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H. S. ALBRECHT.

PULVERIZING AND MIXING MACHINE.

No. 571,588. Patented Nov. 17, 1896.

Fig. I.

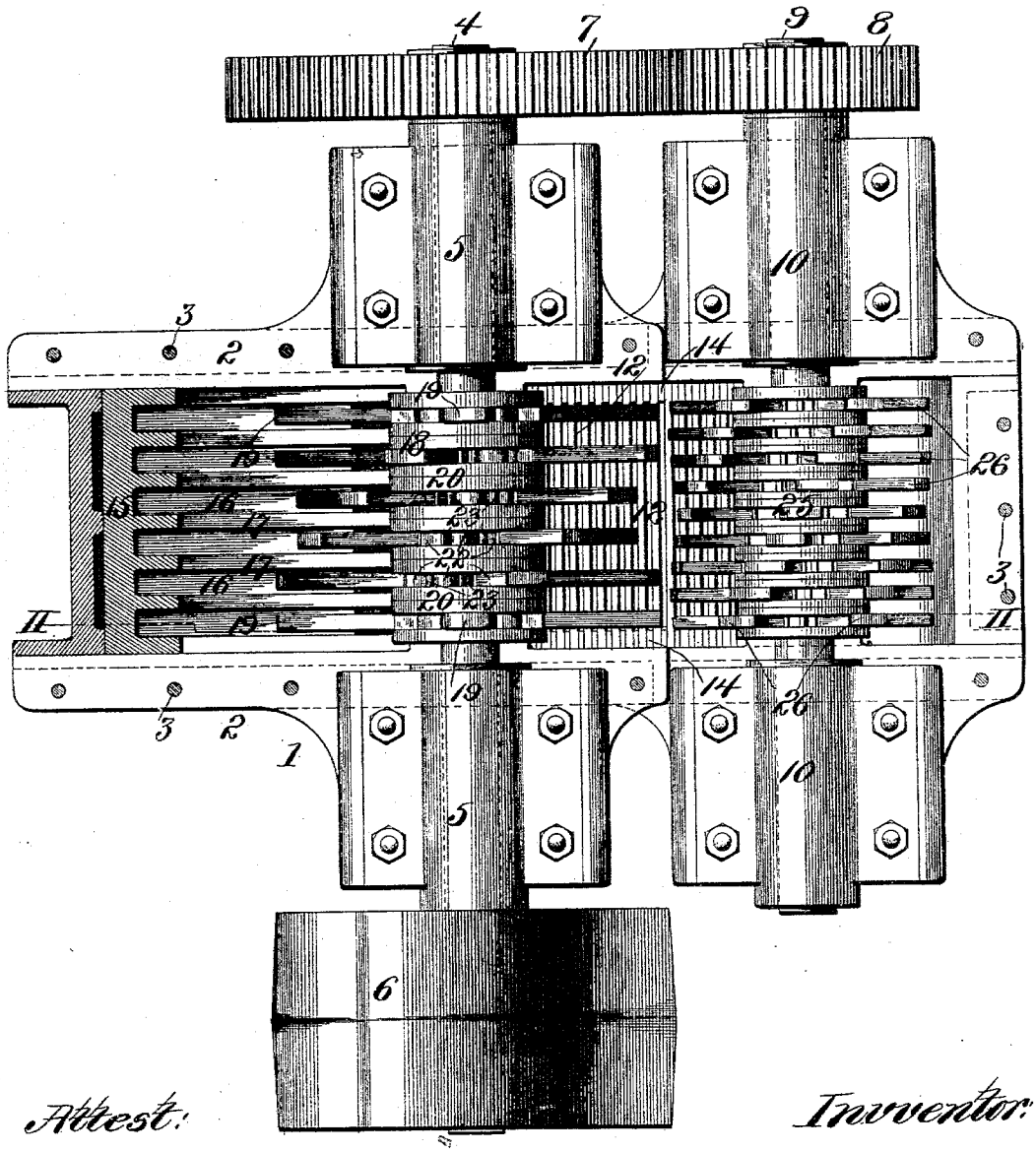

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Fig. II.

