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PATENTED OCT. 2, 1906.

T. A. EDISON.
AUTOMATIC WEIGHING AND MIXING APPARATUS.

APPLICATION FILED JAN. 9, 1903.

3 SHEETS—SHEET 1.

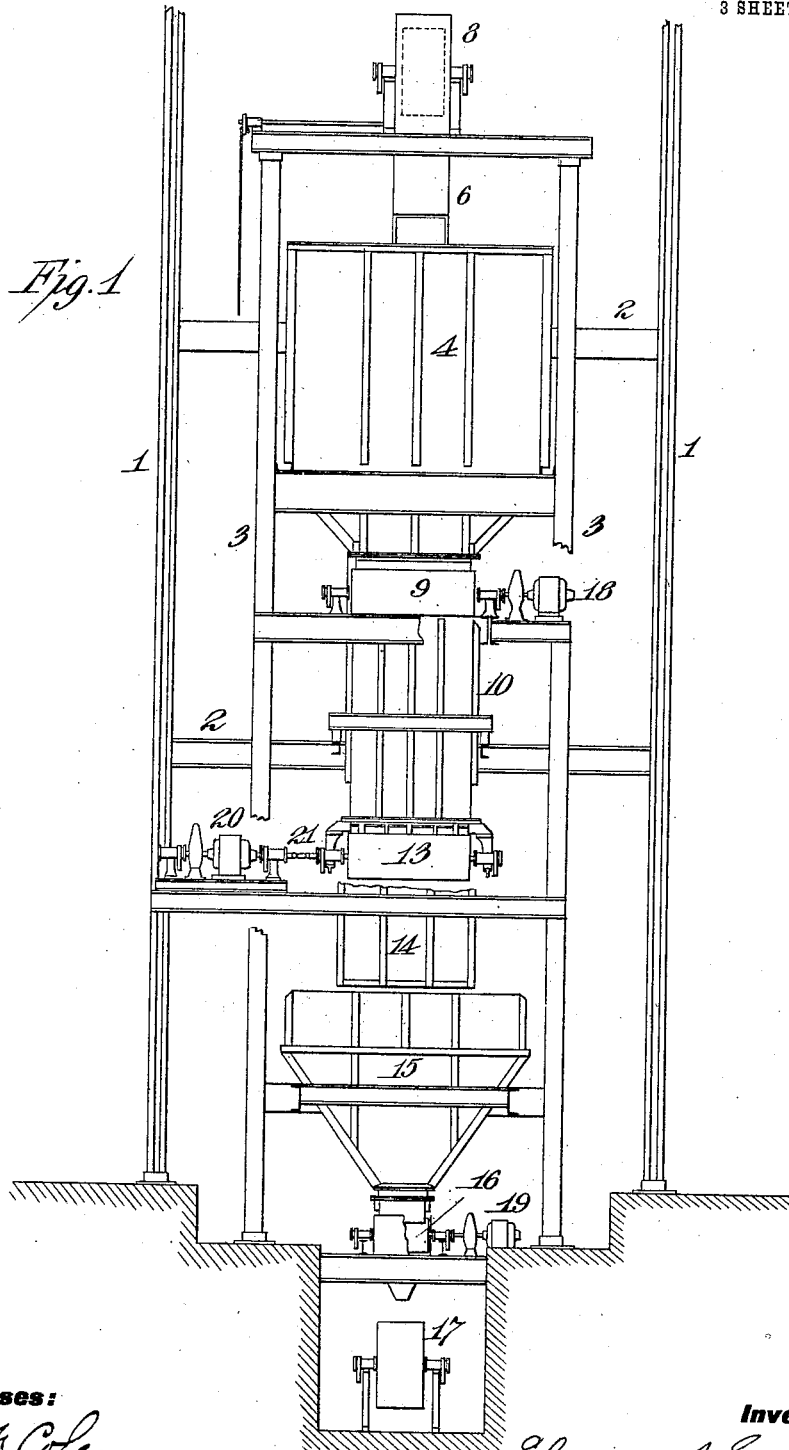


Fig. 1

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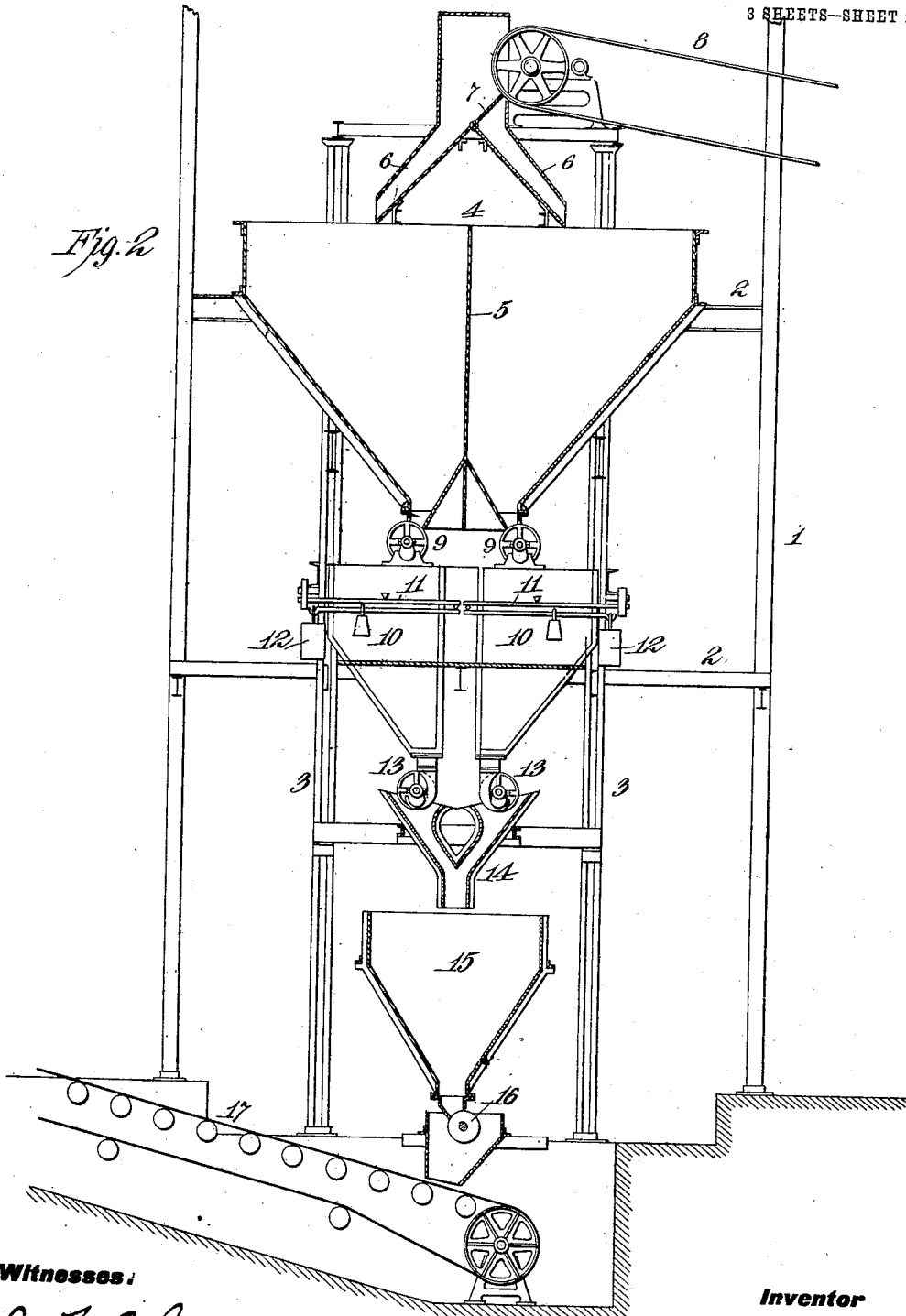
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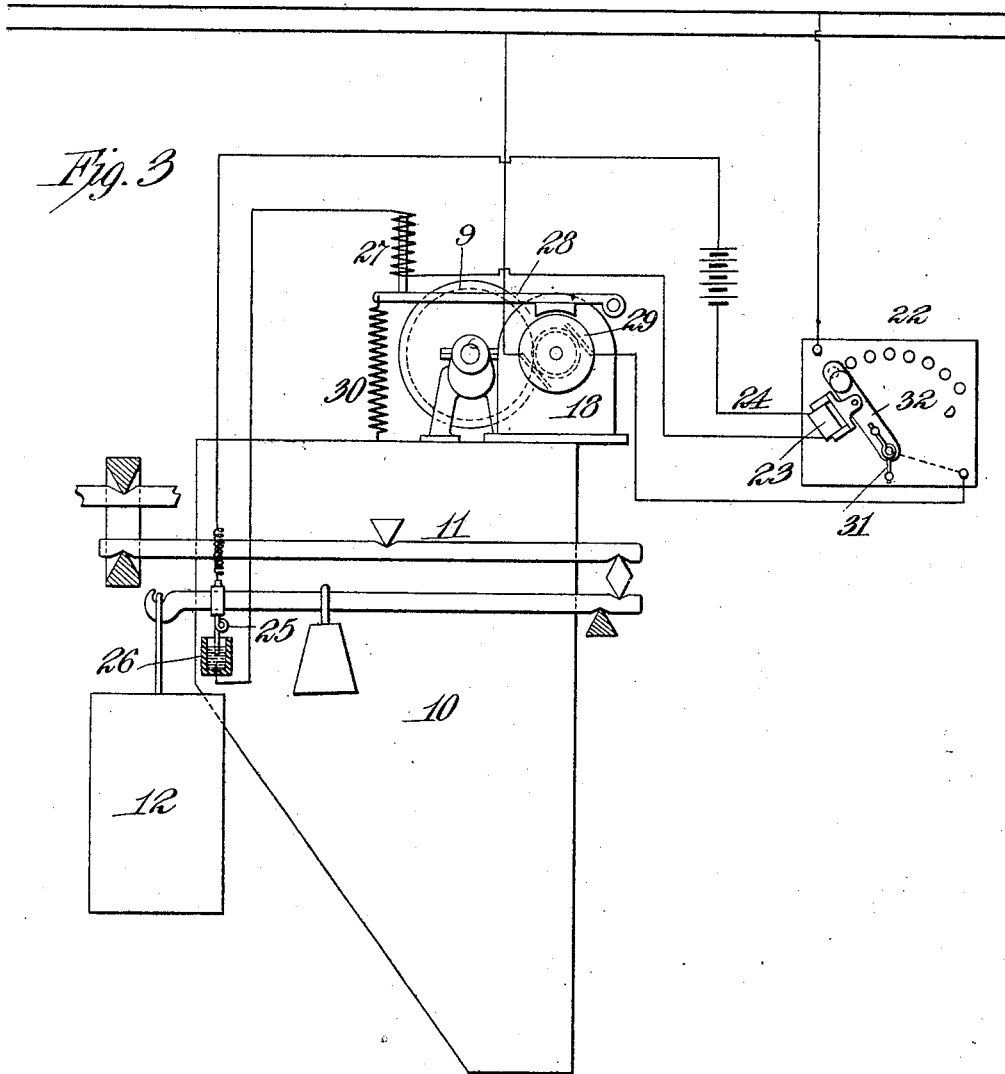
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UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF LLEWELLYN PARK, NEW JERSEY.

AUTOMATIC WEIGHING AND MIXING APPARATUS.

