No. 824,204. PATENTED JUNE 26, 1906.

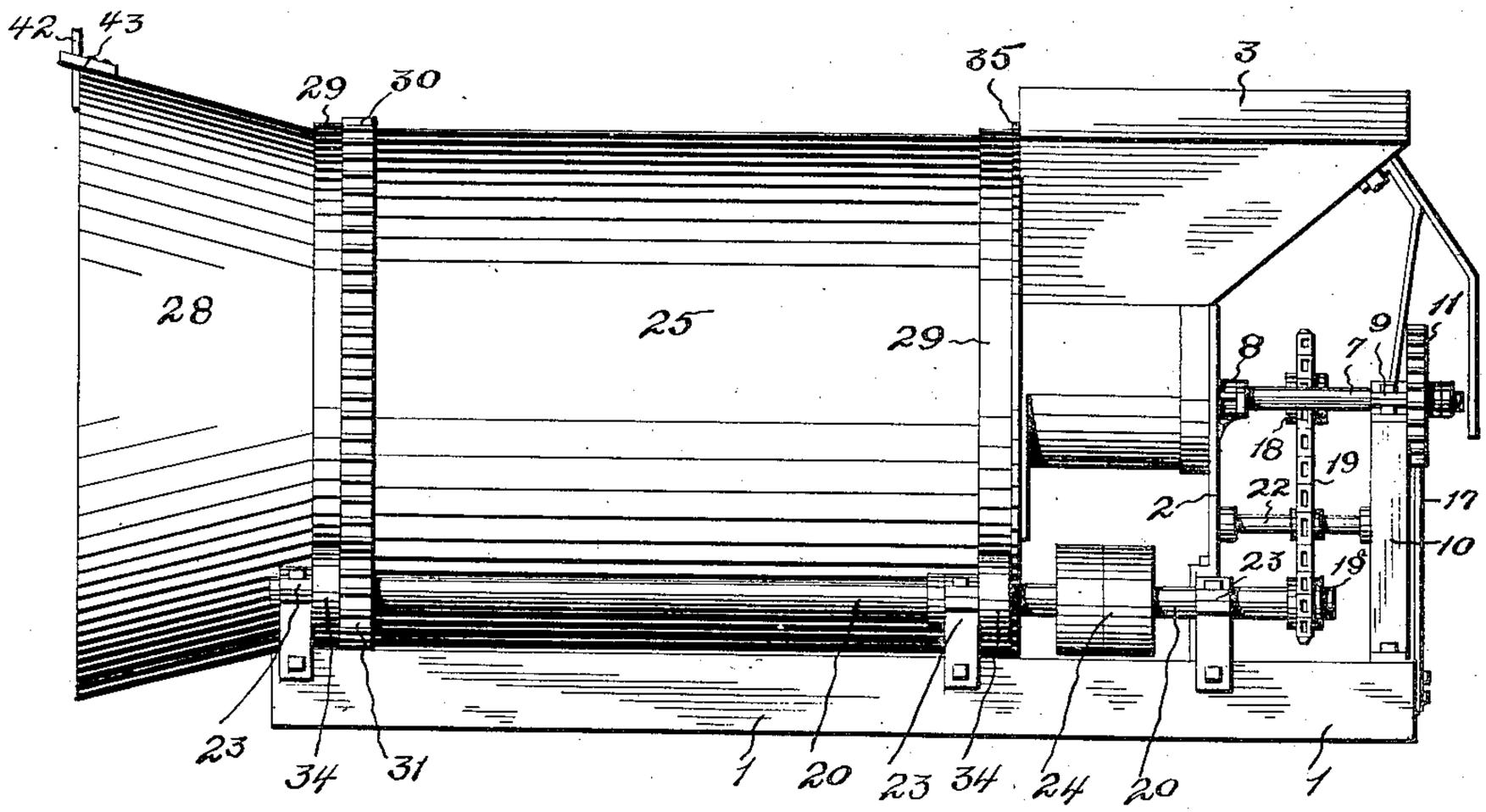
W. H. PHILLIPS.

CONCRETE MIXING MACHINE.

APPLICATION FILED MAR. 20, 1905.

2 SHEETS—SHEET 1.

Fig. 1.