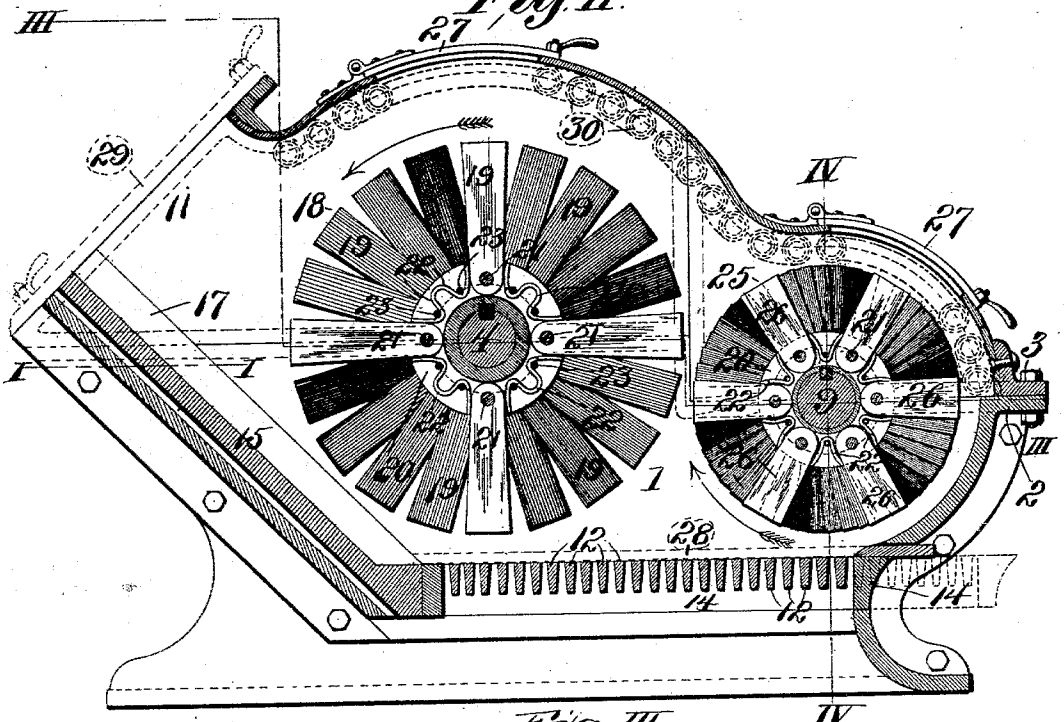
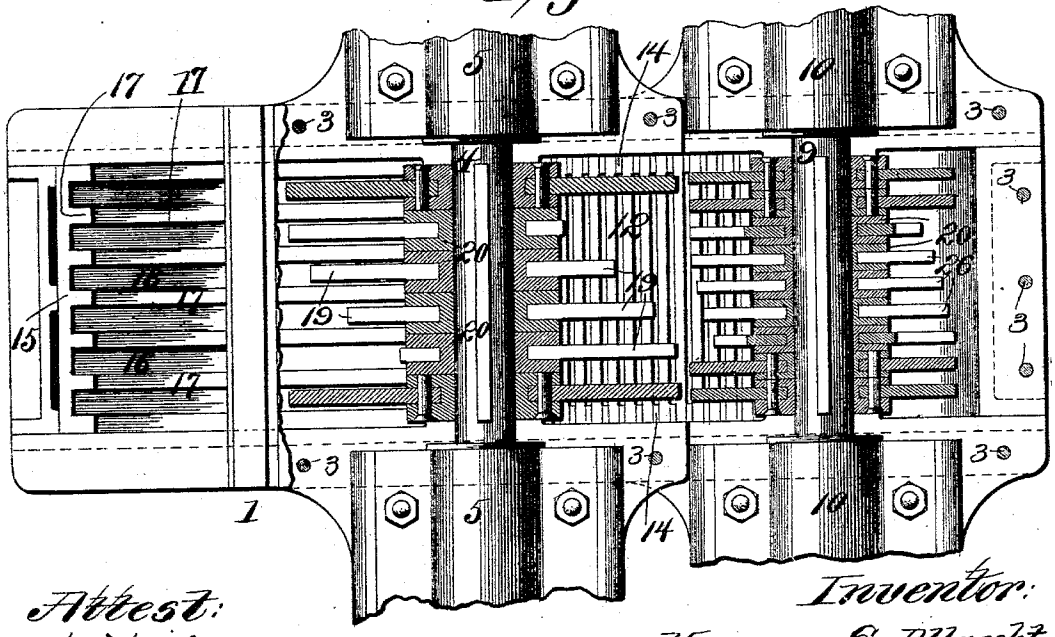


Fig. III.