No. 832,046

Specification of Letters Patent.

Patented Oct. 2, 1906.

Application filed January 9, 1903. Serial No. 138,432.

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, a citizen of the United States, residing at Llewellyn Park, Orange, in the county of Essex and State of New Jersey, have invented a certain new and useful Improved Automatic Weighing and Mixing Apparatus, of which the following is a description.

My invention relates to an improved automatic weighing and mixing apparatus designed particularly for weighing cement-rock and limestone in the proper proportions for producing Portland cement and in then intimately mixing the two ingredients so as to produce when ground a "chalk" suitable for immediate burning.

My objects are to provide a simple and efficient device for the purpose.

In order that the invention may be better understood, attention is directed to the accompanying drawings, forming part of this specification, and in which—

Figure 1 is an end elevation of the improved apparatus; Fig. 2, a side view, partly in section; and Fig. 3, a diagrammatic view showing one of the weighing-bins and the electrical connections for controlling the roller-feed therefor.

In all of the above views corresponding parts are represented by the same numerals of reference.

1 1 represent suitable uprights forming the frame of a proper building and having cross-beams 2, carrying floors, from which the apparatus may be operated and its workings observed. Mounted within the building are vertical uprights 3, carrying the several parts of the apparatus. The apparatus consists, in the first place, of a large receiving-bin 4, having a central partition 5, dividing it into two parts, one for receiving the limestone and the other for receiving the cement-rock. Leading into these two sections or receptacles are chutes 6 6, provided at the top with a flap-valve 7 in order that material can be directed into either one of the compartments at will. A conveyer 8 leads from a suitable stock-house and supplies either cement-rock or limestone, as the case may be, in succession to the apparatus. At the bottom of each of the compartments of the receiving-bin 4 is a roller-feed 9 of common form, by which the material may be removed from the same. Located below the bin 4 and receiving material from the roller-feeds 9 are two separate weighing-bins 10 10, one for receiv-

ing cement-rock and the other for receiving limestone. These weighing-bins 10 are mounted on scale-beams 11 of any suitable form and are counterbalanced by weights 12. This weight is so adjusted as to be elevated when the desired quantity of limestone or cement-rock is received by the corresponding weighing-bin, and the weight is adjustable, as in ordinary scales, so that the proportion of limestone and cement-rock may be varied to suit the changing chemical analyses. Each of the weighing-bins 10 is provided with a discharge-roller 13 for removing material therefrom and directing it to a chute 14, leading to a stationary mixing-bin 15. At the bottom of the mixing-bin 15 is a discharge-roller 16 for delivering material to a conveyer 17, leading to a suitable small-rock stock-house or elsewhere. The roller-feeds 9 and discharge-rollers 16 are operated by motors 18 and 19, respectively, of any suitable type; but preferably electric motors are employed. The motors 19 are provided with rheostats or cut-out boxes, by means of which the speed of the motors may be varied or the motors stopped at will. The motor 20 for operating each of the discharge-rollers 13 is connected to its respective roller through a flexible shaft 21, so that the weighing-bins will be permitted to move independently of the motors, as will be understood, and each of these motors 20 is provided with a rheostat or controller, by means of which the motor may be stopped and started and its speed regulated.

Having reference to Fig. 3, it will be noted that each of the motors 18 is connected in series with a rheostat or starting-box 22, the contact-arm of which is normally kept in a locked position to close the circuit by the attraction of a magnet 23. This magnet is included in a battery-circuit 24 with a contact 25, carried on one of the scale-beams 11 and dipping in a mercury-cup 26. The circuit 24 also includes a solenoid, coil 27, normally retracting a brake-lever 28, cooperating with a band-wheel 29 on the armature-shaft of each motor 18. A spring 30 opposes the coil 27 to apply the brake when the circuit 24 is broken. A spring 31 is connected with the contact-arm 32 of the rheostat 22, so that when the magnet 23 is deenergized the contact-arm will be automatically moved to a cut-out position to stop the motor.

