M. F. WILLIAMS.

SUCTION NOZZLE AND MATERIAL SEPARATOR FOR REDUCING MACHINES.

APPLICATION FILED AUG. 29, 1918.

1,327,452.

Patented Jan. 6, 1920.

Fig. 1

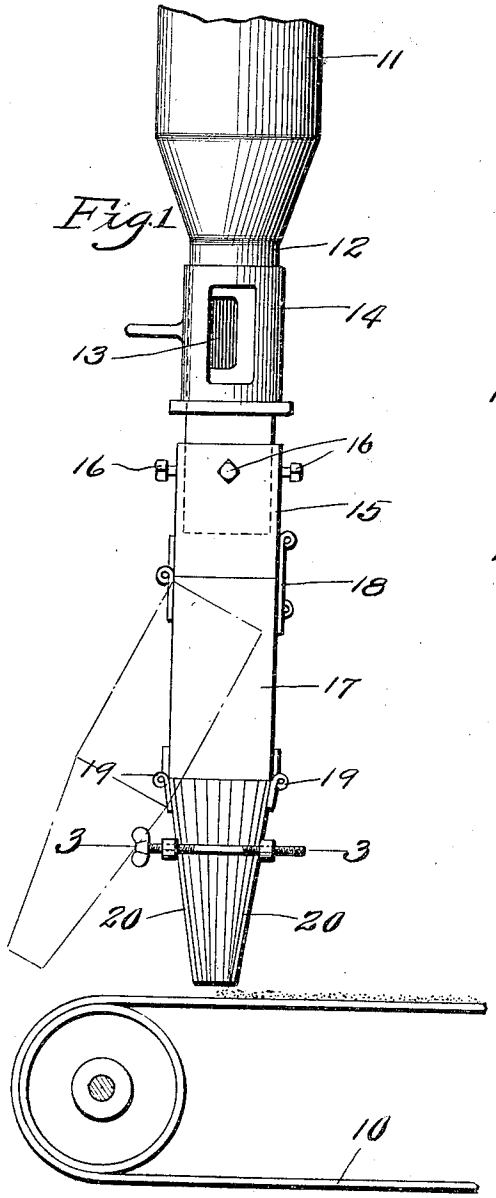


Fig. 2

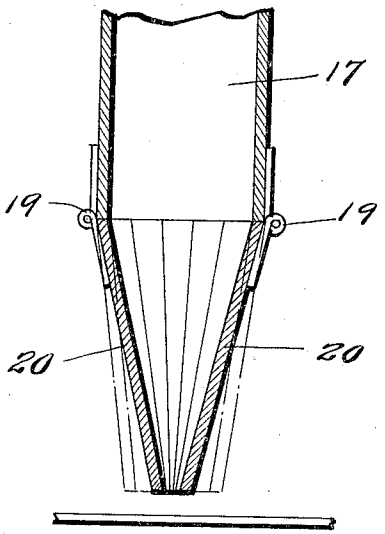
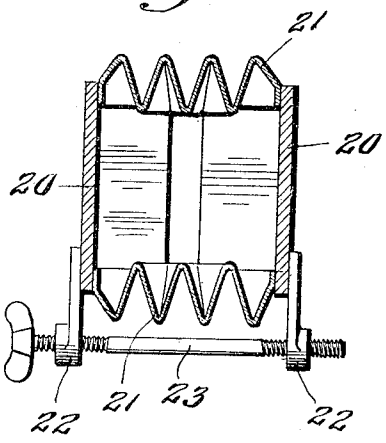


Fig. 3



Inventor

Milton F. Williams

By F. D. Cornwall, Atty.

UNITED STATES PATENT OFFICE.

MILTON F. WILLIAMS, OF ST. LOUIS, MISSOURI, ASSIGNOR TO WILLIAMS PATENT CRUSHER AND PULVERIZER COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI.

SUCTION-NOZZLE AND MATERIAL-SEPARATOR FOR REDUCING-MACHINES.

1,327,452. Specification of Letters Patent. **Patented Jan. 6, 1920.**

Original application filed July 12, 1915, Serial No. 39,425. Divided and this application filed August 29, 1918. Serial No. 251,905.

To all whom it may concern:

Be it known that I, MILTON F. WILLIAMS, a citizen of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Suction-Nozzles and Material-Separators for Reducing-Machines, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

My invention relates generally to machines for reducing or comminuting various materials and more particularly to a suction nozzle constructed and arranged so as to take up and deliver to the suction pipe leading to the reducing machine, the relatively lighter material which is to be reduced and leaving the heavier objects such as pebbles, pieces of metal, and other unfriable objects which have become mixed with the material to be reduced.

This application is a division of my co-pending application filed July 12, 1915, Serial No. 39,425.

In the reduction of various materials such as the general run of stuff from which stock and poultry food is made, the material, in the aggregate, comprises a general mixture including grain, broken straw, hulls, chaff and the like, and this mixture is ground into a meal of the desired degree of fineness and forms the principal ingredient for stock food, poultry food, and the like.

In this general mixture there is usually more or less refractory or unfriable material, such as pebbles, and small pieces of metal which, if drawn to the grinder with the mixture, will materially damage parts of said grinder.

The principal objects of my invention are, to provide a relatively simple and automatically operating suction nozzle which will effectively separate the desired material from the undesired, convey the former to the suction pipe leading to the reducing machine, and permit the discharge of the extraneous and unfriable material such as gravel, small pieces of metal, and the like.

