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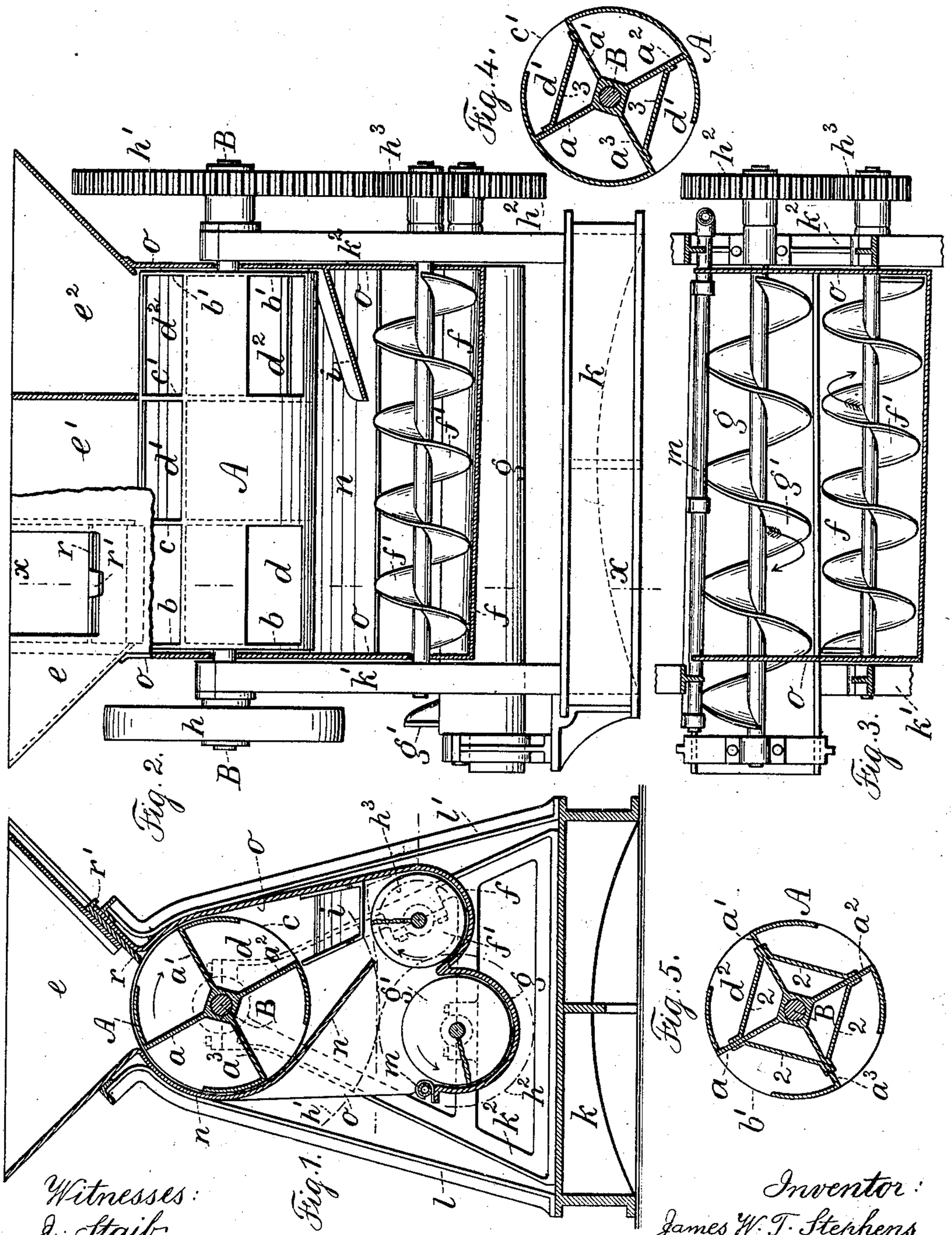
J. W. T. STEPHENS.

GAGING AND MIXING MACHINE FOR CONCRETE.

(Application filed Sept. 22, 1898.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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GAGING AND MIXING MACHINE FOR CONCRETE.

SPECIFICATION forming part of Letters Patent No. 630,420, dated August 8, 1899.

Application filed September 22, 1898. Serial No. 691,587. (No model.)

