March 12, 1940. SAMU-EL ISH-SHALOM 2,193,005

APPARATUS FOR MIXING MATERIALS

Filed June 23, 1939 6 Sheets-Sheet 1

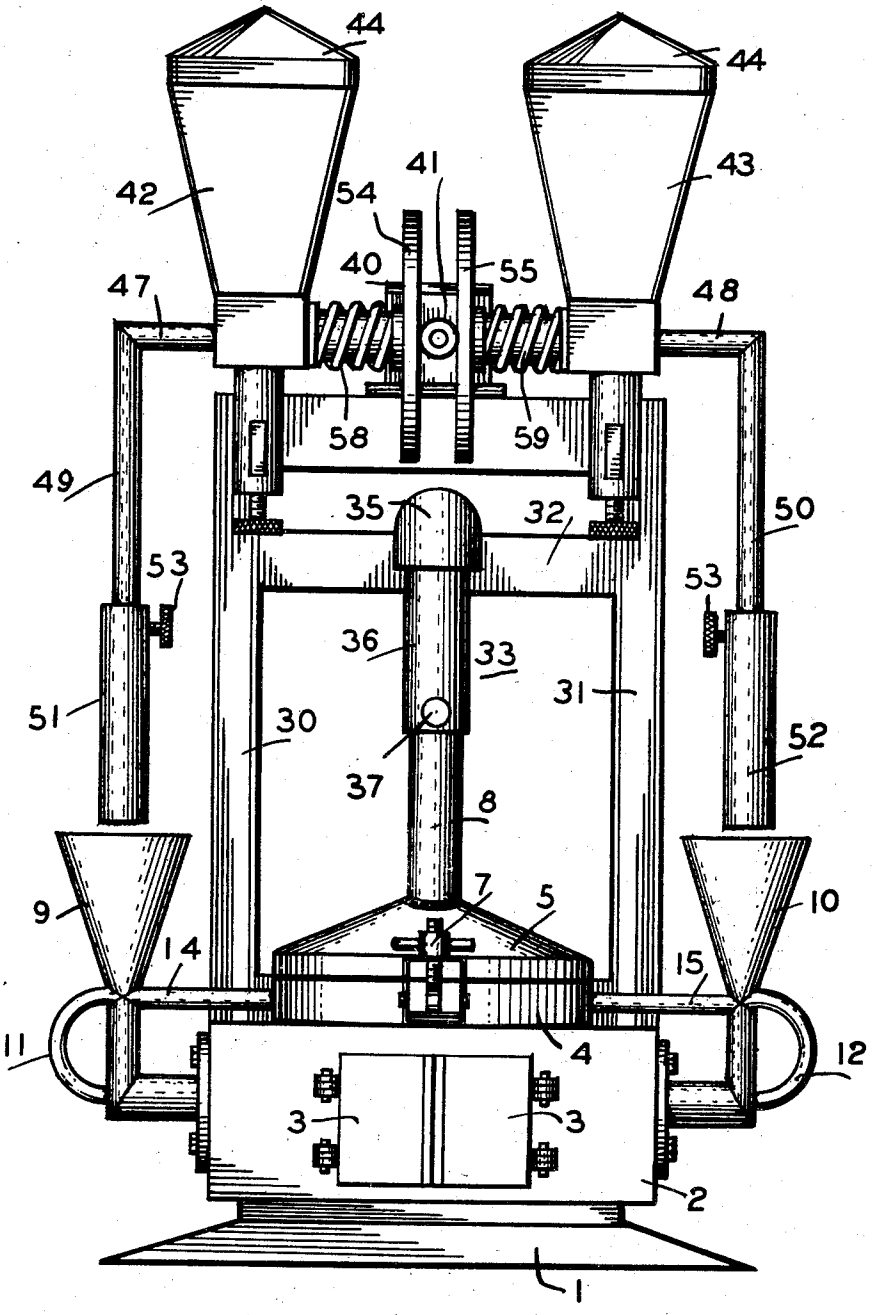


Fig. 1

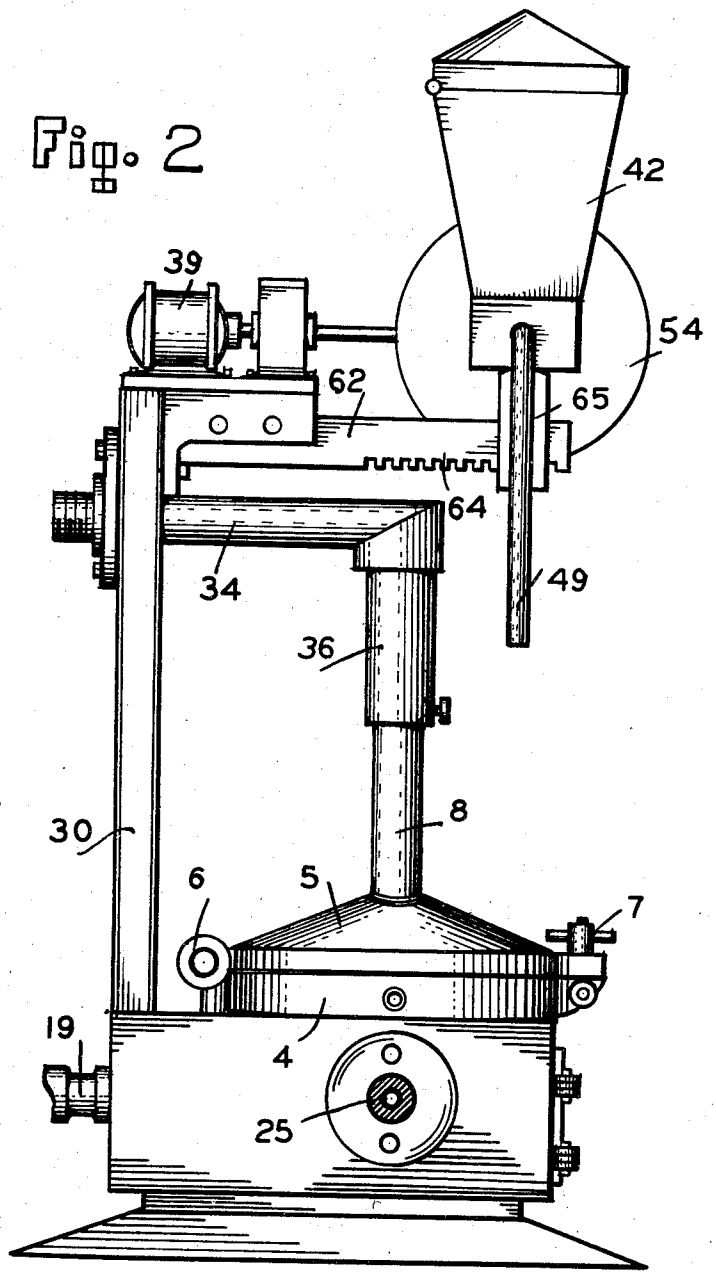
INVENTOR.
SAMU-EL ISH-SHALOM
BY Harry Radzinsky
ATTORNEY.