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PULVERIZING AND MIXING MACHINE.

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Fig. V.

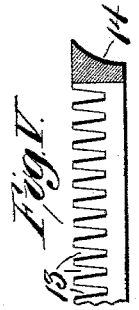


Fig. IV.

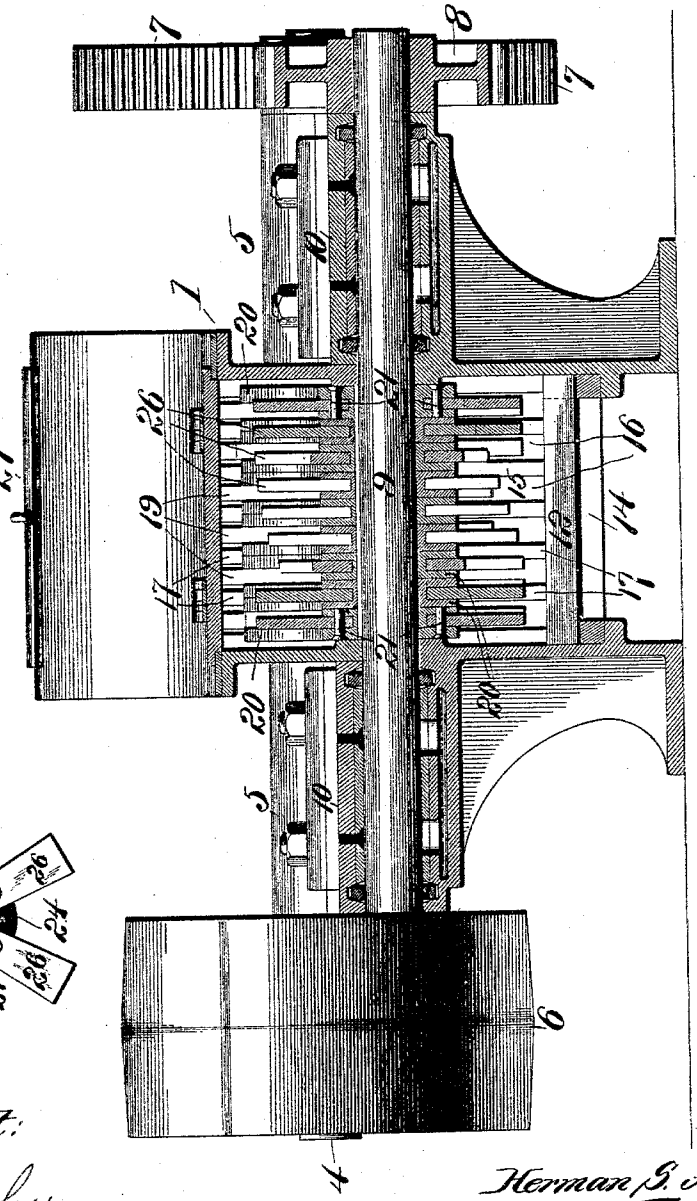
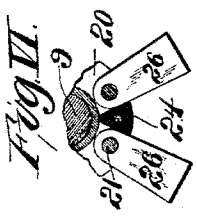


Fig. III.



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H. S. ALBRECHT.