To all whom it may concern:

Be it known that I, JAMES W. T. STEPHENS, a subject of the Queen of Great Britain, residing at the city of New York, in the county and State of New York, have invented a new and useful Improvement in Gaging and Mixing Machines for Concrete, &c., of which the following is a specification.

My invention relates to a machine for rapidly, efficiently, and economically mixing such materials as are employed in making concrete, mortar, and the like in proper proportions for use in construction work.

In carrying out my invention I employ a cylinder or drum having radial longitudinal partitions dividing the same into pockets and also having end heads and transverse partitions dividing the pockets into series. Hoppers for the materials to be mixed are placed above the cylinder or drum, and openings are made in the cylinder which give access to the pockets, so that the material from the hoppers is delivered by gravity into the pockets. The pockets are graded according to the requisite quantities of the materials, and the materials are delivered with the rotation of the cylinder or drum into a trough, in which they are mixed dry and are fed endwise by a revolving screw conveyer. From one end of this trough the materials are delivered into another and lower trough, where they are moistened by a water-spray and are again thoroughly mixed and the water incorporated therewith, and the materials are fed endwise in the opposite direction by another revolving screw conveyer, and the materials so mixed and moistened and in a condition ready for immediate use are delivered from the end of the trough.

In the drawings, Figure 1 is a vertical cross-section at the line $x\,x$. Fig. 2 is an elevation with the case at one side partially removed. Fig. 3 is a sectional plan above the troughs and screw conveyers. Fig. 4 is a section through the central series of pockets, and Fig. 5 is a section through the right-hand-end series of pockets.

The cylinder or drum A is mounted upon a shaft B in bearings in the end frames k' k^2. One end of the shaft B has a belt-wheel h, by which power is communicated, and on the other end of said shaft B is the gear-wheel h'. The end frames k' k^2 are supported upon a foundation k. The cylinder or drum A is provided with a hub around the shaft B, and from which hub longitudinal partitions a a' a^2 a^3 extend equally and radially. The drum is provided with end heads b b' and with transverse partitions c c', which divide the pockets of the cylinder or drum up into series d d' d^2. Above the cylinder or drum are placed hoppers e e' e^2, which are preferably supported from the foundation k by angle-iron or similar supports l l'. These hoppers are provided with ends and with transverse partitions above and in line with the partitions of the cylinder or drum, so that there are as many hoppers as there are series of pockets. The cylinder or drum is provided with openings at the pockets to receive the materials from the hoppers, and from which pockets the materials are delivered as the cylinder or drum is rotated.

In mixing concrete the crushed stone would be placed in the hopper e, the cement in the hopper e', and the sand in the hopper e^2.

In Fig. 1 the series of pockets d receives the crushed stone. In Fig. 4 the series of pockets d' receives the cement, and in Fig. 5 the series of pockets d^2 receives the sand.

It will be noticed from the section Fig. 5 that the pockets d^2 are provided with bottom plates 2, so as to make them shallower than the series of pockets d for the crushed stone, and it will be noticed from Fig. 4 that the pockets are reduced in number, there being only two instead of four, and these pockets are provided with bottoms 3 to reduce the size of the same for the cement, so that in the various series the proportion of the respective materials going to make up the concrete may be properly regulated.

I employ a sand-chute i, supported by and connected to the case o and inclined from the right-hand end of the machine toward the center, the object of this chute being to receive the sand from the series of pockets d^2 as the cylinder or drum revolves and deliver the same upon the stone under or at the same time with the delivery of the cement.

The materials from the respective series of pockets are delivered into the trough f, in which is the screw conveyer f', revolving in the direction of the arrow. I provide another

trough g, placed parallel with and slightly below the level of the trough f, and in this trough g is a screw conveyer g'. The trough f and its screw conveyer f' are within the limits of the case of the machine, while the trough g and the screw conveyer g' extend from the right-hand end of the case outside of and beyond the left-hand end, and the outer end of the trough is open for the delivery of the material. The trough g and screw conveyer g' are preferably made slightly tapering from the right to the left hand, and the bottom of the trough is slightly inclined. This facilitates the quick and easy delivery of the mixed materials. The materials as delivered in the trough f from the series of pockets of the drum are in a dry condition and are mixed by the revolution of the screw conveyer f' and are fed toward the right-hand end of the trough, at which end the materials spill over into the trough g.