March 12, 1940. SAMU-EL ISH-SHALOM 2,193,005

APPARATUS FOR MIXING MATERIALS

Filed June 23, 1939 6 Sheets-Sheet 2

Fig. 2



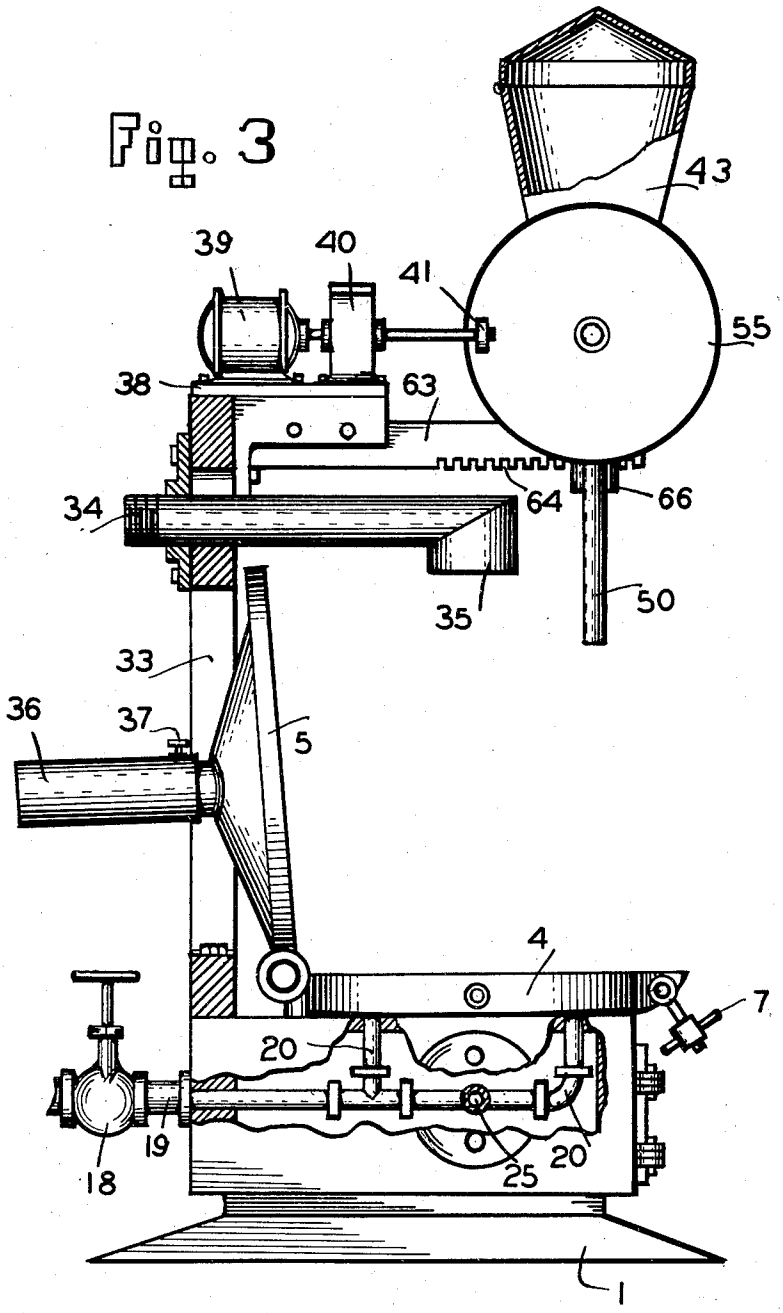
INVENTOR.
SAMU-EL ISH-SHALOM
BY Harry Radzinsky
ATTORNEY.

