June 23, 1936. A. J. MOSLEY 2,044,915

SEPARATING DEVICE

Filed Aug. 9, 1933 2 Sheets-Sheet 1

Fig. 1

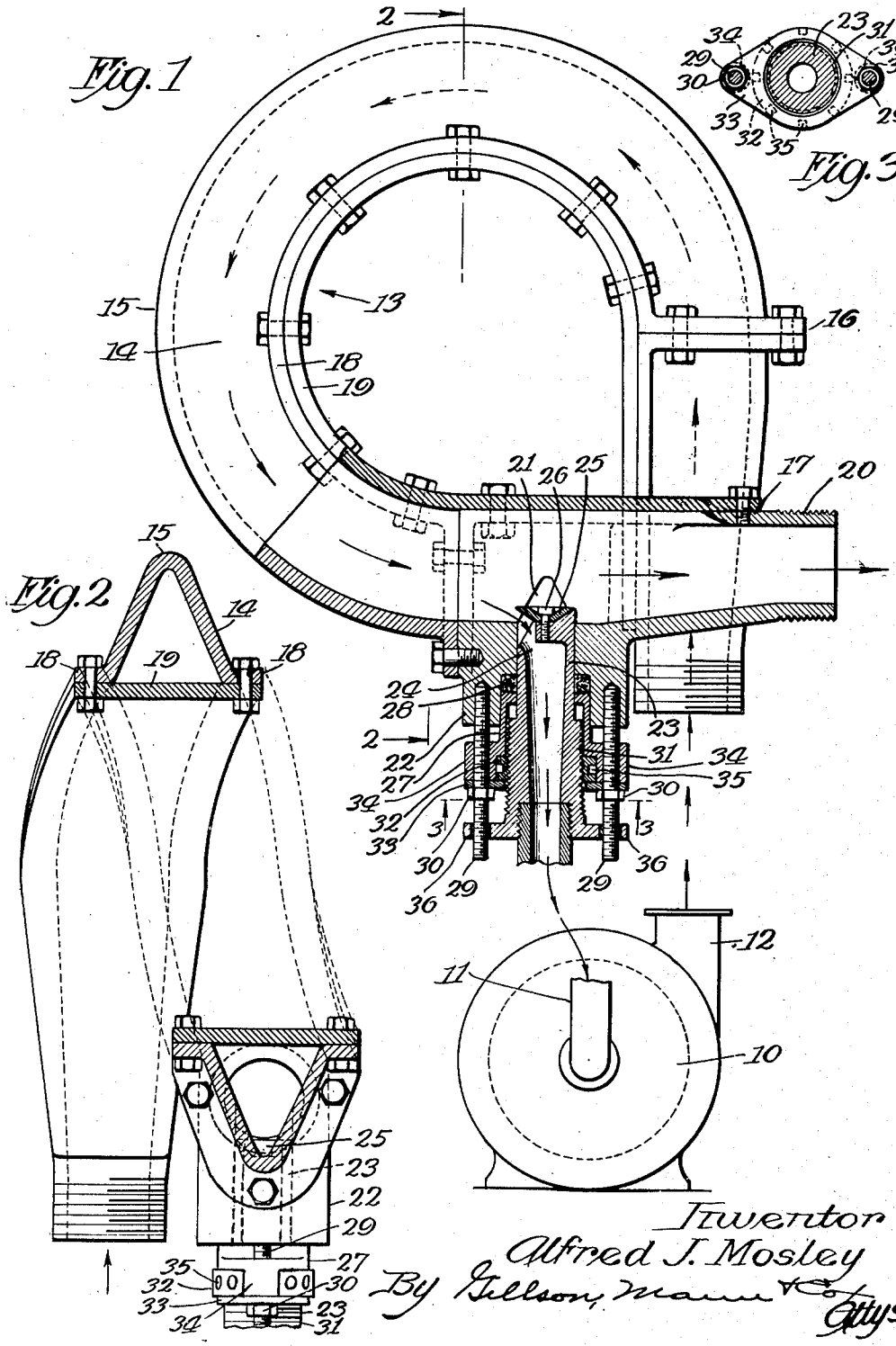



Fig. 3




Fig. 2




Inventor
Alfred J. Mosley
By Gillson, Mann & Co
Attys.

