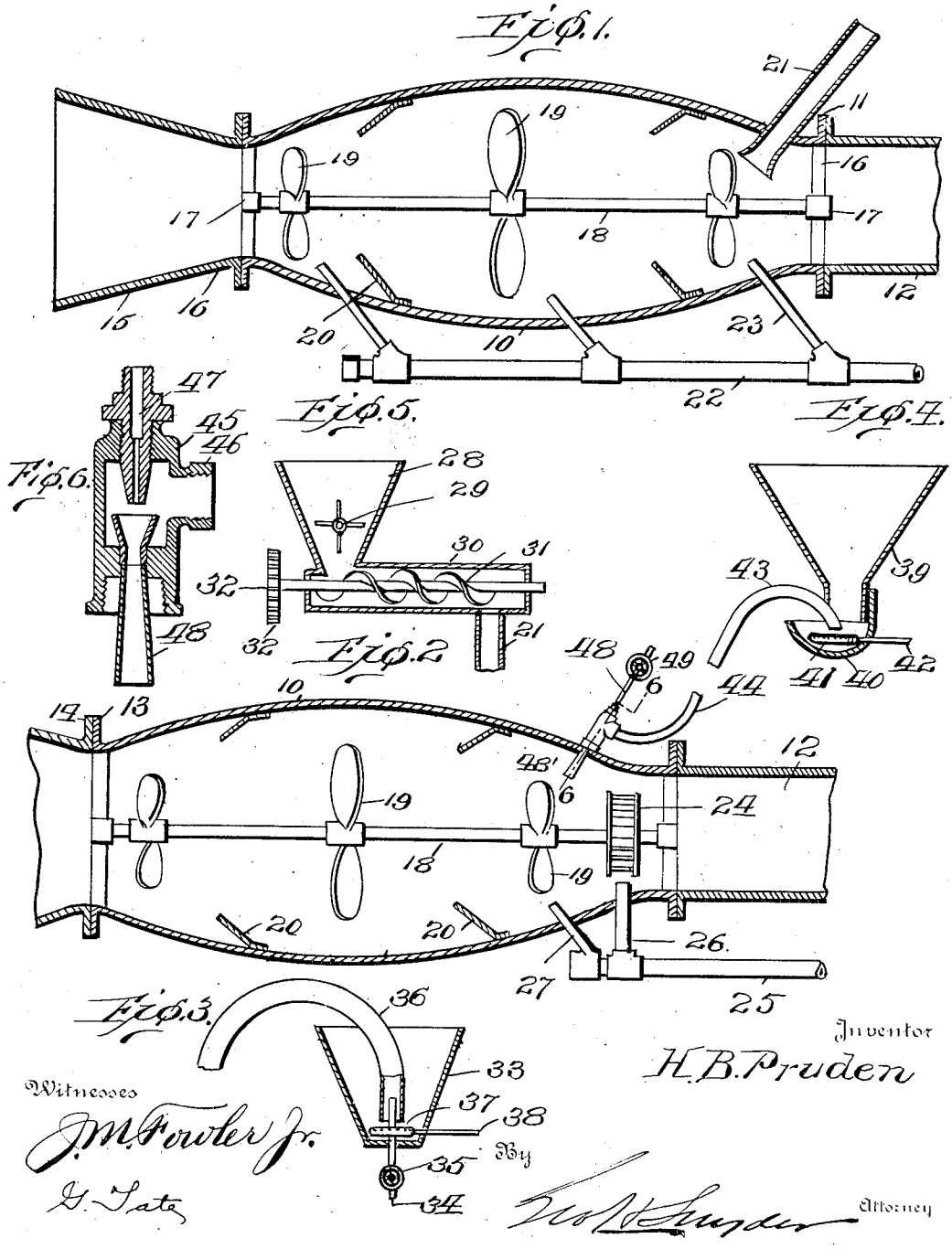
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MIXER FOR COMMINUTED MATERIAL.

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**1,120,534.** Patented Dec. 8, 1914.




Witnesses

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## MIXER FOR COMMINUTED MATERIAL.

1,120,534. Specification of Letters Patent. Patented Dec. 8, 1914.