March 12, 1940. SAMU-EL ISH-SHALOM 2,193,005

APPARATUS FOR MIXING MATERIALS

Filed June 23, 1939 6 Sheets-Sheet 3

Fig. 3



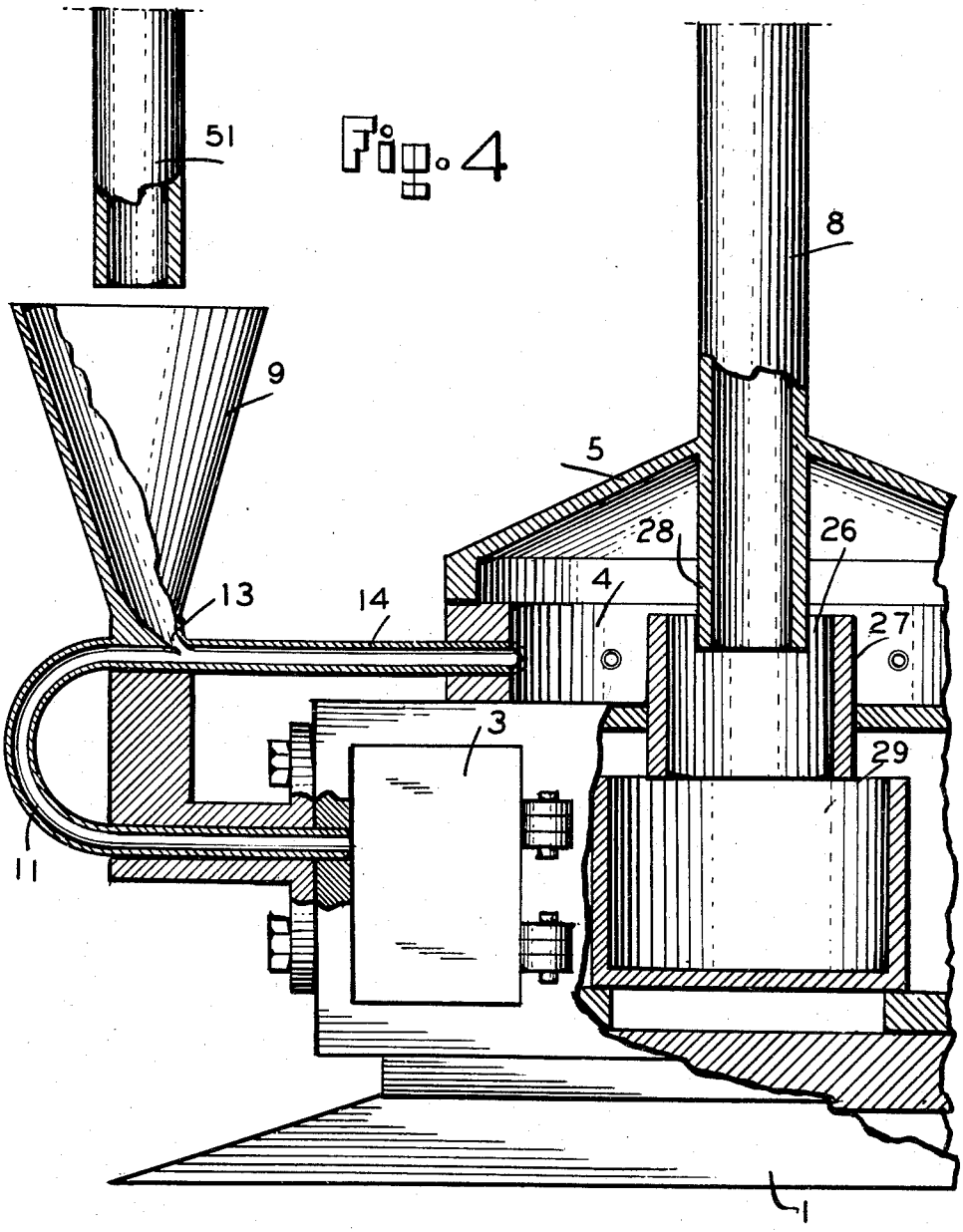
INVENTOR.
SAMU-EL ISH-SHALOM
BY Harry Radzinsky
ATTORNEY.