June 23, 1936. A. J. MOSLEY 2,044,915

SEPARATING DEVICE

Filed Aug. 9, 1933 2 Sheets-Sheet 2

Fig. 4

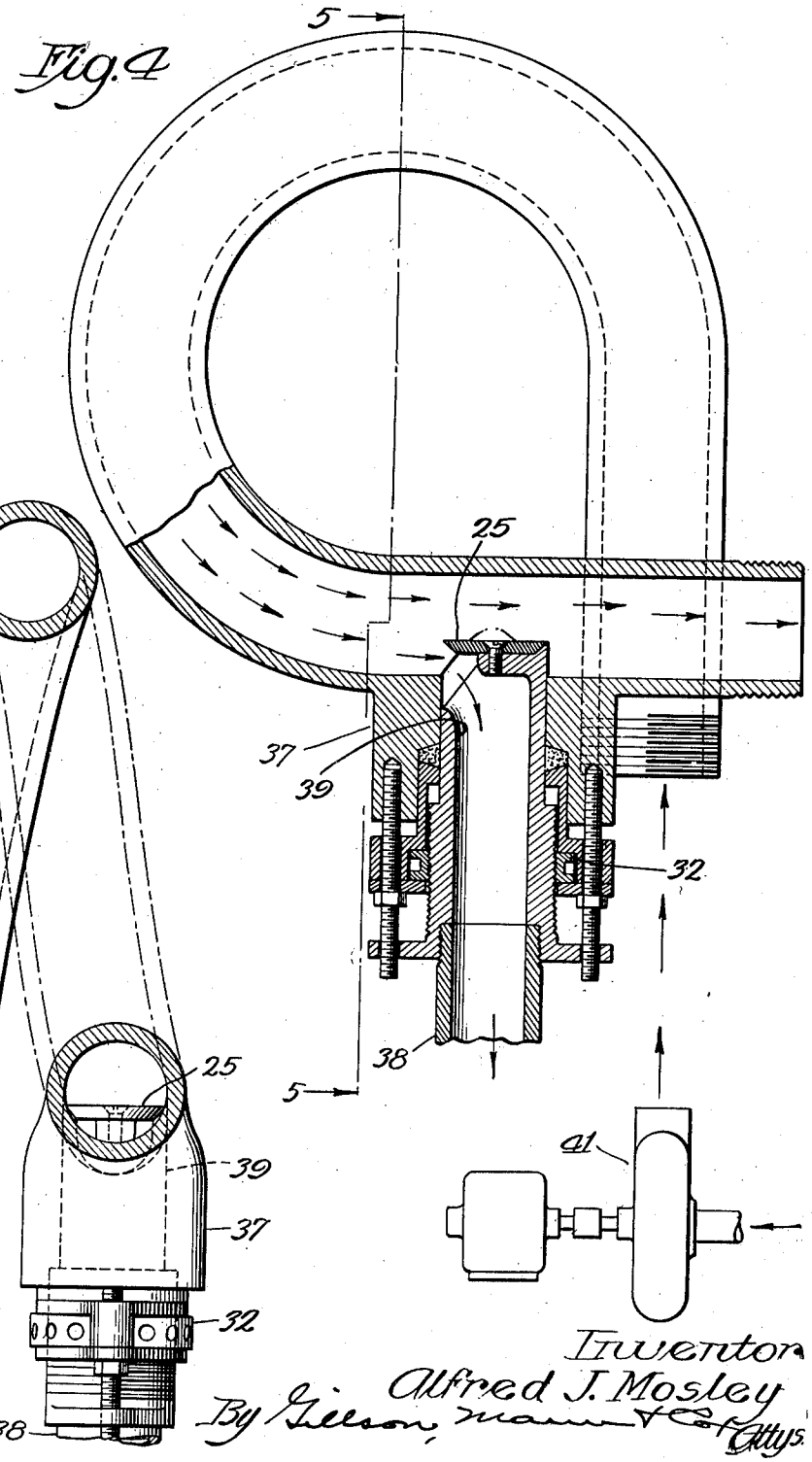



Fig. 5




Inventor
Alfred J. Mosley
By Gilson, Mann & Co
Attys.