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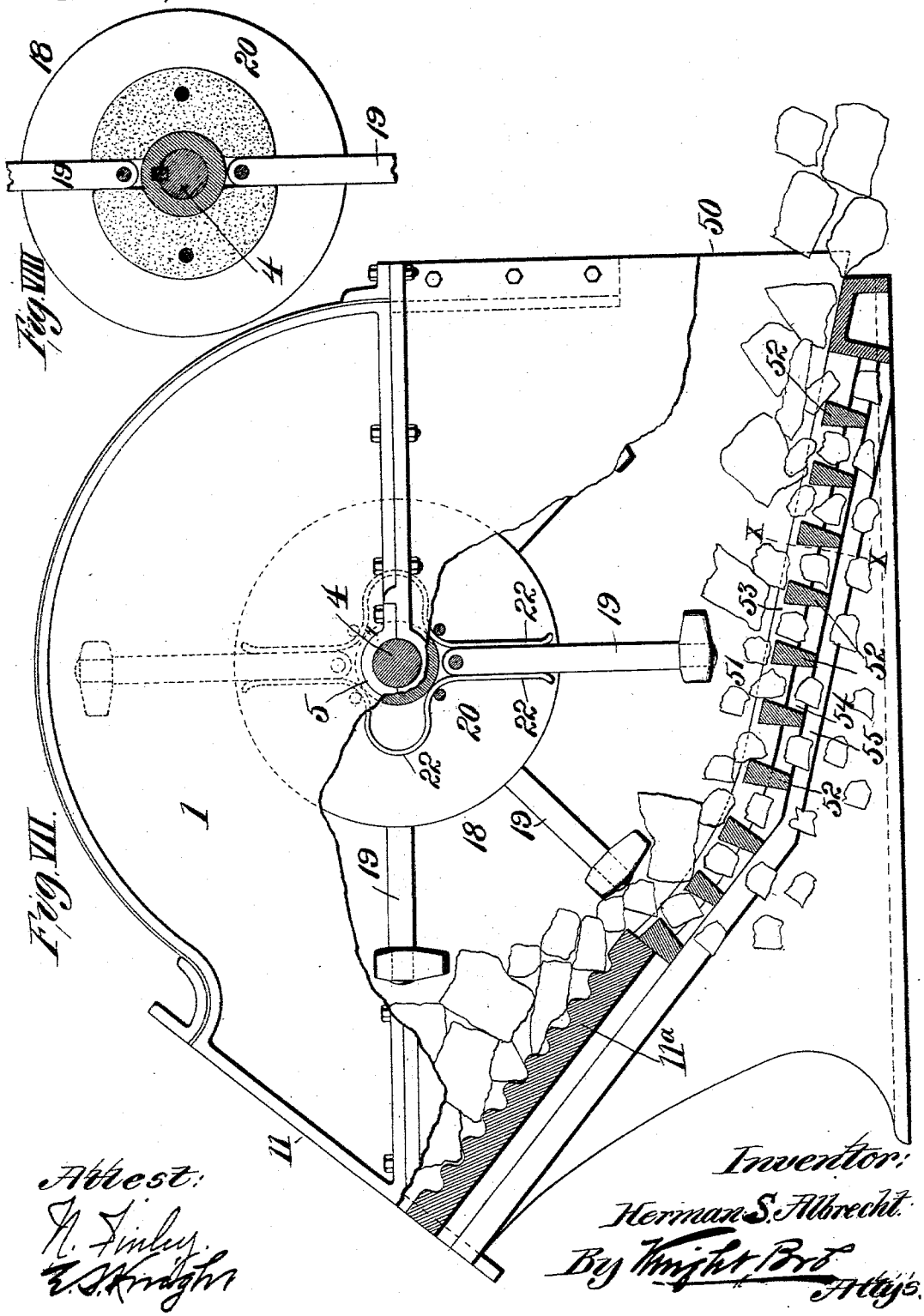
No. 571,588. Patented Nov. 17, 1896.



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PULVERIZING AND MIXING MACHINE.

