

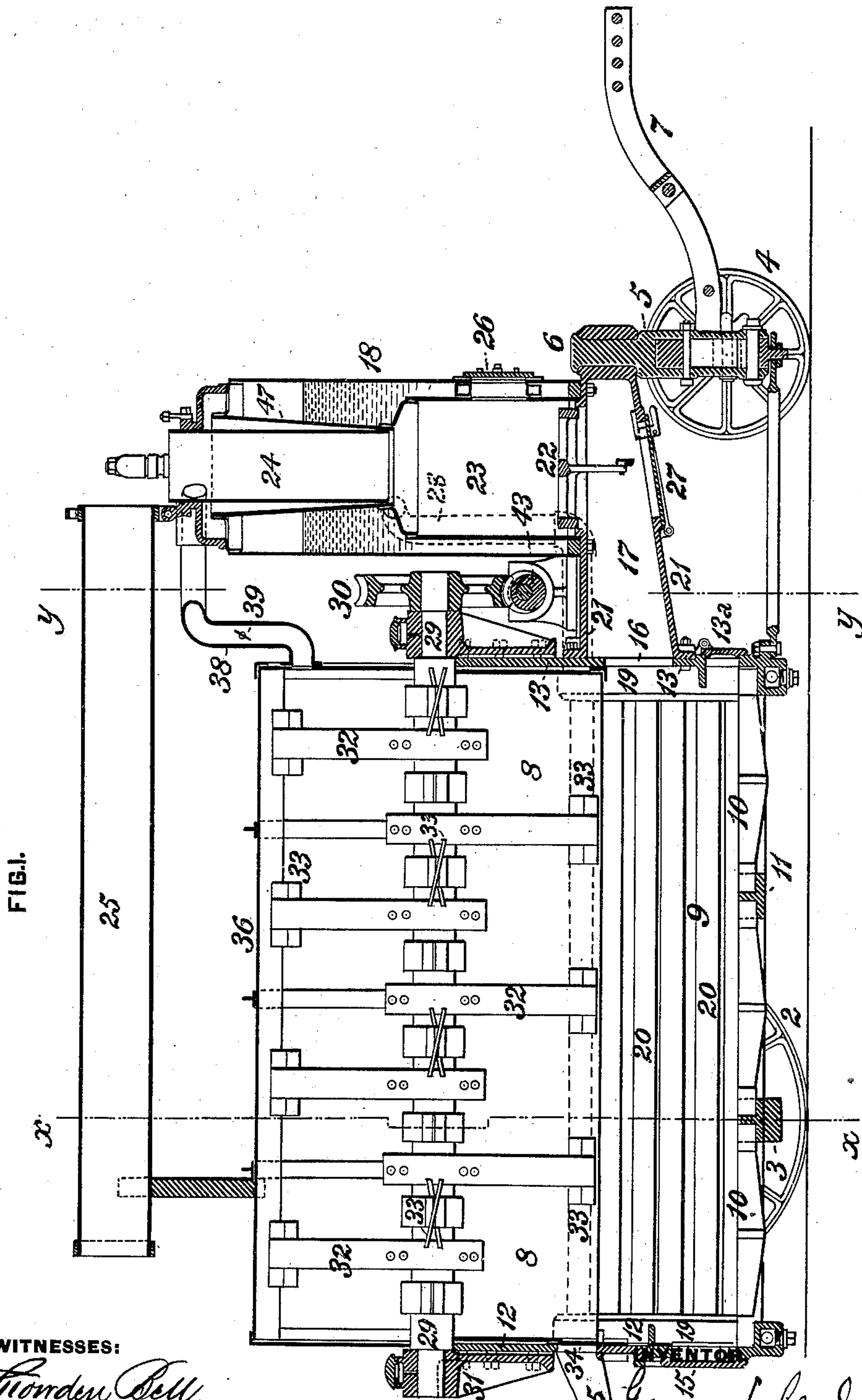
(No Model.)

3 Sheets—Sheet 1.

G. L. PEABODY.
MACHINE FOR MIXING ASPHALT.

No. 405,499.

Patented June 18, 1889.



WITNESSES:

J. Thorden Bell.
F. E. Gaither.

George L. Peabody
by George H. Christy
Att'y.

(No Model.)