Patented June 23, 1936 2,044,915

# UNITED STATES PATENT OFFICE

2,044,915

## SEPARATING DEVICE

Alfred J. Mosley, Aurora, Ill.

Application August 9, 1933, Serial No. 684,372

4 Claims. (Cl. 209—144)

The invention relates to means for separating from granular material the coarser from the finer particles thereof.

A preferred embodiment of the invention is herein shown and will be described, and in the accompanying drawings illustrating it,

Fig. 1 is a side view of a reducing mill and of the separator associated therewith, the latter being drawn to a larger scale and being shown partly in section;

Fig. 2 is a sectional view on the line 2—2 of Fig. 1;

Fig. 3 is a detail section on the line 3—3 of Fig. 1;

Fig. 4 is a view similar to Fig. 1, of a modified form; and

Fig. 5 is a view on the line 5—5 of Fig. 4.

In the reduction of material, such, for example, as rock, it has been found practically impossible to prevent the escape from the mill of a substantial percentage of the product which is not brought to the desired fineness. In consequence of this difficulty in securing desirable uniformity of product, it becomes necessary to either so adjust the mill that much of the material passing through it will be reduced beyond the gauge required, or a subsequent screening operation must be performed. By means of the apparatus forming the subject of this invention any oversize particles of the product will be separated out as the material is discharged from the reducing chamber and returned thereto, to be again operated upon by the mill.

A reducing mill is conventionally shown at 10, and may be of any desired form or type, it being assumed, however, that an air blast is used in connection with the mill for effecting the discharge of its product. The association of a blower with reducing mills being common, it is not thought necessary to illustrate such an attachment. The mill is provided with an intake 11, for receiving the coarser material which has been separated out for further reduction, and an outlet 12 for the reduced material.

The material discharged from the mill at 12 is delivered to the separating device, generally shown at 13, and which, as illustrated, consists of a tube in loop form. This tube is, at least through a portion of its length, V-shape in cross-section, as shown at 14, the apex 15 of the V being radially at the outer side of the loop.

This tube section, which, as shown, extends from the joint 16 to the joint 17, is preferably formed longitudinally of two sections, the outer one being of V-shape and having flanges 18 at the outer ends of its arms, and a flat plate 19 seated against and bolted to these flanges. Beyond the joint 17 the tube takes the form of an integral, circular nipple 20, for attachment to a conveying conduit.

Adjacent to the delivery end of the separator a lateral opening is provided in its outer contracted wall, as shown at 21, this opening being preferably surrounded by an integral boss 22, through which a receiving tube 23 is entered. The inner end of the tube 23 has a lateral opening 24, which is directed backwardly with reference to the direction of the flow of the material. Mounted upon the closed end of the tube 23 is a disc 25, secured to the tube by any suitable means, such as a bolt 26, and preferably loosely held so that it may rotate. The disc is preferably slightly conical in form, and the end of the tube is of complementary form so that all material caught by the deflector will be directed into the lateral opening of the tube. The aperture 21 extends upwardly within the walls of the V-shaped passage of the separating conduit, gradually dying out, as plainly indicated in Fig. 1, and hence the disc 25 entirely crosses the conduit passage whatever may be the adjusted position of the tube.

The tube 23 is entered into the separating conduit through a gland 27, seated within a counterbore in the boss 22, suitable packing material 28 being introduced in advance of the gland. The gland is mounted loosely upon a pair of threaded posts 29, which pass through lateral wings, as 34, and are set into the end of the boss 22, and is adjusted to suitably compress the packing 28 by means of nuts, as 30, mounted on these posts. The tube 23 is in the form of a two-diameter nipple, its larger outer portion 31 being threaded for engagement by a nut 32, seated within the counterbore of the gland 27, and loosely held within that seat by means of a clamping plate 33, interposed between the nuts 30 and the outer face of the gland. The nut 32 is provided with peripheral apertures, as shown at 35, for engagement by a spanner wrench. The threaded end of the tube section 23 is provided with a pair of lateral apertured lugs, as 36, which loosely fit upon the posts 29.