March 12, 1940. SAMU-EL ISH-SHALOM 2,193,005

APPARATUS FOR MIXING MATERIALS

Filed June 23, 1939 6 Sheets-Sheet 4

Fig. 4



INVENTOR.

BY SAMU-EL ISH-SHALOM

Henry Radzinsky

ATTORNEY.

March 12, 1940. SAMU-EL ISH-SHALOM 2,193,005

APPARATUS FOR MIXING MATERIALS

Filed June 23, 1939 6 Sheets-Sheet 5

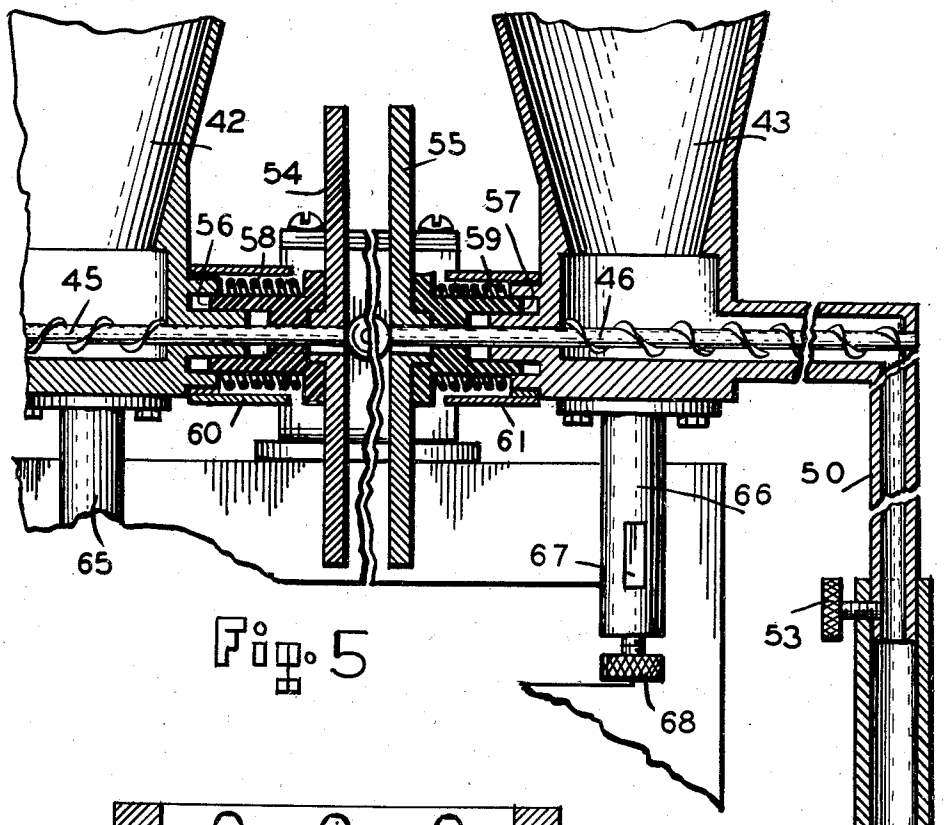