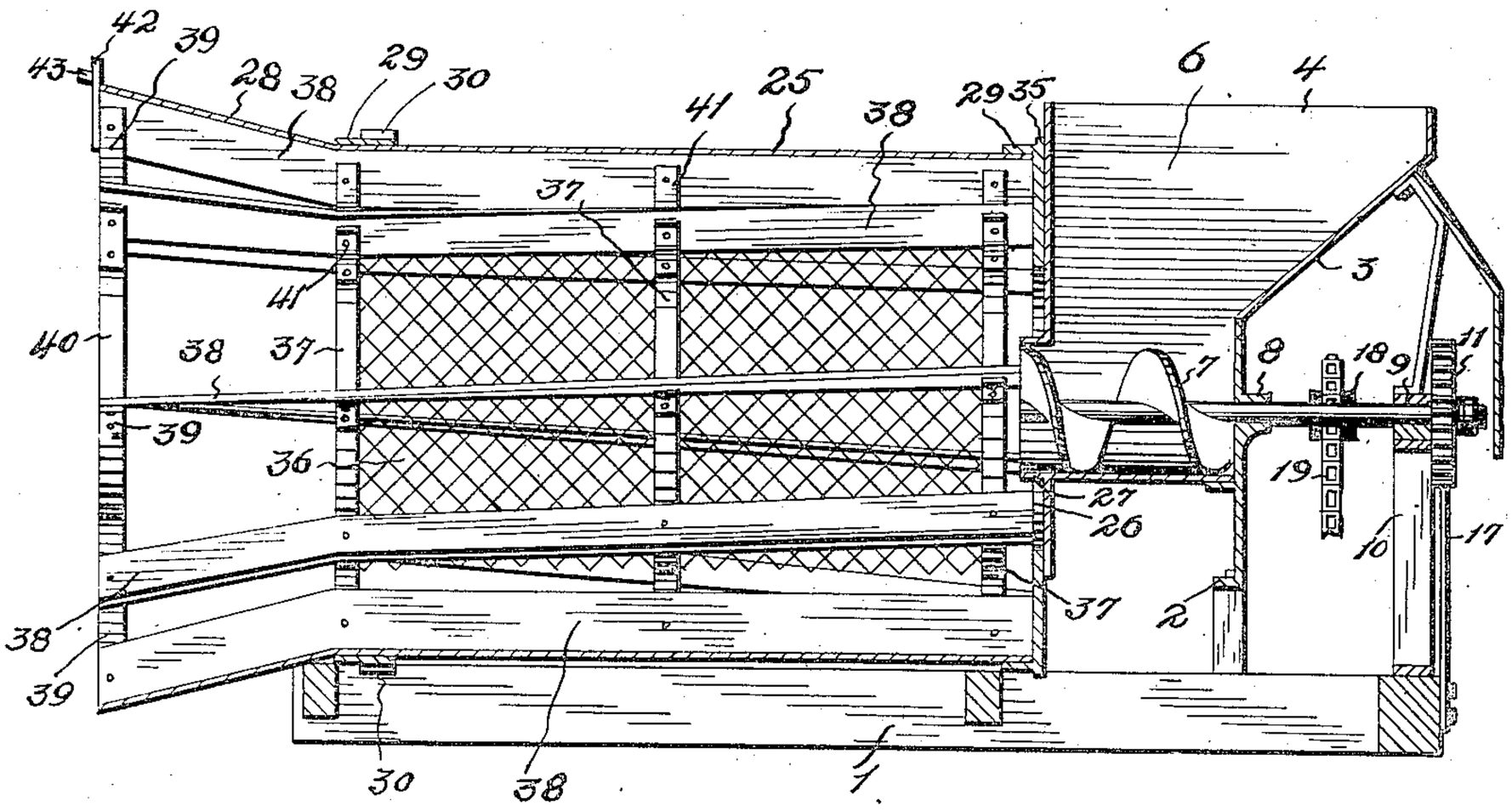


Fig. 2.