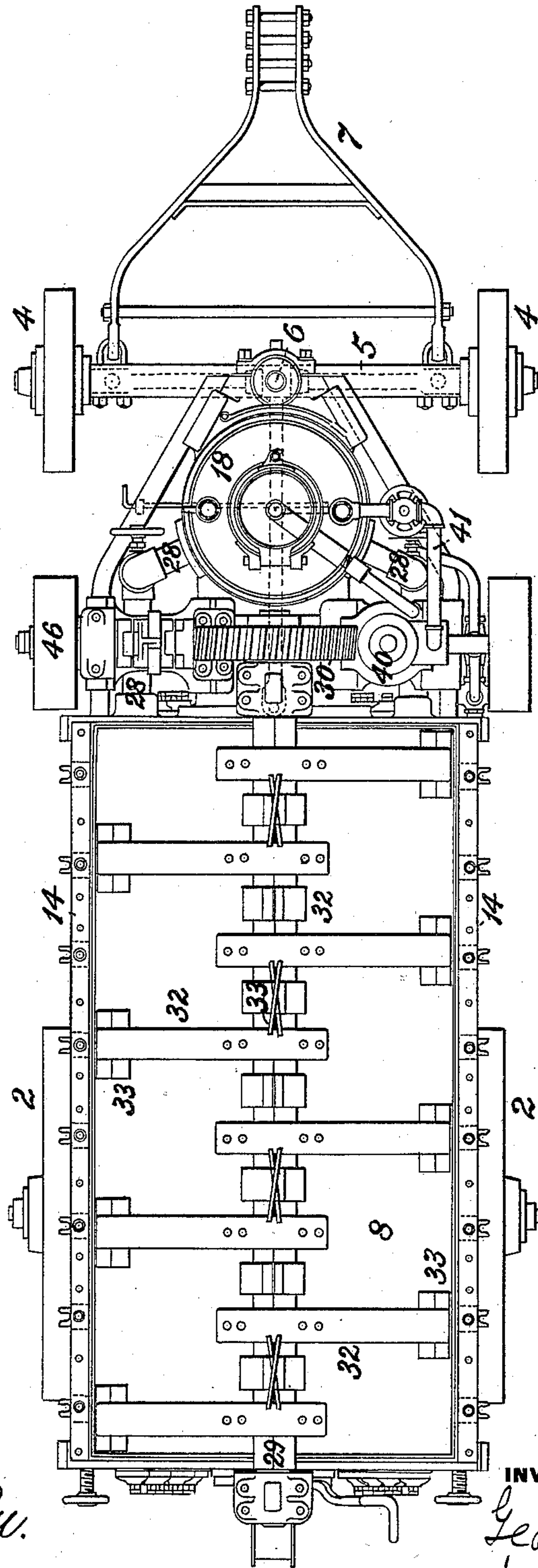
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FIG.2.