Fig. 5

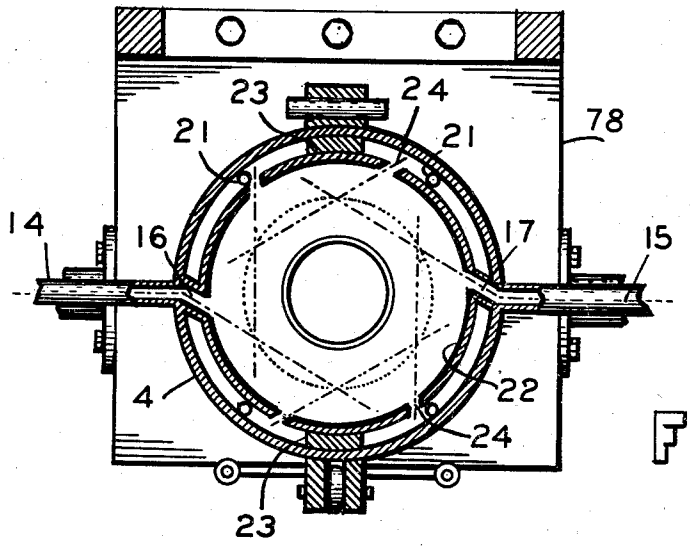


Fig. 6

INVENTOR.
SAMU-EL ISH-SHALOM
BY Harry Radzinsky
ATTORNEY.

March 12, 1940. SAMU-EL ISH-SHALOM 2,193,005

APPARATUS FOR MIXING MATERIALS

Filed June 23, 1939 6 Sheets-Sheet 6

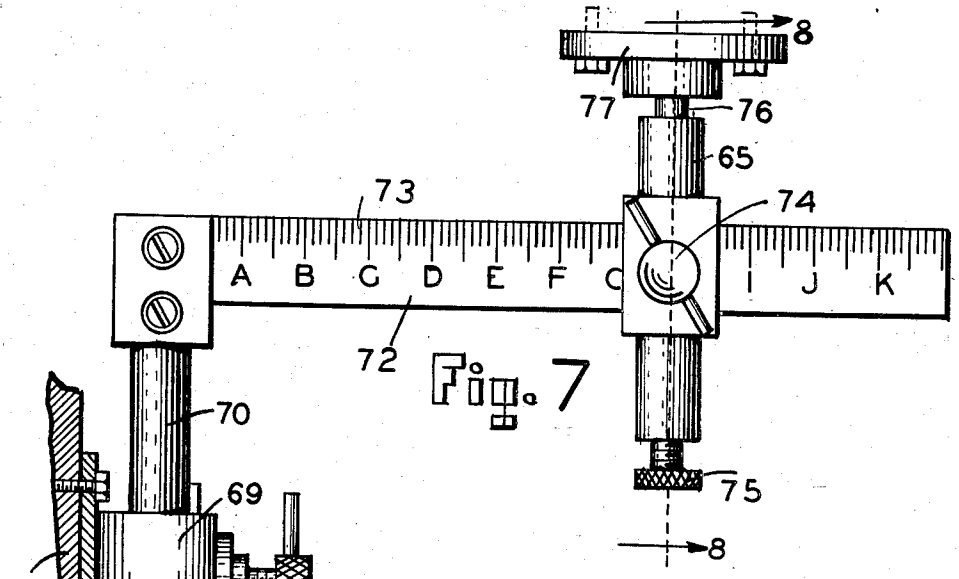
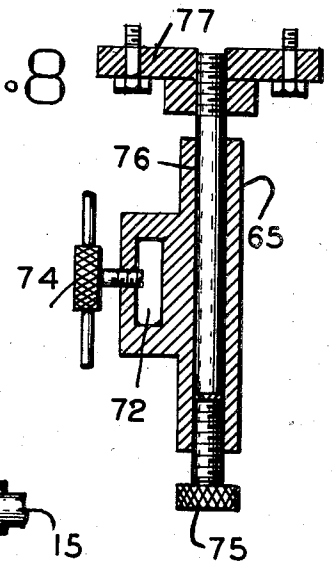