WITNESSES:

Carl Stoughton

W. B. Eckley.

INVENTOR

William H. Phillips

BY

Shepherd & Parker

ATTORNEYS

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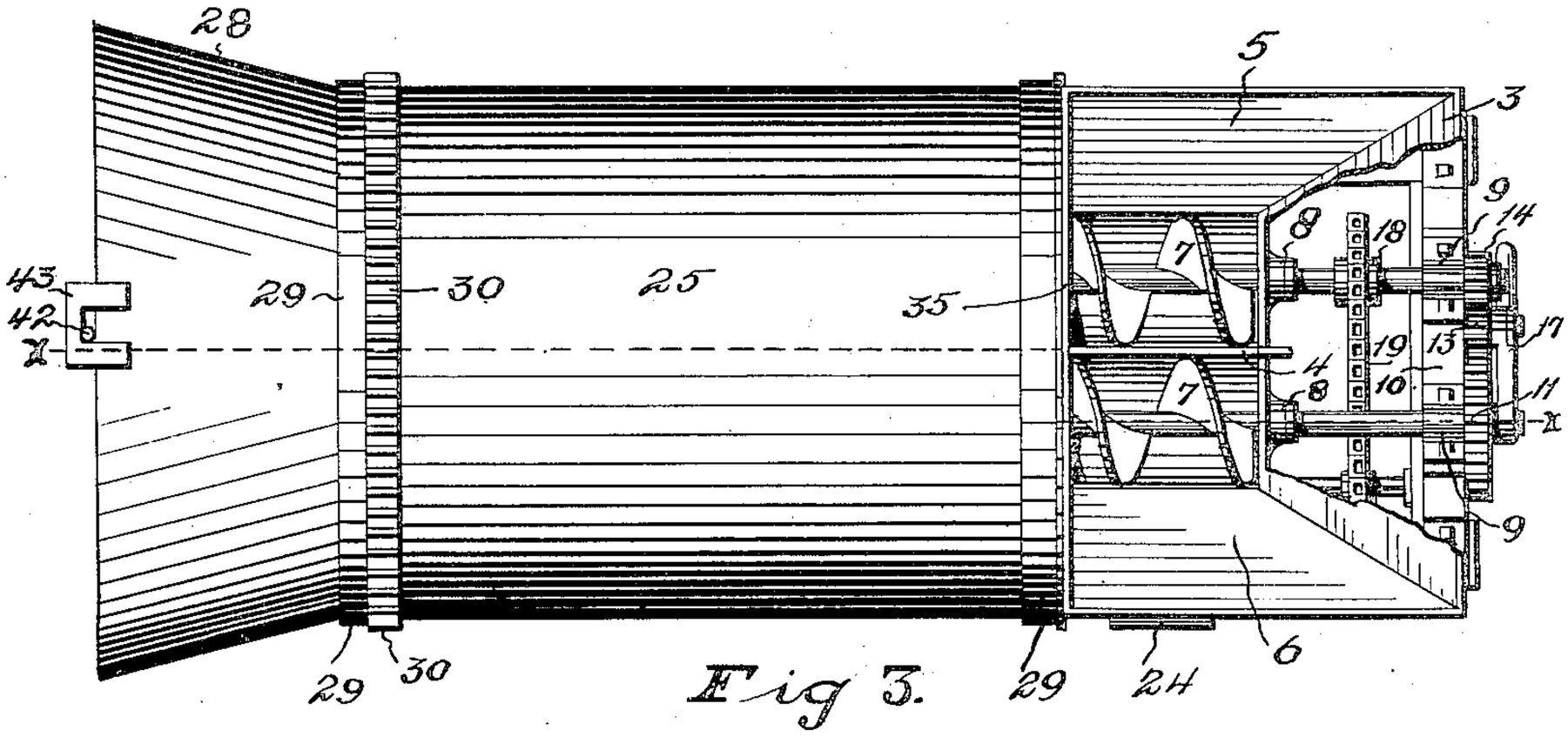

Fig 3.

