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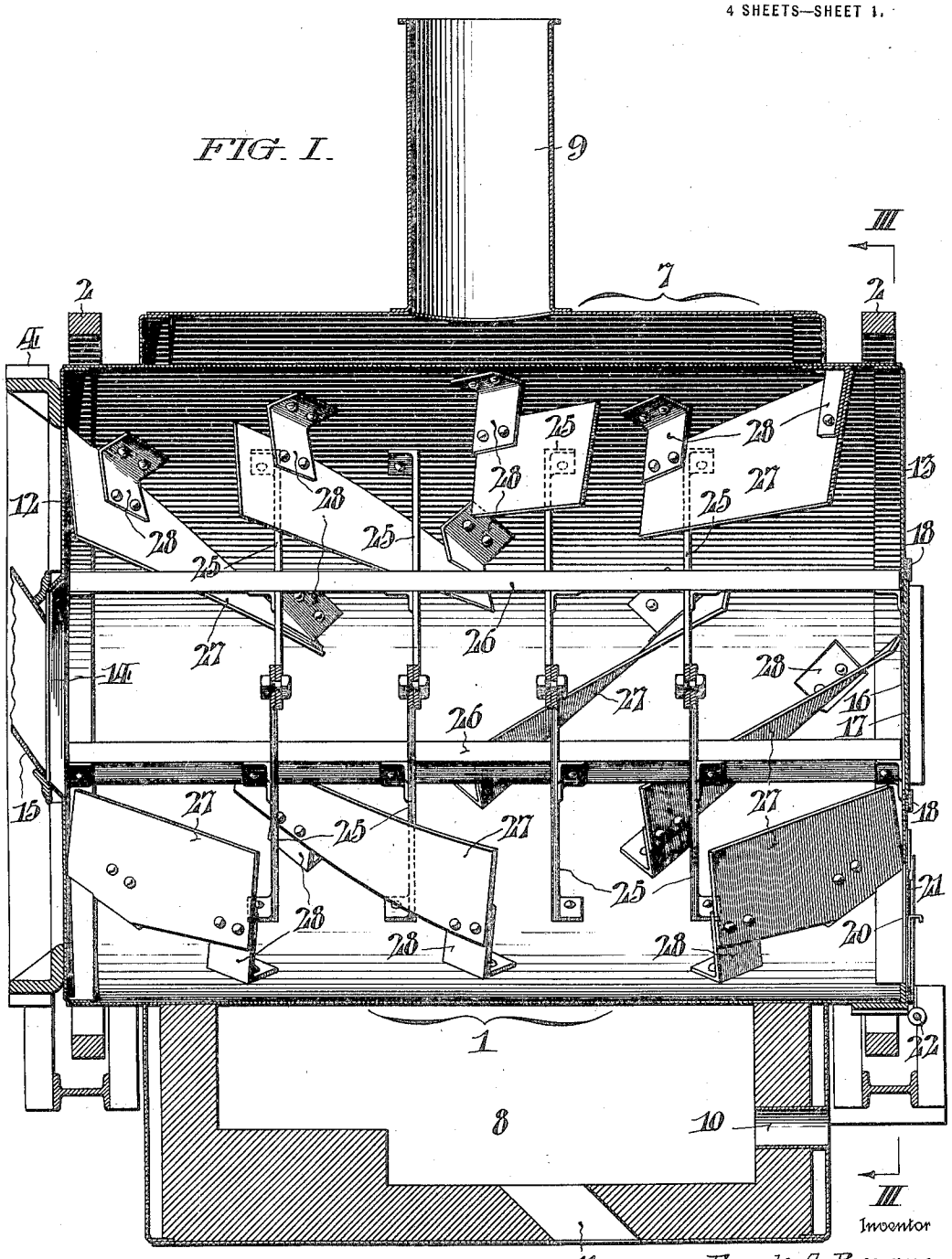
MIXING APPARATUS.

APPLICATION FILED APR. 12, 1917.

1,363,561. Patented Dec. 28, 1920.

4 SHEETS—SHEET 1.

FIG. I.



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MIXING APPARATUS.