In operation cement-rock or limestone, as the case may be, is first fed by the conveyer 8

and deposited in the proper receptacle in the receiving-bin 4, and when that receptacle is filled the other receptacle is furnished with the other ingredient. The receiving-bin 4 is of large capacity, so that at all times proper separate supplies of both cement-rock and limestone will be contained therein. The chemical composition of the cement-rock and limestone in the receiving-bin being first ascertained, the weighing mechanism for the bins 10 is so adjusted that the latter shall receive the proper amounts of these ingredients to constitute the desired cement. Obviously the ingredients in question vary very slightly in chemical composition, so that only slight adjustments of the weighing mechanism are necessary. When feed of material from the sections of the receiving-bin is to be effected, the motors 18, controlling the roller-feeds 9, are started by moving the contact-arm 32 of each rheostat to the starting position, said contact-arm being locked in this position by the magnet 23, the circuit of which is closed at the contact 25 26. The roller-feeds 9 being operated, material from the receiving-bin is supplied to the two weighing-bins, one receiving cement-rock and the other limestone. When the desired quantity of material has been received in one of the weighing-bins, the latter will be depressed, breaking the circuit 24 and permitting the contact-arm of the starting-box 22 to be returned automatically by the spring 31 to break the circuit to the motor 18 of the roller-feed for the weighing-bin in question. As soon as the circuit 24 has been broken, the solenoid-coil 27 will be deenergized and the brake 28 will be applied, bringing the motor very quickly to rest. When a sufficient quantity of the other ingredient has been received in the other weighing-bin, these operations are repeated, the roller-feed 9 therefor being automatically stopped, as explained. It will of course be understood that both of the weighing-bins are being supplied with the two ingredients at the same time. The motors 20 for the discharge-rollers 13 are now operated, and the material from the weighing-bins is fed out of the same in wide thin streams, passing into the hopper 14 and thence into the mixing-bin 15. In this operation a very perfect mixing of the two ingredients takes place. From the mixing-bin the material is fed by the discharge-roller 16, by which a further mixing operation is secured, and deposited on the conveying-belt 17, by which the mixture is conveyed to a suitable small-rock stock-house, from which it may be removed when desired

for separating, grinding, burning, and the subsequent operations necessary in the manufacture of cement.

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

1. In an automatic weighing apparatus, the combination with a bin and scale-beams for supporting the same, of a feed device for supplying material to the bin, an electric motor for operating the feed device, a rheostat for controlling the motor, means for holding the rheostat-arm in working position, means for operating the rheostat to cut out the motor, a brake for the motor-armature, means for holding the brake free and means separate from the said rheostat-operating means for applying the said brake, substantially as set forth.

2. In an automatic weighing apparatus, the combination with a bin and scale-beams for supporting the same, of a feed device for supplying material to the bin, an electric motor for operating the feed device, a rheostat for controlling the motor and normally movable into a position for cutting out the motor, a brake for the motor-armature normally movable into a braking position, separate means for holding said rheostat and brake in position to permit the motor to operate the feed device, and means whereby the descent of the weighing-beam releases the said holding means and thereby cuts out the motor and applies the brake, substantially as set forth.

3. In an automatic weighing apparatus, the combination with a bin and scale-beams for supporting the same, of a feed device for supplying material to the bin, an electric motor for operating the feed device, a rheostat for controlling the motor, means for operating the rheostat to cut out the motor, a brake for the motor-armature, means for applying the said brake, said means being separate from the said rheostat-operating means, an electromagnet for holding the rheostat-arm in a position to operate the motor, a second electromagnet for holding the brake clear of the armature, and connections whereby the descent of said weighing-bin opens the circuit of said electromagnets and thereby cuts out the motor and applies the brake, substantially as set forth.

This specification signed and witnessed this 18th day of December, 1902.

THOMAS A. EDISON.

Witnesses:

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