A further object of my invention is to provide a suction nozzle which is readily adjustable toward or away from the belt or conveyer which carries the material into the mechanism; further, to provide a suction nozzle having a readily adjustable mouth or inlet opening, and further, to provide a suction nozzle which can be readily shifted into an out-of-the-way position when it is not required for use.

With the foregoing and other objects in view, my invention consists in certain novel features of construction and arrangement of parts, hereinafter more fully described and claimed and illustrated in the accompanying drawings, in which—

Figure 1 is an elevational view of a suction nozzle of my improved construction, the same being shown in position over a material conveying belt.

Fig. 2 is an enlarged vertical section taken approximately through the center of the lower end of the suction nozzle.

Fig. 3 is an enlarged horizontal section taken on the line 3—3 of Fig. 1.

Referring by numerals to the accompanying drawings, 10 designates a carrier belt operating over suitable drums or pulleys and which serve to carry the material to be reduced into the apparatus, such material being spread evenly in a relatively thin layer upon the upper surface of said belt. A pipe 11 leads to the reducing machine, and connected to the reduced end 12 of this pipe is my improved suction nozzle, the mouth or inlet opening thereinto occupying a position immediately above the top surface of belt 10, as illustrated in Fig. 1.

It will be understood that suitable means are provided for producing suction through the pipe 11 and nozzle depending therefrom, said suction being of such strength or degree as to take up the relatively light material from the belt 10 and carry it through pipe 11 to the reducing machine. The reduced portion 12 of suction pipe 11 is provided with an air inlet opening 13, the effective size of which is determined by the position of a manually adjustable sleeve or damper 14. The lower end of reduced portion 12 is preferably square or non-circular in cross section, and loosely mounted thereon is a sleeve

15 which can be adjusted vertically and locked after adjustment by means of set screws 16, the same passing through the wall of said sleeve and bearing against the wall of member 12.

Hinged in any suitable manner to the lower end of member 15 is a relatively short tubular member 17 which is normally held in operative position or in alinement with sleeve member 15 by a suitable latch 18, such construction enabling said member 17 and parts carried thereby to be swung upward into an out-of-the-way position, as illustrated by dotted lines in Fig. 1.

Connected by hinges 19 to a pair of oppositely disposed side walls of member 17 are the upper ends of plates 20, the side edges of which are connected by foldable walls 21 of suitable flexible material such as leather or heavy fabric. Projecting upwardly from the plates 20 on one side thereof are brackets 22 in which are screw-seated the right and left-hand threaded portions of a screw rod 23.

As the fan or other suction producing device is operated, air will be drawn into the opening between the lower ends of plates 20 and flexible members 21 and said air will pass upwardly through the nozzle and into and through suction pipe 11, which, it will be understood, leads directly to the reducing machine. The strength of this draft of air can be accurately regulated by varying the effective size of damper opening 13 and which regulation is brought about by an adjustment of member 14.

The material to be reduced is fed onto the upper surface of conveyer belt 10 in a relatively thin uniform layer and in this condition said material is brought into position beneath the mouth of the nozzle. At this point said material is subjected to the suction or draft of air entering the mouth of the nozzle, and all relatively light material will be drawn upwardly through the suction nozzle and carried to the reducing machine through pipe 11.

By vertical adjustment of sleeve 15 on the reduced end 12 of the suction pipe, the mouth or inlet opening at the lower end of the suction nozzle can be slightly raised or lowered, consequently varying the effectiveness of the draft of air upon the material carried by the belt so that said draft of air will only pick up the lighter material and leave the heavier material. By such adjustment, the device may be regulated to pick up the chaff, hulls and broken straw and leave the grain, or it may be regulated to pick up all the desired material including the grain, and leave such heavy objects as pebbles or metal, the latter finally discharging at the point where the conveyer belt passes around one of its supporting pulleys.

The size of the mouth or inlet opening into the suction nozzle is regulated by proper manipulation of the screw rod 23, which latter, when rotated, will move the lower ends of plates 20 toward or away from each other. This regulation of the size of the inlet opening is necessary in order that the nozzle may be effectively used upon material such as grain, chaff, and hulls, or more bulky material, such as straw, dried leaves, vines and the like.

A suction nozzle of my improved construction is relatively simple, is wholly automatic in operation, is particularly applicable for use in connection with machines utilized for grinding stock food, poultry food, and the like, and said nozzle is particularly effective in separating from the material to be reduced, foreign objects such as pebbles, pieces of metal and the like, and which latter would work injury to the reducing machine if they were permitted to enter thereinto.

It will be readily understood that minor changes in the size, form and construction of the various parts of my improved suction nozzle, may be made and substituted for those herein shown and described, without departing from the spirit of my invention, the scope of which is set forth in the appended claims.

I claim:

1. In a separating and feeding device, the combination with a suction pipe, of a tubular member adjustably and removably connected to said suction pipe, the lower portion of which tubular member is hinged so as to be swung laterally with respect to the upper portion thereof, a suction nozzle connected to the lower end of the hinged portion of said tubular member, said suction nozzle comprising a pair of oppositely disposed members hinged to said tubular member, means for adjusting the free ends of said hinged members toward or away from each other, and flexible members connecting the side edges of said hinged members.

2. The combination with a suction pipe, of a sleeve adjustably connected to said suction pipe, a tubular member hinged to said sleeve, a pair of oppositely disposed members hinged to opposite side walls of said tubular member, said oppositely disposed members being adjustable toward and away from each other, and flexible folding walls connecting the side edges of said oppositely disposed members.

In testimony whereof I hereunto affix my signature this 26th day of August, 1918.

MILTON F. WILLIAMS.