Fig. 7

Fig. 8



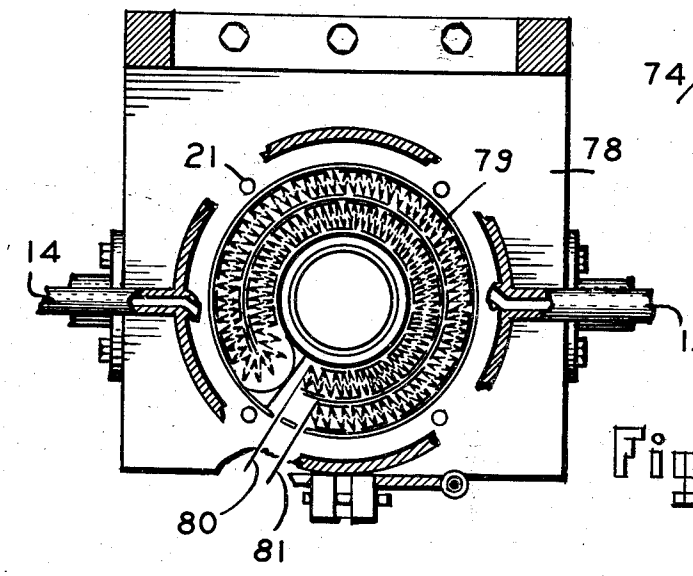


Fig. 9

INVENTOR.
SAMU-EL ISH-SHALOM
BY Harry Radzinsky
ATTORNEY.

Patented Mar. 12, 1940 2,193,005

UNITED STATES PATENT OFFICE

2,193,005

APPARATUS FOR MIXING MATERIALS

Samu-El Ish-Shalom, Brooklyn, N. Y.

Application June 23, 1939, Serial No. 280,785

2 Claims. (Cl. 259—4)

This invention relates to an automatic mixer and more particularly to a mixer adapted for continuous operation.

The present invention provides a method for mixing materials in predetermined proportions and it is primarily intended for the treatment of materials to be used in the manufacture of cosmetics and in preparing pigments or other coloring matter for general use, and also to suit special requirements.

It is among the objects of this invention to utilize a regulated stream of compressed gas, such as air, moving at a high speed and under great compressional energy for mixing materials in predetermined proportions to enable one to quickly obtain the desired tints wherein the pigments are mixed very finely with the dry base and are fed continuously into a mixing chamber by regulated streams of compressed gas maintained at a constant speed.

It is also an object of the invention to utilize a regulated stream of compressed gas, for introducing the different powdered materials into the mixing chamber and to provide regulated material-introducing streams of compressed gas in an air-float mixer which shall constitute a part of the general material agitating or mixing means.

In order to obtain the full range of tints of cosmetics and other materials, a variety of coloring is necessary. It is a further object of this invention to enable one to quickly obtain the desired tints in an air-float mixer which is easily convertible to suit different requirements.

It is a still further object to provide an improved apparatus for carrying out the above process which will be capable of operating continuously, wherein the base or coloring material will be well mixed and to ensure against the formation of lumps, to bring about a fine product heretofore impossible to obtain by the use of existing equipment, by giving the base and coloring matter a perfect air-float mixing at a high rate of output, and which shall be obtained in a device of simple construction, which is easily and quickly assembled and disassembled and therefore easy to maintain in sanitary condition wherein sterilized, germ-free materials may be obtained during the mixing process without additional equipment. However, the process is not limited to the use illustratively disclosed herein but may be adopted whenever it is desired to accomplish the same or similar results in mixing by compressed air powdered materials which are intended to be used for other similar purposes.