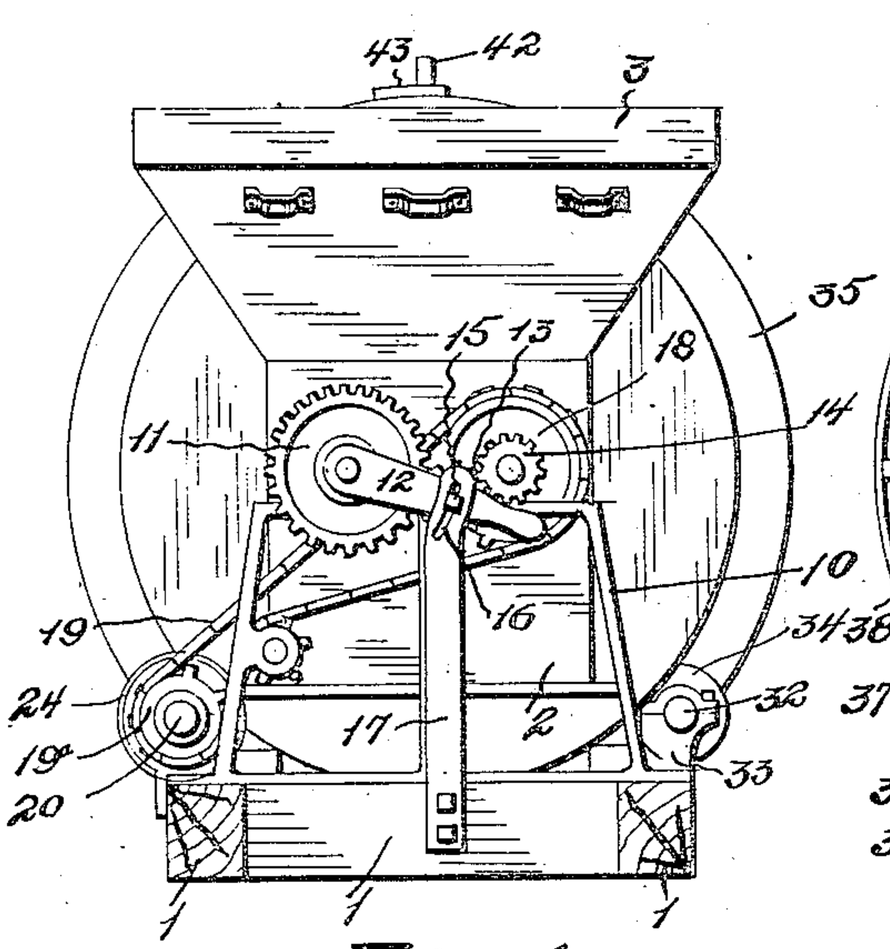

Fig. 4.