Running along the edge of the trough g opposite to the trough f I prefer to place the perforated pipe m, from which water is delivered as a spray into the trough g and is incorporated with the materials to form the concrete as the same are mixed and fed lengthwise of the trough. The quantity of water is regulated according to the materials, so that the material as delivered is in a condition for immediate use. The shafts of the screw conveyers f' and g' are mounted in suitable bearings, and their right-hand ends have gears h^2 and h^3, which mesh with each other, the gear h' meshing with the gear h^2. I prefer also to make the delivery end of the trough f slightly wider than the other end, so that the bottom of said trough inclines slightly in a direction opposite to the inclination of the trough g, and the size of the gears is such that the movement of the screw conveyer f' is accelerated, or, in other words, the same revolves faster than the screw conveyer g'. This is advantageous for the quick delivery of the materials as they fall from the series of pockets of the drum. The case o connects the base of the hoppers to the outer edge of the trough f, and the case n on the other side of the machine is connected to the base of the hoppers and is curved to conform and be concentric to the cylinder or drum, and the lower edge of the case n is inclined so as to deliver the stone and cement into the trough f.

In cross-section the openings in the cylinder or drum are about one-half the width of the pockets, so that the capacity of the pockets will be limited and controlled by the size of the openings, the advancing edge of the drum at the openings acting as a cut-off, the casing of the drum preventing back spill as the pockets come into an upright position, and the forward radial partition, as a', on the other side of the openings in the casing and which comes to the outer edge of the casing insures the speedy delivery of the contents of the pockets, and I provide a slide-plate r in the hopper e at the series of pockets d with a stop r' on the outside for supporting the slide-plate upon the casing o. In filling the series of pockets d the plate r will lift should any stones become jammed between its lower edge and the cut-off edge of the cylinder as the same revolves.

I claim as my invention—

1. In a mixing-machine, the combination with a series of hoppers, of a drum or cylinder having longitudinal radial partitions and end heads and transverse partitions dividing the drum into series of pockets with an opening in the drum at each of the pockets to receive the materials from the respective hoppers, a trough for receiving the materials delivered from the series of pockets, a screw conveyer in said trough for mixing and feeding the materials lengthwise to one end of the trough, another trough parallel with the aforesaid trough for receiving the materials delivered to it, a pipe running lengthwise of said second trough for delivering a water-spray into the trough upon the materials, a screw conveyer in said second trough for mixing the materials and incorporating the water therewith and delivering the materials at one end of the second trough ready for use, substantially as set forth.

2. In a mixing-machine, a cylinder or drum having longitudinal radial partitions, end heads and transverse partitions dividing the cylinder into a series of pockets with openings in the drum at the pockets, means for supporting and rotating the drum, hoppers supported above the drum and conforming thereto, a case at each side of the drum, the case at one side being made with an inclined lower portion beneath the drum acting as a deflector, a tapering inclined trough below the edge of the deflector and at one side into which the materials from the pockets are delivered, a screw conveyer in said trough, a chute inclined from one side of the case for delivering materials from one of the end pockets into the trough in proximity to the material coming from the central pockets, a tapering trough below and parallel with the aforesaid trough and inclined in the opposite direction for receiving the material from said trough, a pipe running lengthwise of said second trough for water from which a spray is delivered into the trough upon the mixed materials, a screw conveyer in said second trough for mixing and feeding along the materials and incorporating the water therewith and delivering them from one end of the second trough, substantially as and for the purposes set forth.

3. In a mixing-machine, the combination with hoppers, of a rotatable drum or cylinder having partitions dividing the same longitudinally and transversely into pockets and having openings in the drum that lengthwise of the drum agree with the length of the

pockets and that transversely of the drum are about half the width of the pockets from the advancing edge, whereby the capacity of the pockets is limited and controlled and back spill prevented, and a slide-plate *r* in the hopper at one series of pockets adapted to be raised by an obstruction in the material in the hopper between the plate and drum and a stop *r'* on the outside for supporting the slide-plate, substantially as set forth.

Signed by me this 15th day of September, 1898.

J. W. T. STEPHENS.

Witnesses:
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