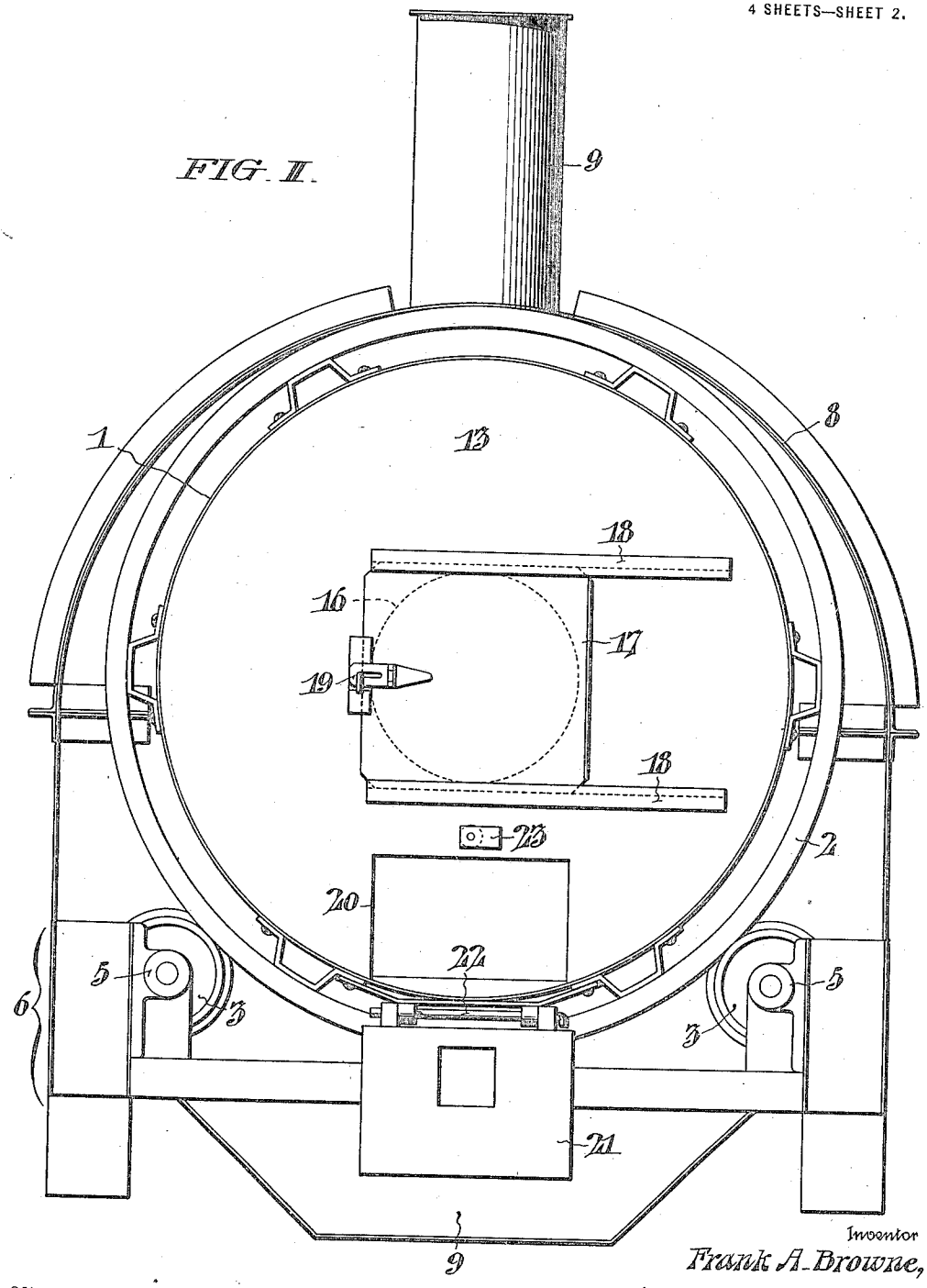
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4 SHEETS—SHEET 2.

FIG. II.