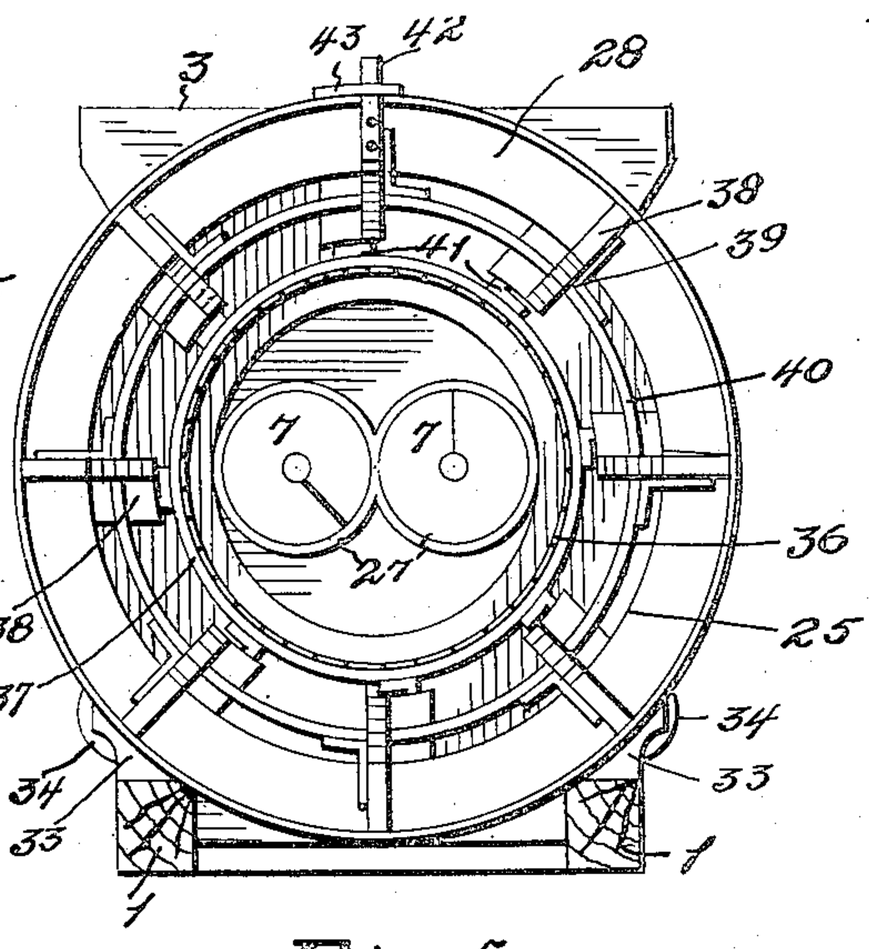

Fig. 5.

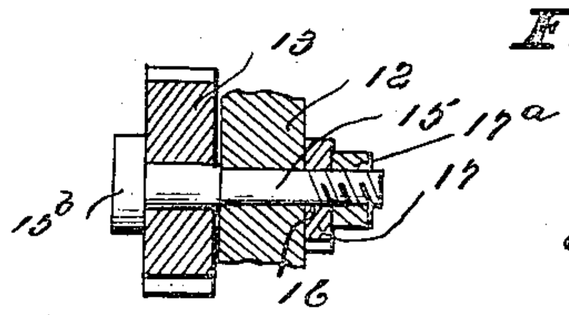

Fig. 6.

WITNESSES:
Carl Stoughton
W. B. Schley

INVENTOR
William H. Phillips

BY
Shepherd & Power
ATTORNEYS

UNITED STATES PATENT OFFICE.

WILLIAM H. PHILLIPS, OF COLUMBUS, OHIO.

CONCRETE-MIXING MACHINE.

No. 824,204. Specification of Letters Patent. Patented June 26, 1906.

Application filed March 20, 1905. Serial No. 250,937.

To all whom it may concern:

Be it known that I, WILLIAM H. PHILLIPS, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Concrete-Mixing Machines, of which the following is a specification.

My invention relates to a new and useful improvement in mixers, and more particularly to that class known as "proportional" concrete-mixers.

The object of the invention is to provide simple and effective means for feeding the materials to be mixed proportionally into a mixing-drum.

Another feature lies in a mixing body or cage fitting snugly but removably in the revolving drum and normally turning with the drum, but so arranged that it may be turned in the drum to clean the inner periphery thereof.

Finally, the object of the invention is to provide a mixer of the character described that will be strong, durable, and efficient, and one in which the several parts will not be liable to get out of working order.

With the above and other objects in view the invention consists of the novel details of construction and operation, a preferable embodiment of which is described in the specification and illustrated in the accompanying drawings, wherein—

Figure 1 is a side elevation. Fig. 2 is a longitudinal vertical sectional view taken on line x x of Fig. 3, but showing the mixing-cage and one of the conveyers in elevation. Fig. 3 is a plan view of a portion of the hopper, being broken away to show the driving mechanism lying therebeneath. Fig. 4 is a rear end elevation. Fig. 5 is an elevation of the delivery end; and Fig. 6 is a horizontal cross-sectional view taken through the strip 17, pinion 13, and a portion of the arm 12, and showing the lock-bolt in plan.

In the drawings, the numeral 1 designates the sills or beams upon which the machine is mounted. Supported from the sills by a suitable chair or bracket 2 is a vertically-extending hopper 3, formed with a flaring mouth and having a central longitudinal partition 4, which divides it into two compartments—preferably a cement-compartment 5 and a sand and gravel compartment 6. Arranged in the bottom of each compartment is a spiral conveyer 7. The stems or shafts of the conveyers extend through bearing-bosses 8, formed in the rear wall of the hopper, and are additionally supported at their outer ends in bearing-boxes 9, supported on a standard 10. In this way a double bearing is provided and the necessity of bearing boxes or supports for the conveyers at their inner ends is obviated, thereby providing a free and unobstructed passage of the materials into the drum and also supporting the conveyer out of contact with the hopper-bottom, which prevents wearing of the parts.