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*To all whom it may concern:*

Be it known that I, HARRY B. PRUDEN, a citizen of the United States, residing at New Castle, in the county of Lawrence and State of Pennsylvania, have invented certain new and useful Improvements in Mixers for Comminuted Material, of which the following is a specification.

This invention relates to devices for mixing finely comminuted material by means of a blast of air.

The principal object of the invention is to improve and simplify the general construction of devices of this character.

A second object of the invention is to provide an improved arrangement for mixing the material with the air blast so that the mixture of air and comminuted material will be uniform throughout.

Another object of the invention is to so arrange the mixing device that it will be actuated by the air blast.

With the above and other objects in view the invention consists in general of certain novel details of construction and combination of parts hereinafter fully described, illustrated in the accompanying drawings, and specifically claimed.

In the accompanying drawings, like characters of reference indicate like parts in the several views, and:—Figure 1 is a vertical longitudinal section through one side of the mixing device and feeder adapted to be used in connection with this device. Fig. 2 is a similar view showing a modified form of mixing device and feeder. Fig. 3 is a section through a feed pipe and hopper showing one form of means for causing the comminuted material to enter the feed pipe. Fig. 4 is a view similar to Fig. 3 but showing a slight modification of the hopper, the view being arranged in proper relation to Fig. 2. Fig. 5 is a section through a screw feeding device adapted for use in connection with this invention. Fig. 6 is a section through an injector, the view being a section on the line 6—6 of Fig. 2.

In both the form shown in Fig. 1 and the form shown in Fig. 2 there is provided a casing 10 which is in the form of a hollow body, truncated at both ends. To one end of this body, which is provided with a flange 11, is secured the low pressure air pipe 12 which is arranged to be connected to a suitable low pressure blower, not deemed necessary to be shown, but giving an air pressure of, for instance, about 8 ounces. The other end of the casing 10 is provided with a flange 13 to which is secured the flange 14 of a flaring mouth of nozzle 15. Within the casing 10 at each end thereof is secured a spider 16 on the center of which is formed a bearing 17. These bearings 17 are in alinement and serve to support the longitudinally extending shaft 18 whereon are mounted the propellers 19. These propellers are so arranged that the central propeller is larger than those of the ends. Within the casing 10 are arranged a series of baffles 20 which are inclined toward the nozzle 15 as clearly shown in Figs. 1 and 2.

In the form of the device shown in Fig. 1 there is provided a gravity feed pipe 21 which extends through the casing and terminates just to the rear of the rearmost propeller 19. In this form there is also provided a high pressure blast pipe 22 which has branches 23 extending into the casing 10 and so arranged that the air from these branches impinges against the blades of the propellers 19 thus causing said propellers to rotate, this action being assisted by the flow of air through the pipe 12.

In the form of the device shown in Fig. 2 there is provided on the shaft 18 an impulse wheel 24 and from the high pressure blast pipe 25 extends a pipe 26 which delivers a jet of air against the impulse wheel 24 so as to rotate the shaft 18 and consequently rotate the propellers. This action is furthermore assisted by means of the diagonal pipe 27 which branches off from the pipe 25 and delivers a jet of air against the rearmost propeller 19. It is to be noted that the pipes 27 and 23 are each inclined so as to be parallel to the baffle plates 20. In order to feed material to the delivery pipe 21 the device shown in Fig. 5 may be used. In this device there is provided a hopper 28 having therein an agitator 29 and from the

bottom of this hopper extends a tube 30. In this tube 30 is a worm conveyer 31 which is operated through the medium of a belt wheel 32, the latter being driven by any suitable machinery which may be deemed necessary. This form of feed is best adapted for gravity feed. Where it is desired to have siphonic feed the devices shown in Figs. 3, 4 and 6 may be used. In the device shown in Fig. 3 there is provided a hopper 33 through the bottom of which depends a high pressure air tube 34 controlled by a valve 35. This tube extends upward into a goose neck 36 which is connected with the delivery tube of the device. The tube 34 being smaller than the tube 36 the blast of air delivered from the tube 34 will, by an injector action cause the comminuted material contained in the hopper 33 to pass up into this tube. Furthermore this action is assisted by means of a ring tube 37 which is connected to a high pressure pipe 38, the ring tube being perforated so that the jets of air issuing therefrom will keep the material in the hopper in a state of agitation thus preventing caking and clogging.