In the accompanying drawings constituting a part hereof, and in which like reference characters indicate like parts:

Fig. 1 is a front elevational view of an apparatus constructed in accordance with the present invention;

Fig. 2 is a side elevational view thereof, with the mixing chamber in locked position;

Fig. 3 is a view similar to Fig. 2, with the cover of the mixing chamber shown in open position and some of the upper parts removed for clearness;

Fig. 4 is a fragmentary, enlarged vertical, cross-sectional view of a portion of a mixing chamber and one of the feed hoppers thereof;

Fig. 5 is a fragmentary, enlarged vertical, cross-sectional view of the upper portion of the apparatus showing particularly the driving arrangement for the material feeding means;

Fig. 6 is a horizontal cross-sectional view taken through the mixing chamber;

Fig. 7 is a fragmentary, side elevational view of a somewhat modified form of device for adjusting the position of the containers for the material;

Fig. 8 is a vertical, cross-sectional view taken along the line 8—8 of Fig. 7; and

Fig. 9 is a view similar to Fig. 6 showing particularly the arrangement of heating elements beneath the mixing chamber.

The apparatus comprises a base 1 having a chamber 2 fitted thereon with doors 3 allowing access to the interior thereof. A mixing chamber 4 of annular shape is secured to the top of enclosure 2 and a cover 5 therefor is hinged at 6 and is provided with means 7 for latching or locking the same in place. A gas exit pipe 8 is formed integrally with said cover.

A pair of feed hoppers 9 and 10 on opposite sides of chamber 4 are provided with conduits 11 and 12 respectively communicating with the open bottoms 13 thereof and connecting with pipes 14 and 15 which enter opposite sides of chamber 4. Angular ducts 16 and 17 respectively cause the mixture of gas and material entering through pipes 14 and 15 to have a swirling motion within chamber 4.

A gas supply passes through valve 18 and pipe 19 and thence through branches 20 and in through openings 21 in the bottom of chamber 4. An annular partition 22 within chamber 4 provides an annular passageway for gas entering in through openings 21. Blocks 23 at opposite sides thereof together with ducts 16 and 17 divide the same into independent gas chambers. Each of

such chambers is provided with an opening 24 angularly placed and assist in the flow of material and cause intimate mixing thereof. From pipe 19 branches 25 connect to conduits 11 and 12 to supply gas from a single source for both the transporting and mixing operations.

A central exit opening of annular shape 26 is provided by means of central member 27 and a pipe 28 depending from pipe 8 enters member 27 and provides a centrifugal separator causing the gas to pass upwardly through pipes 28 and 8. The material deposited in member 27 falls into receptacle 29 within the housing 2.

Projecting upwardly from the base 1 are standards 30 and 31 united at their upper ends by horizontal beams or the like 32. The arrangement provides an opening 33 whereby the cover 5 may be conveniently retained in open position, as shown more particularly in Fig. 3.

A horizontal pipe 34 is fixed in the framework so formed having a downwardly extending elbow 35. A pipe 36 of larger diameter than pipe 8 and provided with a set screw 37 allows a connection between pipes 8 and 34 when cover 5 is closed, as shown in Fig. 2. When the cover is to be opened, screw 37 is loosened, pipe 36 is telescoped over pipe 8, thus providing sufficient space for quickly and conveniently opening the cover.

On top of the framework is a plate 38 to which a motor 39 is fixed at a central portion thereof. It is connected to a gear reduction system 40 and carries a friction wheel 41 at the extreme end of the motor shaft. A pair of containers 42 and 43 on opposite sides of friction wheel 41 as shown in Fig. 1, are provided with covers 44. In the bottom of said containers are screw conveyers 45 and 46 respectively for feeding materials therein into horizontal pipes 47 and 48 respectively and thence into vertical pipes 49 and 50 respectively. Sleeves 51 and 52, preferably of flexible nature such as rubber hose, fitted over the respective pipes 49 and 50 are provided with set screws 53.

At the inner ends of conveyors 45 and 46 are a pair of discs 54 and 55 respectively, in parallel relation and contacting with friction wheel 41 which is located between the same. Bushings 56 and 57 are provided over said wheels 54 and 55 for sliding movement. A pair of springs 58 and 59 are fitted over the respective bushings as shown in Fig. 5 whereby wheels 54 and 55 are continually forced into frictional engagement with wheel 41. Cover sleeves 60 and 61 are usually provided for protective purposes.