The shaft of the cement-conveyer has fixed upon its outer end a gear 11, and beyond the gear but adjacent thereto a lever-arm 12 is also mounted upon the said shaft. This arm pivotally supports a pinion 13, which is adapted to mesh with a second pinion 14, fixed upon the outer end of the sand-conveyer shaft. The lever 12 carries a lock-bolt 15, which projects through a curved slot 16 of a vertical strip 17, secured at its lower end to one of the cross-sills.

The lock-bolt 15, as shown in Fig. 6, is provided with a shoulder portion 15^a, which abuts the inner side of the arm 12, thus permitting the arm and the vertical strip 17 to be securely locked together when the nut 17^a is tightened on the bolt 15, while the pinion 13, which is confined on the shoulder by the bolt-head 15^b, is free to rotate.

When it is desired to change the relative rates of speeds at which the conveyers are driven, the pinion 14 may be removed and either a larger or smaller pinion 14 substituted, it being necessary to loosen the bolt 15 to allow the arm 12 to be swung upward or downward to bring the pinion 13 into mesh with the new pinion 14, it being understood that the said pinion 13 is at all times in mesh with the gear 11.

Motion is imparted by a sprocket-wheel 18, mounted on the shaft of the sand-conveyer 5. This sprocket is driven by a chain 19, which passes about a sprocket 19^a, keyed on a drive-shaft 20. A sprocket-tightener 21 is mounted on a shaft 22, supported by and between the chair 2 and the standard 10. The drive-shaft 20 extends longitudinally of the sills, and is supported in suitably-mounted bearing-boxes 23, fastened upon the sill. A pair of band-wheels 24 are disposed upon the drive-shaft beneath the hopper.

A mixing-drum 25 is provided in its rear end with a concentric annular opening 26, into which project spouts 27, formed on the

inner wall of the hopper and disposed about the conveyers so as to deliver the materials into the drum. A flaring delivery-spout 28 is formed on the end of the drum, and at the intersection of the drum and the spout I provide a circular track or band 29 and also a similar track 29 at the rear end of the drum adjacent the hopper. The forward track or band is provided with an annular gear-ring 30, which meshes with a pinion 31, keyed upon the drive-shaft 20. On its opposite side the mixer is provided with a longitudinal shaft 32, suitably supported in bearing-boxes 33, mounted on the sill 1 opposite to the sill supporting the drive-shaft. The said shaft 32 is thus arranged in parallel relation to the drive-shaft and carries wheels 34, which engage with the tracks 29 and stand opposite like wheels 34, mounted on the drive-shaft and also engaging with the tracks. It is thus apparent that the drum is rotatably supported, and to guard against longitudinal movement of the same an annular flange 35 is formed on the rear track 29, so as to impinge the rear sides of the rear wheels 34. Motion being imparted to the drive-shaft 20 will be transmitted to the gear-ring 30 by the pinion 31, and the drum thus revolved.

Within the drum proper I arrange a cylindrical wire cage 36, braced at its ends and center portion by cylindrical bands 37, and having a diameter considerably less than that of the drum. The forward end of the cage terminates on the line of intersection between the spout 28 and the drum and its rear end terminates short of the rear end of the drum. The bands support vanes or blades 38, having their outer free edges bearing against the inner periphery of the drum 25. The blades are inclined rearwardly and are arranged with respect to their length at an angle to the imaginary longitudinal axis of the cage. At their outer ends the blades are bent outwardly or flared, so as to have their outer or free edges in contact with the inner periphery of the spout 28. At the mouth of the spout the outwardly-bent ends are fixedly secured to the ends of angular brackets 39, which are fastened upon an annular ring or band 40. That portion of the blades extending within the drum are secured upon the bands 37 by suitable angle-irons 41. To cause the blades and cage or mixing-body to turn with the drum, a pin 42 is secured upon the outer end of one of the blades and projects beyond the edge of the spout within a loop 43, mounted upon the spout, the said loop being so positioned as to engage with the pin when the drum is revolved. In this manner the mixing-body, while held in the drum by the pin 42 and loop 43 is otherwise independent thereof, as the blades, while fitting snugly within the drum, are not in any way connected to the same, and by removing the pin 42 the mixing-body may be readily withdrawn from the drum or manually revolved therein.