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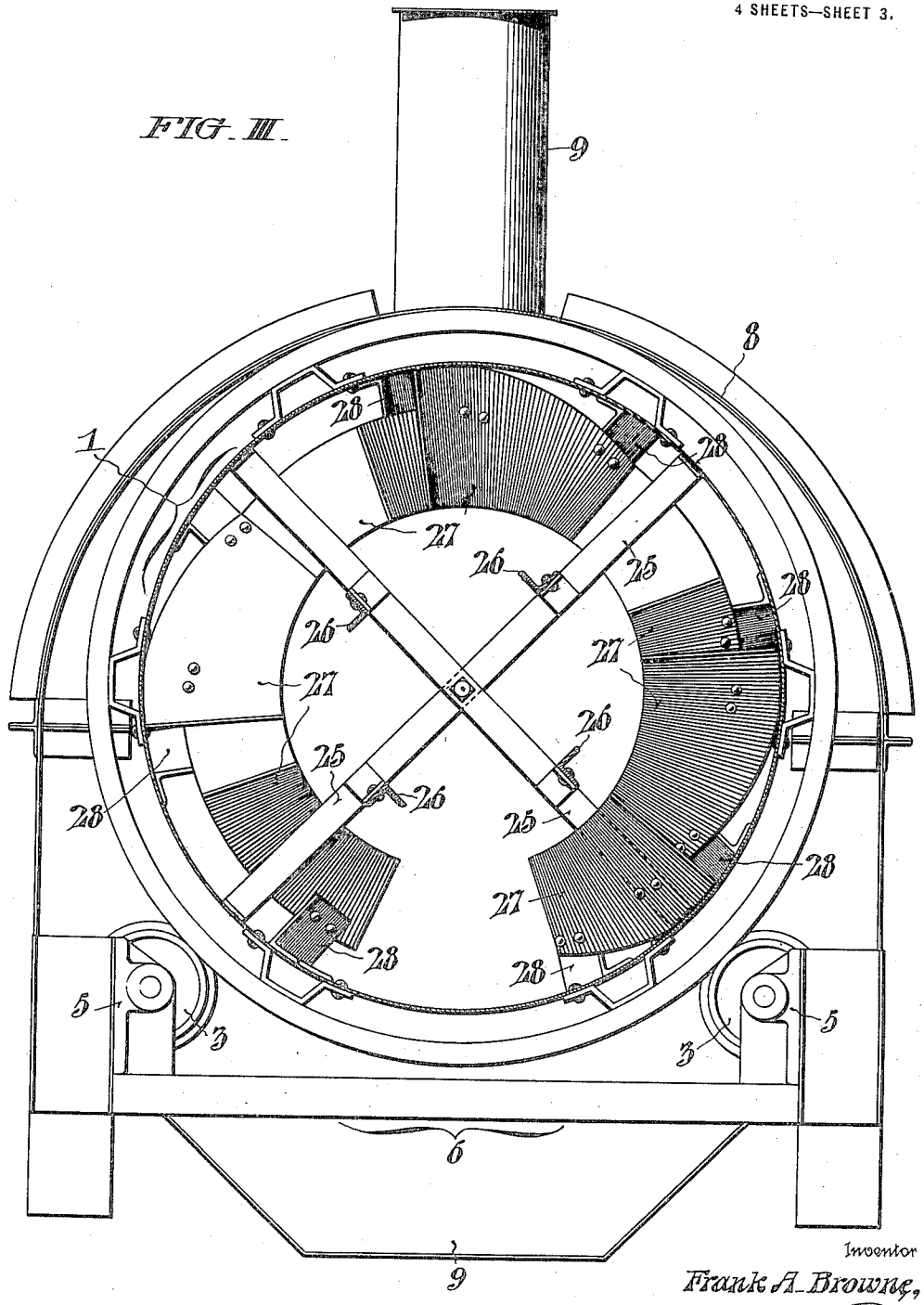
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4 SHEETS—SHEET 3.

FIG. III.



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4 SHEETS—SHEET 4.