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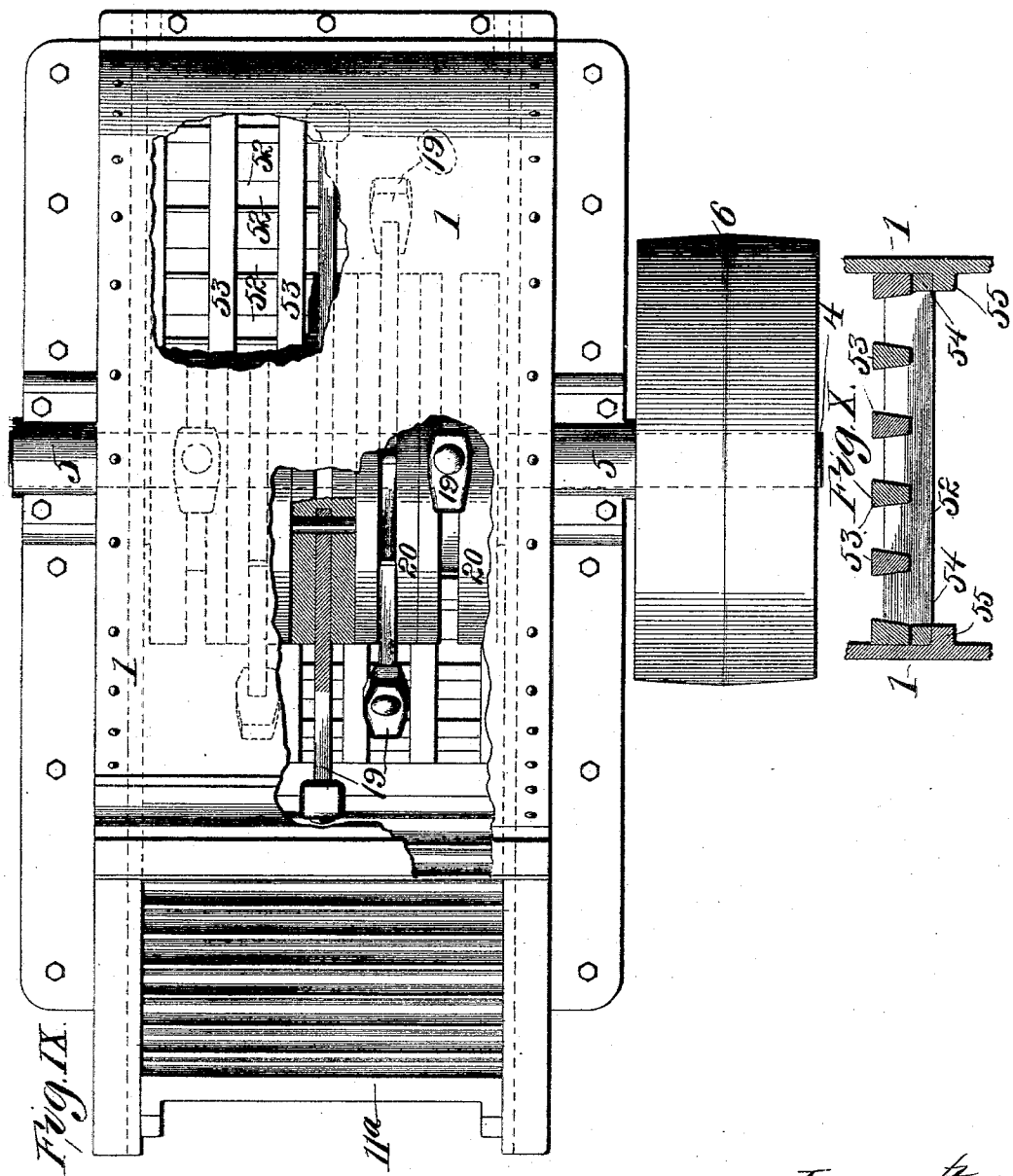

Fig. IX.

Fig. X.

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UNITED STATES PATENT OFFICE.

HERMAN S. ALBRECHT, OF ST. LOUIS, MISSOURI.

PULVERIZING AND MIXING MACHINE.

SPECIFICATION forming part of Letters Patent No. 571,588, dated November 17, 1896.

Application filed May 6, 1896. Serial No. 590,481. (No model.)

To all whom it may concern:

Be it known that I, HERMAN S. ALBRECHT, a citizen of the United States, and a resident of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Pulverizing and Mixing Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to an improved machine for breaking or pulverizing ore, stone, clay, shale, and the like, and for mixing paints and other substances.