In utilizing my invention motion having been imparted to the drive-shaft 20 by means of the band-wheels 24 and the drum and conveyers caused to revolve in the manner described, cement is delivered into the cement-compartment 6 and the material with which it is to be mixed—such as sand, gravel, &c.—is delivered into the compartment 5. The conveyer in the compartment 5, revolving at a higher rate of speed, owing to its direct drive by the chain 19 and sprocket 18, than the conveyer in the compartment 6 will thus deliver a greater amount of sand, gravel, &c., through the spout 27 into the drum than the amount of cement conveyed or delivered through the other spout 27 by the said cement-conveyer. The materials delivered through the spouts pass into the mixing-drum 17, which is revolved at a comparatively ow rate of speed. The materials thus delivered enter the cage 36, and owing to its open mesh readily pass through the same to the bottom of the drum and are taken up by the blades and carried up with the drum. However, the materials that are carried upward by the drum or blades again fall through the cage as they are carried toward the top of the drum. The materials falling from the upper part of the drum drop upon the fresh materials which are being delivered through the spouts, and thus again fall through the cage to the bottom of the drum, and are in this way thoroughly mixed. Owing to the angular disposition of the blades the materials as they are mixed are gradually worked forward in the drum until they reach the spout. At this point water is suitably introduced to dampen the mixture, and the cement is finally delivered from the spout ready for use. It will be observed that the mixing operation is continuously carried on as long as the materials remain within the spout or drum, as the blades extend entirely to the outer edge of the spout. When it is desired to clean the inner periphery of the drum and spout, it is merely necessary to remove the pin 42 and grasp the band 40 or one or more of the brackets 39 and turn the blades or mixing-body in the opposite direction to that in which the drum is revolving. This operation will thoroughly scrape the said peripheries and remove any adhering materials. The spout and drum may also be cleaned by shutting off the power and stopping the drum and grasping the mixing-body in the manner described, then turning the same back and forth, which will effectually accomplish the desired result. The mixing-body may be readily withdrawn after the pin 42 has been disengaged from the hook 43 and removed from the drum for the purposes of cleaning and inspection. After the mixing-body has been removed it may be easily

cleaned by either shaking or jarring it against some fixed surface.

Having now fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a machine for mixing building materials, the combination with feeding means, of a mixing-drum formed with a delivery-spout and arranged in communication with the feeding means, means for imparting motion to the drum, and a removable mixing-body fitting snugly within the drum and normally revolving therewith, but arranged to be moved independently thereof to scrape the inner periphery of the drum.

2. In a machine for mixing building materials, the combination with feeding means, of a revolving mixing-drum arranged in juxtaposition to the feeding means and having communication therewith, and a removable mixing-body fitting snugly within the drum having inclined mixing-blades contacting with the inner periphery of the said drum.

3. In a mixing-machine, the combination with feeding means, of a revolving mixing-drum arranged adjacent to the feeding means having a flaring spout and an independent removable mixing-body having a flared end so as to fit snugly within the spout and the drum.

4. In a machine for mixing building materials, the combination with feeding means and a revolving drum associated with the feeding means and having communication therewith, of a mixing-body arranged in the drum and comprising a cage of smaller diameter than the drum and provided with mixing devices extending between its outer surface and the inner periphery of the drum, the said mixing-body adapted to normally turn with the drum, but being independent thereof and removably disposed therein.

5. In a machine for mixing building materials, the combination with feeding means, of a mixing-drum formed with a delivery-spout and arranged in communication with the feeding means, means for imparting motion to the drum and a removable mixing-body, consisting of a loose cage in the drum and inclined mixing-blades in the drum extending into the spout fitting the inner peripheries of both drum and spout snugly, but arranged to move independently thereof to scrape their inner peripheries.

6. In a machine for mixing building materials, the combination with feeding means, of a revoluble mixing-drum arranged in juxtaposition to the feeding means and having communication therewith, and a removable mixing-body consisting of a loose cage in the drum and inclined mixing-blades in the drum extending into the spout contacting with their inner peripheries.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM H. PHILLIPS.

Witnesses:
A. T. PHELPS,
M. B. SCHLEY.