In Fig. 4 is disclosed another form of hopper which has a cup shaped bottom. This hopper is indicated at 39 and the cup shaped bottom at 40. In this form it is preferred to use the ring tube 41 perforated as in Fig. 3 and supplied with air through a tube 42. Leading up from the cup shaped bottom 40 is a goose neck 43. When this form of the device is used it is preferred to connect this goose neck with such a delivery pipe as 44 in Fig. 2. This delivery pipe 44 is connected to a T fitting 45 the pipe entering the side through a suitable nipple 46. This T fitting is provided with an injector nozzle 47 which is connected to an air pipe 48 provided with a suitable valve 49. In the fitting 45 is also the usual Venturi tube 48′ for the delivery of material, this tube 48′ extending through the casing 10 in Fig. 2.

In all of these forms when the material is delivered through the delivery tube, either gravity as in Fig. 1 or by the injector devices as illustrated in Figs. 3 and 6, the latter giving a siphonic action, this material is fed into the casing 10 and there meets the low pressure air blast coming through the pipe 12. This causes the material to be driven toward the delivery end of the casing. The high pressure air pipes, such as are indicated at 23 and 27 in Figs. 1 and 2 respectively blow this material up into the upper part of the casing while at the same time the rapid revolution of the propellers 19 causes the material to mix thoroughly with the air blast from the pipe 12 so that when it is delivered out of the nozzle 15 it is practically in the form of a cloud of uniform density throughout. There has thus been provided a simple and efficient device of the kind described and of the character specified.

It will be obvious that many minor changes may be made in the form and construction of this invention without departing from the material principles thereof. It is not therefore desired to confine the invention to the exact form herein shown and described, but it is wished to include all such as come properly within the scope claimed.

Having thus described the invention, what is claimed as new, is:—

1. In an apparatus for mixing feeding comminuted material, a casing provided with a fuel and air inlet arranged at one end, a horizontal air pipe connected to said end of the casing, a shaft journaled in said casing and extending through the longitudinal center thereof, agitator propellers mounted on said shaft, and an air pressure pipe extending through the casing and arranged to deliver air against one of said propellers whereby to rotate the agitators propellers and shaft.

2. In an apparatus for mixing comminuted material, a casing, a fuel and air feeder arranged at one end of the casing, a horizontally disposed agitator shaft arranged in the casing, and pressure air pipes extending into the casing and arranged to rotate the shaft and agitate the material and air delivered through the feeder.

3. In an apparatus for mixing comminuted material, a casing, a feeder projecting in one end of the casing and arranged to deliver a mixture of material and air thereto, a horizontally disposed agitator shaft arranged in the casing, pressure air pipes extending into the casing and arranged to agitate the mixture of material and air and to rotate the shaft, and a siphonic delivery device connected to said feeder.

4. In an apparatus for mixing comminuted material, a casing, a supply connected to said casing and arranged to deliver a mixture of air and comminuted material thereto, an agitator in said casing, and high pressure pipes extending into the casing and arranged to positively rotate the agitator and violently stir the mixture of air and material.

5. In an apparatus for mixing comminuted material, a casing provided with inlet and outlet ends, baffle plates arranged in said casing against the walls thereof and inclined toward the outlet end of the casing, and air pipes projecting into the casing and arranged parallel with said baffle plates.

6. In a device for mixing comminuted material, a casing, an agitator shaft extending longitudinally in said casing, agitator propellers mounted on said shaft, an impulse wheel fixed upon said shaft, a high pressure

air pipe, a branch extending from said high pressure air pipe into said casing and arranged to deliver air against the impulse wheel and thereby rotate the shaft, and a second branch inclined toward the delivery end of the casing and extending into said casing to deliver air against one of said agitator propellers; in combination with means to supply a mixture of air and comminuted material to the casing.

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

HARRY B. PRUDEN.

Witnesses:
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