My invention consists in features of novelty hereinafter fully described, and pointed out in the claims.

Figure I is a top or plan view with the top of the housing of the machine removed, part of the figure being in section taken on line I I, Fig. II. Fig. II is a vertical section taken on line II II, Fig. I. Fig. III is a horizontal section taken on line III III, Fig. II. Fig. IV is a vertical section taken on line IV IV, Fig. II. Fig. V is an enlarged detail view showing part of the supporting-frame of the screen-bars. Fig. VI illustrates a modification. Fig. VII is a view, part in elevation and part in vertical section, and illustrating a modification. Fig. VIII is a detail vertical section showing another modification. Fig. IX is a top or plan view, part in section, of the modification shown in Fig. VII. Fig. X is a detail vertical section taken on line X X, Fig. VII.

Referring to the drawings, 1 represents a case or housing, preferably made of two parts provided with meeting flanges 2, secured together by bolts 3.

4 represents a shaft journaled to the housing by means of boxes 5. This shaft is provided with a driving-pulley 6. On the other end of the shaft from the driving-pulley is a gear-wheel 7, meshing into a pinion 8, secured to one end of a shaft 9, that is journaled to the housing 1 by means of boxes 10. The housing is provided with an opening or spout 11, through which the material to be acted upon is introduced, and at the bottom of the housing there is a screen composed of a number of bars 12, fitting in notches 13, (see Figs. II and V,) made in a frame 14. The frame 14 is made removable and can be drawn out, as shown by dotted lines in Fig. II, for the purpose of renewing the bars 12 or for changing the bars. Extending from the mouth of the feed-opening 11 to the forward edge of the screen the housing is provided with a lining 15, which is provided with a series of grooves 16, (see Figs. I and III,) that produce a number of ribs 17, over or along which the material passes into the machine. The lining is arranged in inclined position.

On the shaft 4, within the housing, is a cylinder 18, made up of a series of arms or bars 19, secured to the shaft at their inner ends. My preferred manner of securing the arms or bars to the shaft is by means of disks 20, each of which is formed with a groove to receive part of the arms or bars. I have shown each disk provided with four of the arms held to the disk by means of pins 21, by which the arms are pivotally held in place. The arms radiate from the shaft and are held at right angles to the shaft by means of springs 22. These springs may be in the form of a strip spring metal held to the disks between the of arms, as shown in Fig. II, by means of pins 23, or rubber springs 24 may be used, as shown in Fig. VI.

The cylinder 18 revolves in the direction of the arrow, Fig. II, and as it does so the arms 19 strike the material being treated and break or pulverize it much after the manner of a hammer in the hands of a workman, the arms being permitted to yield by the springs 22 as they strike the material. The breaking of the material is facilitated by the ribs 17, upon which the material rests as it is struck by the arms. As the material passes beneath the cylinder 18 the particles that are sufficiently broken will escape through the screen 12, while the larger particles will rest upon the screen.

On the shaft 9 is a cylinder 25, composed of a number of arms 26, hinged to the shaft and provided with springs after the same manner as that explained in connection with the cylinder 18. The cylinder 25 is preferably somewhat smaller than the cylinder 18, and I have shown each grooved disk of this cylinder as carrying six of the arms. The cylinder 25 turns in the direction of the arrow, Fig. II, and any material that passes onto the screen and which is too large to pass through the screen will be acted upon by the cylinder 25, as well as by the cylinder 18, that is to say, the cylinder 18 will throw the

material toward the cylinder 25, and the cylinder 25 will throw it back toward the cylinder 18, and thus the material will become sufficiently broken or pulverized to pass through the screen, the particles not only being broken up by the arms but by being thrown by force against each other.

In practice the cylinders will be made to revolve at a high rate of speed, (the cylinder 18 revolving at, say, one thousand revolutions per minute and the cylinder 25 at fifteen hundred revolutions per minute,) so that the material is very quickly broken or disintegrated after entering the machine. The arms 19 of the cylinder 18 are arranged in spiral form, as shown in the drawings, as are also the arms 26 of the cylinder 25.