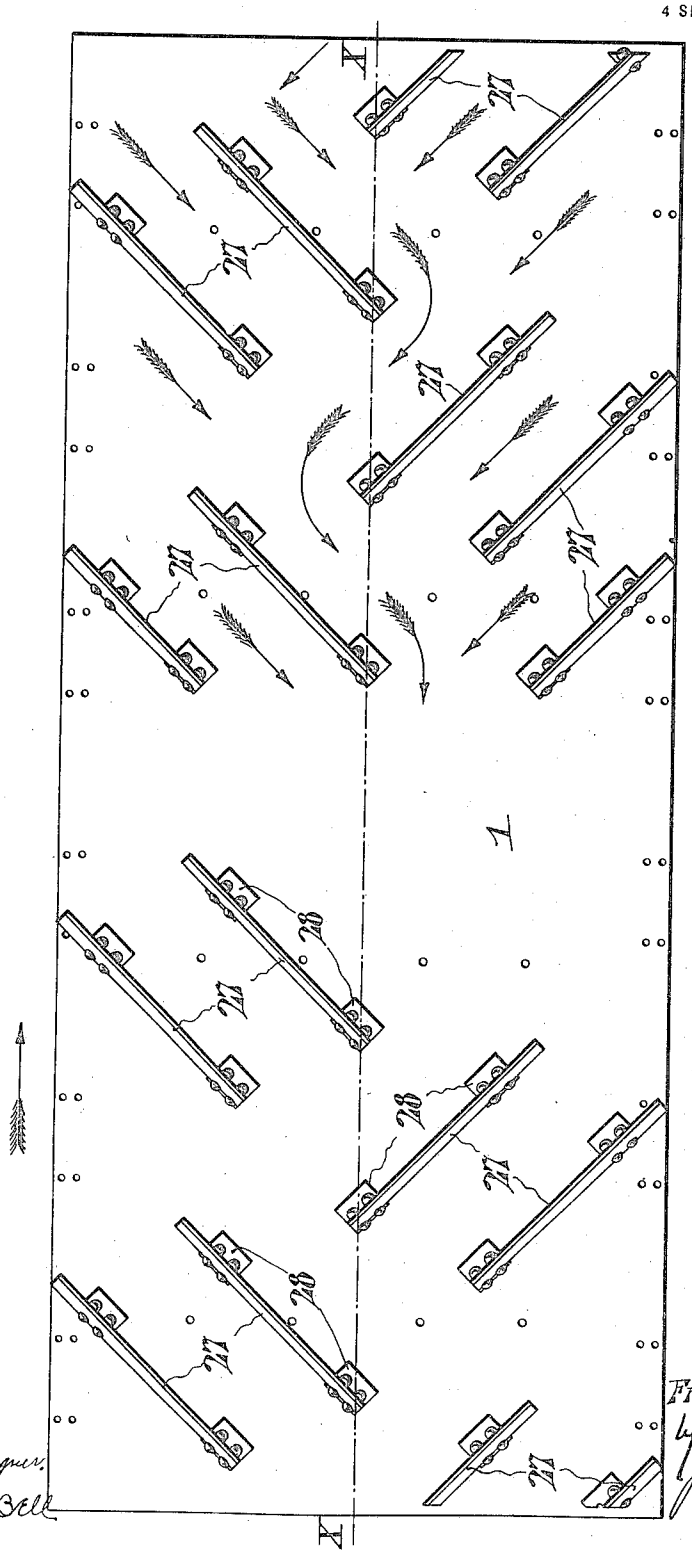


FIG. IV.

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UNITED STATES PATENT OFFICE.

FRANK A. BROWNE, OF BUFFALO, NEW YORK, ASSIGNOR TO THE BARBER ASPHALT PAVING COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF WEST VIRGINIA.

MIXING APPARATUS.

1,363,561. Specification of Letters Patent. Patented Dec. 28, 1920.

Application filed April 12, 1917. Serial No. 161,538.

To all whom it may concern:

Be it known that I, FRANK A. BROWNE, of Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Mixing Apparatus, whereof the following is a specification, reference being had to the accompanying drawings.

The invention relates to mixing devices, adapted for mixing bituminous compounds, such as are used for pavements, paving blocks and the like.

It is an object of the invention to provide an apparatus for mixing bituminous compounds in which every particle of the material being mixed is moved in as many different directions as possible, and comes into contact with the greatest number of other particles of the material being mixed at the time.

A further object of the invention is to provide a mixing apparatus so arranged that it tends to force all the particles of material to travel toward the center of the machine during the process of mixing, but to travel only a short distance at a time, and to move in directions which are at right angles to one another.

A still further object of the invention is to prevent large masses of material from collecting and to break up any such masses which do collect.