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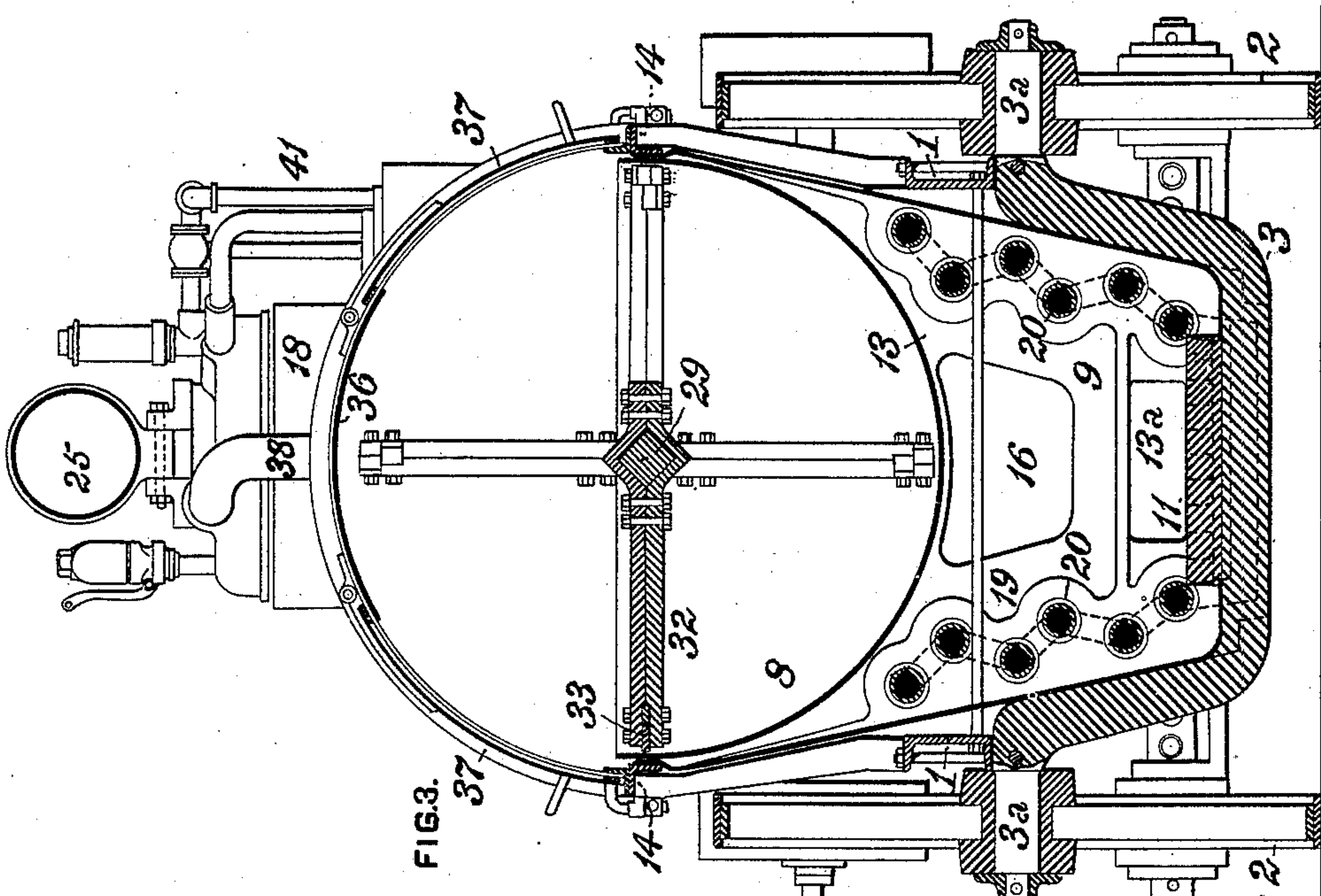
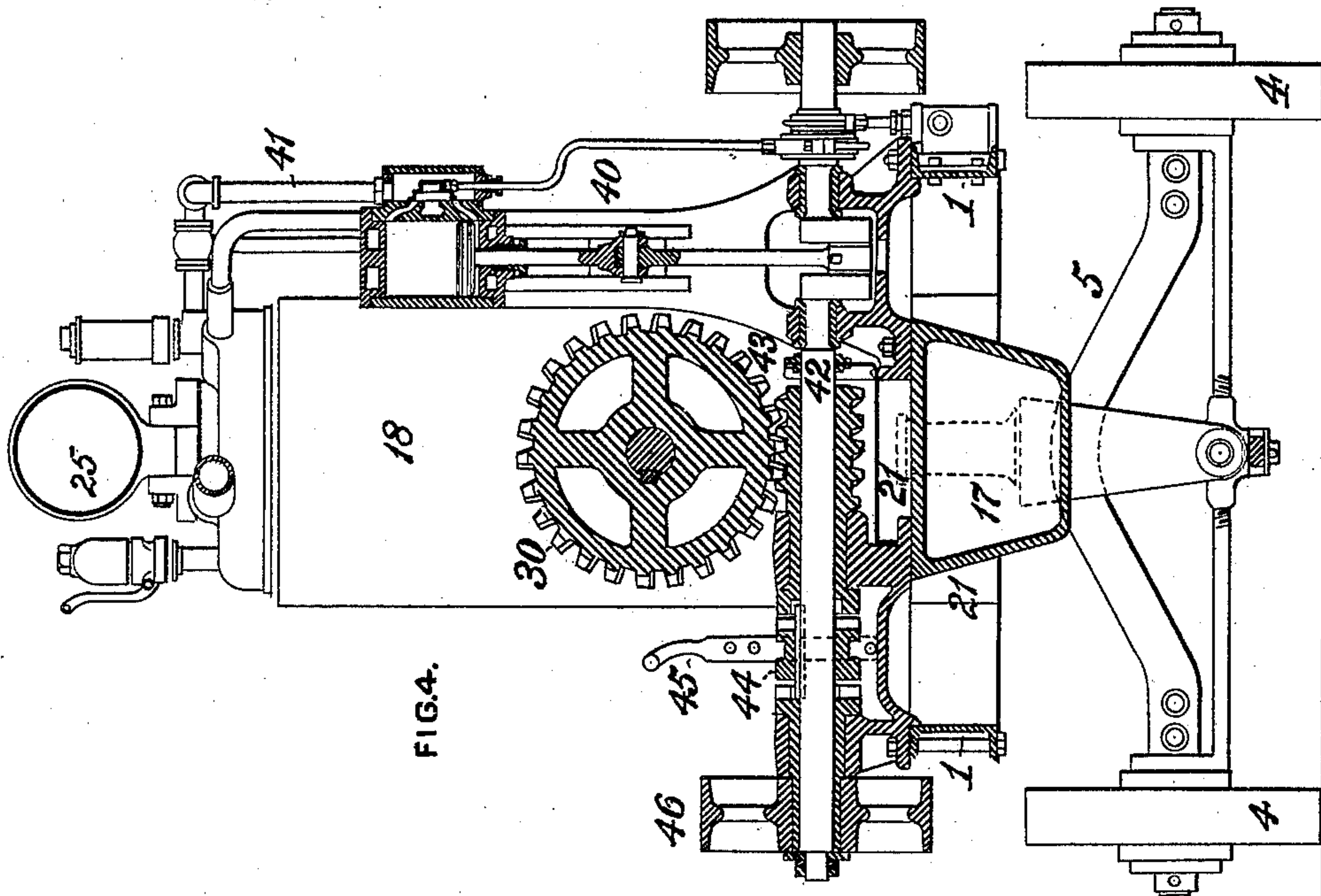
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WITNESSES:

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UNITED STATES PATENT OFFICE.

GEORGE L. PEABODY, OF PITTSBURG, PENNSYLVANIA.

MACHINE FOR MIXING ASPHALT.

SPECIFICATION forming part of Letters Patent No. 405,499, dated June 18, 1889.

Application filed October 1, 1888. Serial No. 286,853. (No model.)

To all whom it may concern:

Be it known that I, GEORGE L. PEABODY, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Machines for Mixing Asphalt, of which improvements the following is a specification.

My invention relates to machines for melting and mixing rock-asphalt with other materials preparatory to laying it in pavements, and its object is to provide a simple and compact portable apparatus in which the heat required for maintaining the materials in a liquefied condition may be effectively and economically applied for such purpose and further utilized in the generation of steam for the rotation of a mixer shaft and blades, as well as to afford convenient means for cleaning the mixing-chamber from time to time, as may be desired.

To this end, my improvements consist in certain novel devices and combinations, hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a vertical longitudinal central section through a machine for mixing asphalt embodying my invention; Fig. 2, a plan or top view of the same, with the cover of the mixing-chamber removed; and Figs. 3 and 4, vertical transverse sections, on an enlarged scale, at the lines *xx* and *yy*, respectively, of Fig. 1.

In the practice of my invention I provide a frame 1, which is preferably formed of channel-bars, and is supported adjacent to its rear upon a pair of wheels 2, fitted to rotate upon end journals 3^a on an axle 3, fixed to the frame, its front end being carried upon a pair of wheels 4 of smaller diameter, mounted in a truck or swiveling frame 5, journaled by a pivot 6 to a forward extension of the frame, and provided with a tongue 7, by which the machine may be hauled from place to place. A semi-cylindrical mixing-chamber 8, of boiler-iron, is connected to and closes at top a furnace 9, the sides of which are inwardly and downwardly tapered, passing inside the longitudinal bars of the frame and fitting between and above the inclined lateral and horizontal central portions of the axle 3, which is bent downwardly between its journals to embrace and support the furnace. A grate 10

is supported on bearers 11 in the bottom of the furnace below the central portion of the mixing-chamber, the inwardly-tapering sides of which enable the wheels 2 to be placed as closely together as practicable, so as to economize space, while providing a direct application of heat to the thickest body of material in the mixing-chamber.

The furnace is closed at its ends by heads 12 13, which are bolted to the side bars of the frame 1 and is secured at top to angle-irons 14, connected to the heads. An opening in the rear head 12, closed by a fire-door 15, serves for the introduction of fuel, and access may also be had to the forward portion of the furnace and grate through an opening in the front head 13, closed by a door 13^a. The products of combustion pass off through an opening 16 in the front head 13, communicating with a discharge-flue 17, which in turn communicates with the fire-chamber and flue of a steam-boiler 18, to be presently described.