The top of the housing over each cylinder is preferably provided with a door 27, affording access to the interior of the machine.

My improved machine is well adapted for the purpose of mixing two or more ingredients, such as paints, and for thoroughly pulverizing ingredients, such as lampblack, at which times the screen 12 will be covered by a plate 28, (shown in dotted lines, Fig. II,) and after the material is inserted into the machine the feed-opening 11 will be closed by a door or cover 29. (Shown by dotted lines in Fig. II.) When the machine is thus used, the material is inserted and the machine started and allowed to run a sufficient length of time to thoroughly pulverize or mix the ingredients, and then the slide 28 is withdrawn and the contents allowed to fall through the screen. In this use of the machine I prefer to locate a heating-coil 30 within the upper part of the housing, as shown in Fig. II.

In Figs. VII to X, inclusive, I have shown a modified form of my machine especially well adapted for breaking rock to make macadam. In these figures the housing 1 is made much the same as in the other form of the machine, except that it has a discharge-opening 50, through which the rock not sufficiently broken up escapes, and this rock is reintroduced into the machine through the feed opening or spout 11. In this form of the machine the shaft 9 with its cylinder 25 is omitted. The cylinder 18 with its arms 19 is retained and the cylinder is made up of the grooved disks 20, in which the arms are pivoted and which are provided with the springs 22, which may be in the form shown in Fig. VII, which is also the form shown in Fig. II, or they may consist of blocks of rubber held in the grooves, as shown in Fig. VIII. The arms 19 in this form of the machine are preferably made in the shape of hammers, as shown.

The feed-opening 11 is provided at bottom with a casting or lining 11^a, which is preferably corrugated, as shown in Fig. I, the corrugations running preferably in a direction transversely across the machine, as shown in Fig. VII. From the casting 11^a to or nearly to the discharge-opening 50 is a screen 51, consisting, preferably, of transverse bars 52 and longitudinal bars 53. The transverse bars are connected to side pieces 54, (see Fig. X,) that rest upon flanges 55 on the inside of the housing, and these transverse bars are notched to receive the longitudinal bars 53. The bars 53 extend slightly above the transverse bars of the screen, and they are so arranged with relation to the arms or hammers 19 that the latter pass over the spaces between the former, as shown in Fig. IX, so that a piece of rock resting upon the bars 53 is struck by the hammer between its points of support and is thus more readily broken. The hammers or arms are made to revolve at a high rate of speed, and as they strike the rock they do so with a yielding blow, owing to the spring connection they have with the disks 9, much after the manner that a rock is struck by a hammer in the hands of a workman. The casting 11^a and the screen are arranged on an incline, as shown in Fig. VII, and as the rocks pass through the machine they are broken up and the pieces broken sufficiently small fall through the screen, while the larger pieces are discharged at 50 and are reintroduced into the machine to be further acted upon. In this modification I have shown each disk 9 provided with but two of the arms or hammers. The spacing apart of the bars 53, so that the arms will pass over the spaces between the bars, corresponds to the same arrangement of the bars 17 in Fig. I and the arrangement of the arms there shown, which pass over the grooves 16 between the arms 17.

A machine thus constructed is capable of breaking a large amount of rock per day at a comparatively small expense.

By providing the arms or hammers with a spring connection they are permitted to bound and rebound in the operation of the machine, thus avoiding danger of breakage as well as making their operation more effective, and the springs serve to keep the arms normally at right angles to the shaft.

I claim as my invention—

1. A pulverizing and mixing machine comprising a housing having a feed-opening provided with an inclined ribbed lining, a screen beneath the lining and a pair of cylinders having spring-arms and revolving in opposite directions; the arms of the outer cylinder being adapted to break the material on the lining and also on the screen; substantially as described.

2. A pulverizing and mixing machine comprising a housing having a feed-opening provided with an inclined, ribbed lining, a screen beneath the lining, and a cylinder having spring-arms; the arms of the cylinder being adapted to break the material on the lining and also on the screens, substantially as set forth.

HERMAN S. ALBRECHT.

In presence of—
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E. S. KNIGHT.