Provision is made for changing the relative speeds of conveyors 45 and 46 whereby the relative amounts of material being fed and mixed may be changed at will and within wide limits. To accommodate this, mechanism is provided whereby containers 42 and 43 with their associated mechanisms may be shifted bodily relative to member 39. There are provided a pair of arms 62 and 63 for respective containers having notches 64 along the lower edge thereof. Depending members 65 and 66 from the respective containers have openings 67 therein of a size and shape as to closely accommodate arms 62 and 63. Set screws 68 are provided in the bottom of members 65 and 66 and adapted to set into any desired notch 64. It will be seen that by shifting one or both of the containers the relative position of friction wheel 41 with respect to the discs 54 and 55 may be used to change the rate of revolution of the conveyors.

In some cases it may be desirable to allow vertical movement of the containers and also to provide a different means for shifting the same laterally and this is provided for in the modification shown in Figs. 7 and 8. Secured to the beam 32 is a sleeve 69 having a bar 70 slidably mounted therein with a set screw 71 leading into an opening in depending member 65 adapted to accommodate arm 72 which instead of being provided with notches, is provided with a scale 73 whereby to gauge the desired position of the container in question. Set screw 74 allows a fixing of the container in its adjusted position. Member 65 is not directly secured to the respective containers, but is provided with a screw 75 operating in a central opening therein and having a rod 76 slidably mounted in said opening. A plate 77 is adapted to be secured to the containers 42 or 43. By means of screw 75, the height of a container may be varied.

As shown in Fig. 9 chamber 7 may be provided with heating means for obtaining simultaneously with mixing sterilization of the contents, as more particularly set forth in my copending application, Ser. No. 278,513, filed June 10, 1939. The bottom 78 of chamber 4 is provided with two annular sets of heating coils located below chamber 4 but secured to plate 78. Leads 80 and 81 are connected to a suitable source of power whereby any desired regulated amount of heat for sterilization or other purposes may be supplied.

Although I have described my invention setting forth a single complete embodiment thereof and slight variations of the construction, it will be apparent that many other changes may be made in the details without departing from the spirit of the invention. For instance, the openings of the gas inlets of the mixing chamber may be of any number as the size of the mixing chamber may require, but they are to be placed so that their angle will permit and tend to deliver the materials forward into the adjacent gas stream. The speed of the material introducing streams may be varied by manipulation of gas inlet valves so that the flow of compressed gas may be increased or decreased as the different materials may require, and there may be provided a separate valve for other gas inlets while the pressure of the gas stream flow through the mixing chamber may be regulated from the main valve. The gas streams may also be supplied from the bottom by utilizing an arrangement in the shape of a star so that the streams of the outlet openings are directed upward and forward. This arrangement may also be used in combination with or instead of an arrangement where the inlets and openings are provided with means to utilize a stationary or exchangeable upper plate. There also may be provided a series of projections on the bottom plate of an angular shape having suitable gas inlet openings so that the gas supply may be continuous and strong enough to move the material forward under pressure as may be required. Of course, there is no set limitation as to the exact pressure required, as that largely depends on the size of the mixing chamber, the material to be used, its granular or particle size and weight and also on the amount of material fed into the chamber in a given time.

What I claim is:

1. In an apparatus for mixing powdered materials, a mixing chamber of cylindrical formation provided with concentrically arranged, spaced inner and outer walls forming an annular space between them, the chamber having a pair of feed tubes arranged diametrically opposite to one an-

other and having angularly disposed ejection ends at their points of entry into the mixing chamber, whereby the material ejected from one of said tubes will be directed in a direction opposite to that of the other but substantially parallel thereto, said feed tubes leading through both walls and communicating with the interior of the chamber but not with the annular space, the inner wall of the chamber being provided with a plurality of air inlets establishing communication between the annular space and the interior of the chamber, and means for delivering air under pressure into said annular space.

2. In an apparatus for mixing powdered materials, a mixing chamber of cylindrical formation provided with concentrically arranged, spaced inner and outer walls forming an annular space between them, the chamber having a pair of feed tubes arranged diametrically opposite to one another and having angularly disposed ejection ends at their points of entry into the mixing chamber, the ejection end of each tube being disposed at an angle to the tube on which it is located and the two ejection ends being disposed substantially parallel to one another whereby the material ejected from one of the tubes will be directed in a direction opposite to that of the other but substantially parallel thereto, said feed tubes leading through both walls and communicating with the interior of the chamber but not with the annular space, the inner wall of the chamber being provided with a plurality of air inlets establishing communication between the annular space and the interior of the chamber, and means for delivering air under pressure into said annular space.

SAMU-EL ISH-SHALOM.