In order to utilize the heat developed by the combustion of the fuel in the furnace in the generation of steam for the rotation of a mixer shaft and blades, a water-chamber 19 is formed in each of the furnace-heads 12 13, and a series of tubes 20, arranged one above another and connected at their ends to said chambers, is located on each side of the furnace. Said chambers and tubes are supplied with water by a pump or injector, and the direct heat of the fuel being exerted thereon a circulation of the water through the tubes is maintained and the generation of steam thereby advantageously effected.

The steam-boiler 18, which is preferably of the vertical cylindrical type, is mounted upon a bed-casting 21, secured to the front head 13 of the furnace and to the frame and inclosing the discharge-flue 17 of the furnace. A tilting or dumping grate 22 is pivoted to the bed-casting 21 above an opening in the upper plate thereof, communicating with a central fire-chamber 23 in the boiler, from the top of which chamber a flue 24 leads to and out of the top of the boiler. A stack 25 may be added, if deemed desirable, to afford increased draft, and in such case the stack is preferably hinged to the top of the boiler, as shown, so as to be lowered for convenience in the trans-

portation of the machine. The boiler is provided with a fire-door 26, and a door 27, closing an opening in the lower plate of the bed-casting 21, admits of fuel or ashes being
5 dumped from the fire-chamber, when required.

In order to prevent the application of an unduly high degree of heat to the water in the boiler by the escaping products of combustion, the flue 24 is inclosed by a conical
10 shield 47, which is open at top, so as to provide a steam-space around the flue and prevent the contact of water therewith. The water-chamber 19 of the front furnace-head is connected by delivery-pipes 28 with the
15 water-space of the boiler, into which said pipes discharge the heated water from the circulating-tubes 20.

A longitudinal mixer-shaft 29, having a worm-wheel 30 secured upon one of its ends,
20 is mounted concentrically with the mixing-chamber 8 in bearings 31 secured to the heads 12 and 13 of the furnace, and carries a series of radial stirrer-arms 32, each of which has secured upon its outer end two or more blades
25 33. The mixer-shaft is preferably formed of square or rectangular section and the stirrer-arms in two parts, which are bolted together to embrace the shaft. The arms are arranged helically upon the shaft—that is to say, each
30 succeeding arm stands at an angle, say, ninety degrees—in advance of the preceding arm, so that the arms and blades act successively upon the material in the mixing-chamber in the rotation of the mixer-shaft. An opening closed
35 by a valve or gate 34 is formed in the rear end of the mixing-chamber in line with its bottom, to admit of the withdrawal of the mixed asphalt from time to time, as required, through a discharge-spout 35, and to enable the
40 chamber to be entirely cleared of material when desired without opening its doors or stopping the rotation of the mixer-shaft, the blades 33 nearest to the outer ends of the stirrer arms, which in their traverse move as closely
45 as may be to the wall of the mixing-chamber, are inclined relatively to the longitudinal planes of their respective arms, so as to remove the material adhering to the chamber and carry it backwardly to the discharge-spout. The blades 33 of the stirrer-arms
50 which are next the outer ones are inclined in opposite direction thereto, and thereby tend to move the material in opposite direction to said outer blades—that is to say, away from the discharge-spout. It will thus be seen
55 that during the mixing operation, in which both blades of each stirrer-arm are completely submerged, the tendency of each blade to induce longitudinal movement of the material in the mixing-chamber is counteracted by
60 that of the other; but when so much of the material has been allowed to pass out of the chamber that only the outer arms are submerged, the discharging tendency of the latter is unopposed, and they therefore sweep
65 out of the chamber the remaining portion of the material, the removal of which has here-

tofore been required to be effected by hand and has involved considerable delay and inconvenience. The central portion of the mixing-chamber is closed at top by a segmental
70 cover 36, between which and the sides of the chambersubstantially continuous open spaces are interposed, said spaces being closed on each side by a series of doors 37, which are
75 hinged or pivoted to the cover 36 and immediately adjoin each other, so that by raising the doors the whole or any desired portion of the space between the cover and mixing-chamber may be exposed to afford access to
80 the interior of the latter. The vapors evolved from the materials in the mixing-chamber are carried off by an escape-pipe 38, which leads into the boiler-flue 24 and may be provided with a valve or damper 39.
85