With these and other objects in view I provide a cylindrical drum, which is horizontally mounted and adapted to rotate about its longitudinal axis. On the interior surface of this drum I provide a number of baffle plates or flights, which are located at an angle to one another, but which do not come into contact with one another. The baffle plates at each end of the drum are oppositely inclined to those at the other end, which causes the material to travel longitudinally toward the center of the drum. These baffle plates are inclined at a slight angle to the interior surface of the drum, and mounted at a slight distance therefrom, so that an interspace is formed between the baffle plates and the drum. I also provide a plurality of radial cross bars extending across the interior of the drum. These carry a plurality of horizontal bars extending longitudinally the length of the drum and positioned at a point half way between the surface of the drum and the longitudinal axis thereof. The location of the cross bars and longitudinal bars is such that they tend to change the direction of travel of particles moving toward the center of the drum, and also to break up any lumps or masses of material which may be formed.

In the accompanying drawings, Figure I, is a longitudinal sectional view through a mixer, conveniently embodying my invention.

Fig. II, is an end elevation as seen from the right of Fig. I.

Fig. III, is a cross sectional elevation of the same viewed in the direction of the arrows III, III, in Fig. I.

Fig. IV, illustrates the appearance of the inner surface of the mixer when developed upon a plane.

In the embodiment shown in the drawings, the apparatus consists generally in a drum 1, horizontally and rotatably mounted in an enveloping furnace 7, over a fire box 8. Drum 1, is cylindrical in form and provided at each end with a circular track 2, adapted to engage rollers 3, supported on bearings 5. This mounting permits rotation of the entire drum, which is accomplished through toothed annular ring 4, fixed on one end of drum 1, which engages suitable driving mechanism.

Drum 1, is preferably formed of sheet metal closed at its ends by heads 12, and 13. Head 12, is provided with a suitable aperture 14, centrally located for the reception of the end of a chute 15, by means of which the material is fed to the interior of the drum 1. Head 13, is provided with a similar central aperture 16, through which access may be had to the interior of the drum. This aperture, however, is normally closed by door 17, adapted to slide in suitable guides 18, and secured by hasp 19. Head 13, is also provided with outlet aperture 20, located near the periphery of the drum and from which the material may be withdrawn at the end of the mixing. This aperture is closed by door 21, suitably hinged at 22, and during the mixing held closed by catch 23.

In order to accomplish the thorough mixing of the material, I provide a number of baffle plates or flights 27, which are mounted on the interior surface of the drum. The arrangement of these plates is best shown in Fig. IV, from which it can be seen that the

plates are placed at an angle to the axis of rotation and that the plates at each end are oppositely inclined to those at the other. The direction of the travel of the material is shown by the arrows. Plates 27, are mounted on clips 28, which hold them a slight distance removed from the interior surface of drum 1. This prevents any clogging of the material, such as would be likely to occur in the angle formed between the plates and the surface of the drum if there were no interspace. In certain of these plates, the edge which is opposed to the periphery of the cylinder, is inclined so that although one end of the plate is held by its clip with its edge at a distance from the interior surface of the drum, the other end reaches into contact with said surface, as seen more particularly in Fig. III. Plates 27, are also inclined at a slight angle to the radii of the cylinder forming drum 1, drawn to the points of attachment of the plates. This inclination is produced by the inclination of clips 28, as best shown in Fig. III.

It will be noted upon examination of Fig. IV, that the baffle plates 27, are arranged in sets, one set consisting of a plurality (say two or three or more) plates, occupying the particular region of the periphery and having all the plates of the set substantially parallel and inclined similarly to the axis of the drum, while adjacent sets are inclined at a different angle. It will also be observed that notwithstanding this arrangement of the sets the combined action of all of the baffle plates is at all times to tend to throw the material toward the center of the drum.

As drum 1, rotates, the material tends to travel toward the center of the drum. Some of the material, however, sticks to the surface of the drum and passes under plates 27; other portions slide along the surface of plates 27, dropping off therefrom when the plates reach their inverted position. The material which drops off these plates is diverted in its downward movement by angle irons 26, which extend longitudinally throughout the drum. Angle irons 26, are attached at intervals to radial cross bars 25, which are mounted in pairs throughout drum 1, being placed at right angles to one another as shown in Figs. I and III. These angle irons are also mounted at points approximately half way from the axis of drum 1, to the surface thereof. Consequently, the greater portion of the material dropping off plates 27, comes into contact with one of bars 26, and is deflected to the sides, instead of falling straight down. This deflecting function is also performed somewhat by cross bars 25. Their main function is, however, to interfere with the longitudinal travel of the material throughout the drum, deflecting portions against plates 27, and to break up large lumps, such as tend to accumulate in certain stages of the mixing operation. The cross bars 25 are the better enabled to perform this latter function of deflecting the material against the baffle plates 27 by reason of their being located in the interspaces or intervals between said baffles 27, in the path of the material traveling against the periphery of the drum under impulsion of gravity and of said baffles.