In assembling the parts just described the nut 32 may be threaded upon the tube nipple 23 and seated within the gland and under the plate 25. The gland being now threaded upon the posts 29, the end of the nipple is carried forward within the aperture of the boss 22, and the nuts 30 are turned up to properly seat the gland. The nut 32 being now turned, the nipple 23 is advanced

into the conduit of the separator to provide the desired opening from the latter into the delivery tube, through which the material caught under the deflector plate **25** is carried back into the receiving opening **11** of the reducing mill **10**.

In the operation of the apparatus the material reduced by the mill **10** is discharged therefrom through the outlet **12** into the separator **13** at such velocity that the centrifugal force, while not sufficient to mass the stream along the outer wall of the curved conduit, will cause the larger particles to follow that wall because of their greater momentum, thereby causing them to be deflected by the plate **25** into the tube **23**, by which they are returned to the mill and subjected to a second reducing operation. The finer material will escape the deflector **25** and pass on through its outlet **20**. The separation of the finer from the coarser particles will be due, in part, to the V-shaped cross-sectional form of the conduit, the stream of coarser material monopolizing the apex of the V, to the exclusion of the finer material, should the centrifugal force exerted upon the latter urge it tangentially. The nipple **23** is readily adjusted to correspond with the action of the mill.

If the milling operation is such that the material is uniformly reduced, the aperture **21** may be entirely closed off. If, because of the character of the material or the condition of the mill, the reducing operation is not uniform, the nipple **23** may be adjusted to insure the return of all of the oversize particles for a second operation thereon.

The separator may, if desired, be round, as shown in Figs. 4 and 5, or may take other cross-sectional forms.

In the modification shown the boss **37**, corresponding with the boss **22**, is of sufficient size to permit the use of a nipple **39** for the discharge conduit **38**, which is of approximately the same diameter as the bore of the separator; and the walls of the latter, merging into the boss, are interrupted to permit the entry of the nipple into the separator to the extent of approximately one-half of its diameter. The nipple may be secured, as in the case of the nipple **23**, and there will be provided a deflector for diverting the trapped material into a side opening of the nipple, as in the other form.

The form of separator last described will be of special value in the elimination of fine material from gravel, or the like, and when used for that purpose the nipple **39** will trap the material desired for use, permitting the dust to pass on to be discharged onto a dump, or into a suitable receptacle.

Where the operation to be performed is the separation out of the dust or fine sand which frequently is mixed with gravel, and also in operating on other materials, water may be used as the carrier instead of air, and in the drawings there is shown a pump **41** for conveying the material to and forcing it through the separator.

The invention may be advantageously used in separating ore from gangue, and the form of the embodiment employed will vary with the service desired. The deflector **25** is circular and rotatable, and is made of hardened material to increase its durability.

I claim as my invention—

1. In a separator, a curved tube having a V-shaped section, the contracted portion being outward with reference to the curvature and having a lateral outlet at the apex of the V-shaped section, a boss surrounding the outlet, a discharge tube projecting through the boss and having a closure for its inner end and a lateral opening adjacent thereto, and means for adjustably securing the tube to the boss.

2. A separator comprising a curved tube having an outlet opening in its outer wall, a counterbored boss surrounding the opening, a gland fitting within the counterbore, a pair of posts projecting from the boss, a discharge tube projecting into the curved tube through the gland and being laterally open at its inner end and being exteriorly threaded, a pair of posts projecting from the gland and engaging the discharge tube to prevent its turning, and a nut rotatably carried by the gland and engaging the threads of the discharge tube.

3. A separator comprising a curved tube having an outlet opening in its outer wall, a counterbored boss surrounding the opening, a gland fitting within the counterbore, screw means for adjustably securing the gland within the counterbore, a discharge tube projecting into the curved tube through the gland and being laterally open at its inner end and being exteriorly threaded, a post projecting from the gland and engaging the tube to prevent its turning, and a nut rotatably carried by the gland and engaging the threads of the discharge tube.

4. A separator comprising a curved tube having an outlet opening in its outer wall, a counterbored boss surrounding the opening, a gland fitting within the counterbore, screw means for adjustably securing the gland within the counterbore, a discharge tube projecting into the curved tube through the gland and being laterally open at its inner end and being exteriorly threaded, means for preventing relative turning movement of the tube and gland, and a nut rotatably carried by the gland and engaging the threads of the discharge tube.

ALFRED J. MOSLEY.