Rotation is imparted to the mixer-shaft by an engine 40 of any suitable and preferred construction, which is secured upon the bed-casting 21 and frame 1, and is supplied with steam by a pipe 41, leading from the boiler
90 18. The crank-shaft 42 of the engine carries a worm 43, which meshes with the worm-wheel 30 of the mixer-shaft, the worm 43 fitting loosely upon the crank-shaft and being caused to rotate therewith, as desired, to im-
95 part rotation to the mixer-shaft, by a clutch 44, which is adapted to slide upon a feather on the crank-shaft and is engaged with and disengaged from the worm by a lever 45. The crank-shaft also carries a loose driving-pulley
100 46, which may be caused to rotate with or allowed to remain loose upon the shaft, as desired, by the clutch 44, according as the latter is engaged with or disengaged from the worm 43. The engine may be thus adapted
105 to drive other machinery during such periods as the mixer-shaft may not be required to be rotated.

In the operation of the machine, the circulating-tubes, water-chambers, and boiler being supplied with water to a proper level in
110 the latter, the materials to be mixed—usually consisting of rock-asphalt, Trinidad asphalt, bitumen, and coarse sand in proper proportions—are placed in the mixing-chamber and
115 steam is generated from fuel placed in the fire-chamber of the boiler and in the furnace 9, and the asphalt is liquefied by the heat of the furnace. The mixer-shaft is then rotated by the engine, and when the materials have
120 been properly mixed the compound is removed through the discharge-opening and discharge-spout. After steam has been raised to a sufficient pressure to operate the engine, the supply of fuel to the fire-chamber of the
125 boiler is discontinued and the cinders discharged therefrom by dumping the grate. The generation of steam is thereafter continued by the calorific action of the fuel in the furnace 9 and of the heated products of combustion therefrom, which traverse the discharge-flue 17, fire-chamber 23, and boiler-flue
130 24 in their exit from the furnace. The escape of waste heat is thus prevented and a

corresponding economy of fuel attained. The construction and arrangement of the stirrer arms and blades enables the materials to be thoroughly mixed and the chamber to be entirely cleared, when necessary, without the inconvenience, heretofore experienced, of doing so by hand. During such periods, as it may not be necessary or convenient to operate the mixer-shaft, the engine may be employed in other duty connected with the operation of the machine, such as grinding or crushing material, pumping water, &c.

I claim as my invention and desire to secure by Letters Patent—

1. In a machine for mixing asphalt, the combination of a furnace, a mixing-chamber located above said furnace, a steam-boiler, a discharge-flue connecting the furnace with the flue of said boiler, and a shield inclosing the boiler-flue within the water-space of the boiler, substantially as set forth.

2. In a machine for mixing asphalt, the combination of a furnace, a mixing-chamber located above said furnace, a steam-boiler, a discharge-flue leading from the furnace to the fire-chamber of the boiler, and a tilting or dumping grate located in the fire-chamber of the boiler, substantially as set forth.

3. In a machine for mixing asphalt, the combination of a mixing-chamber, a furnace located below said chamber, heads closing the ends of the furnace and having water-chambers formed therein, and circulating-tubes within the sides of the furnace and con-

necting said water-chambers of the furnace, substantially as set forth.

4. In a machine for mixing asphalt, the combination of a mixing-chamber, a mixer-shaft journaled to rotate therein, and a series of stirrer-arms secured radially upon the shaft, each arm carrying adjacent to its outer end a pair of blades which are inclined in respectively opposite directions to the longitudinal plane of the arm, substantially as set forth.

5. In a machine for mixing asphalt, the combination of a furnace, a mixing-chamber located above said furnace, a steam-boiler, and a vapor-discharge pipe leading from the mixing-chamber to the flue of said boiler, substantially as set forth.

6. In a machine for mixing asphalt, the combination of a wheeled supporting-frame, a furnace, a mixing-chamber, a mixer-shaft provided with stirrer-arms and fitted to rotate in said chamber, a steam-engine having a driving-pulley upon its crank-shaft, a boiler supplying steam thereto, a gear fitting loosely upon the crank-shaft of the engine and meshing with a gear fixed upon the mixer-shaft, and a clutch for engaging and disengaging the crank-shaft gear and crank-shaft, substantially as set forth.

In testimony whereof I have hereunto set my hand.

GEORGE L. PEABODY.

Witnesses:

J. SNOWDEN BELL,
E. J. SMAIL.