As the material is rotated and mixed within the drum, it is heated by furnace 7, which surrounds the drum and has a fire box 8, beneath the drum and a flue 9, above the drum, so that the heated products of combustion pass entirely around the drum before escaping. Fire box 8, is preferably provided at one end with an aperture 10, for the reception of an oil burner not shown, and the requisite air for the support of the combustion is admitted through port 11.

The operation of the apparatus will be obvious from the foregoing description. The material is admitted through opening 14, and drum 1, is rotated agitating the contents, which are heated by furnace 7. As a result of my arrangement of baffle plates and cross bars there is no clogging of the material within the drum and the individual particles of material are constantly in motion, but in widely different directions. As the drum rotates a large part of the material slides along the surface of the plates 27, and drops off when the particular plate is moved above the center of the drum. During its descent its direction is changed by bars 25, and 26. Other portions of the material adhere more closely to the surface of the drum and the direction of their movement is altered by the various angles assumed by plates 27, during the rotation of the drum.

Having thus described my invention, I claim:

1. In a mixing apparatus, the combination of a cylindrical drum mounted to rotate about its longitudinal axis; and means within the drum for causing the material to be mixed to travel varying courses during rotation thereof, said means including a plurality of baffle plates attached to the inner surface of the drum by clips and having their edges adjacent said inner surface inclined with reference thereto, so that at one end they are spaced therefrom, while at the other end they are in contact therewith.

2. In mixing apparatus, the combination of a cylindrical drum mounted to rotate about its longitudinal axis; and means within the drum for causing the material to be mixed to travel varying courses during rotation thereof, comprising a plurality of inclined baffle plates mounted in sets upon the interior surface of the drum, the baffle plates of each set being substantially parallel and extending across the path of material coming from an adjacent set.

3. In a mixing apparatus for bituminous paving material, the combination of a cylindrical drum mounted to rotate about its longitudinal axis; means mounted upon the inner surface of the drum comprising a multiplicity of elements whereby the material to be mixed is caused to travel varying courses during the rotation thereof; and cross bars in the interior of the drum extending from one side of the drum to the other in the intervals between elements of said first-mentioned means, so as to break up and deflect the material traveling against the inner surface of the drum, as well as that falling inward therefrom.

4. In mixing apparatus, the combination of a cylindrical drum mounted to rotate about its longitudinal axis; inclined baffle plates mounted upon the inner surface of the drum whereby the material to be mixed is caused to travel longitudinally therein; radial cross bars arranged in pairs throughout the drum in the interspaces between said inclined baffle plates, so as to break up larger lumps of material during their longitudinal travel; and angle irons mounted upon said cross bars parallel to the longitudinal axis of the drum, so that material dropping from the baffle plates is deflected to the sides by said angle irons instead of falling straight down.

5. In mixing apparatus, the combination of a cylindrical drum mounted to rotate about its longitudinal axis; means mounted upon the inner surface of the drum for causing the material to be mixed to travel varying courses during rotation thereof; a plurality of cross bars mounted within the drum; and a plurality of longitudinal bars carried by the cross bars substantially midway between the longitudinal axis of the drum and the periphery thereof.

6. In a mixing apparatus for bituminous paving material, the combination of a cylindrical drum mounted to rotate about its longitudinal axis; a plurality of baffle plates on the inner surface of the drum inclined with reference to its axis and arranged to constantly deflect the material toward the center thereof; a plurality of cross bars mounted in pairs throughout the interior of the drum, the bars of each pair crossing substantially at the longitudinal axis of the drum; and longitudinal irons mounted on said cross bars parallel with the axis of the drum; so that the mass of material in the drum is constantly broken up, forced toward the center of the drum, and driven away therefrom axially of the drum by the accumulating pressure of material moving toward the center of the drum in the region of its periphery.

In testimony whereof, I have hereunto signed my name, at Buffalo, Erie Co., N. Y., this 7th day of April, 1917.

FRANK A. BROWNE.

Witnesses:
JOHN J. GIFFORD,
JOHN RINDFLEISCH.