a sewer pipe machine, the combination of a casing, molds adapted to pass 95
through the casing by gravity, a former head adapted to receive steam, a hollow shaft for supporting and rotating the former head, means for introducing steam to the former head through said shaft, 100
means for regulating the flow of steam through the former head and a movable support for the molds while in the casing, adapted to receive and separate the same as they pass therefrom. 105

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

JOHN H. STEWART.

Witnesses:

J. C. GATES,

E. C. STEVENSON.