Jan. 13, 1931. G. S. MELOY 1,789,246

DEVICE FOR SAMPLING BULK MATERIAL

Filed Dec. 26, 1929 2 Sheets-Sheet 1

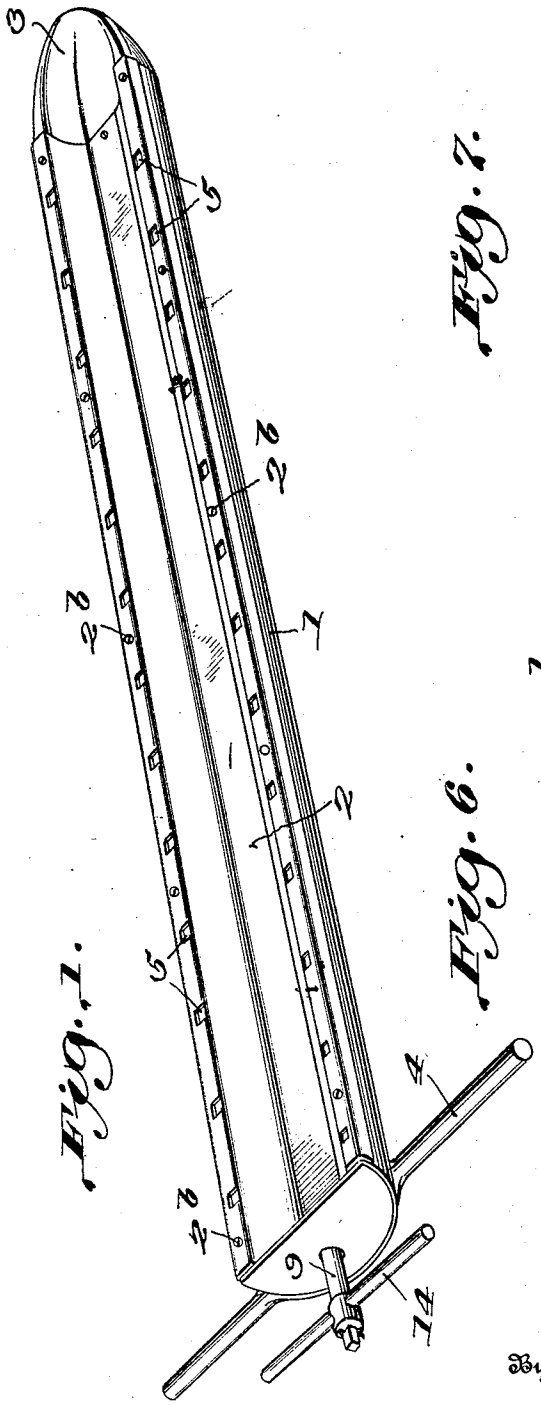


Fig. 1.

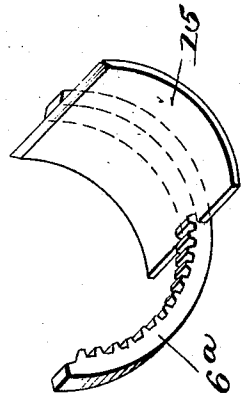


Fig. 7.

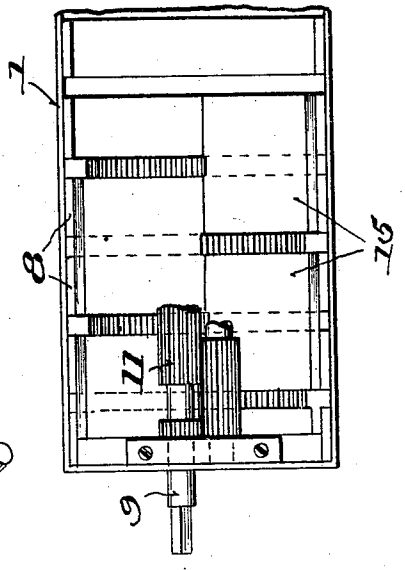


Fig. 6.

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Jan. 13, 1931. G. S. MELOY 1,789,246

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Filed Dec. 26, 1929 2 Sheets-Sheet 2

Fig. 2.

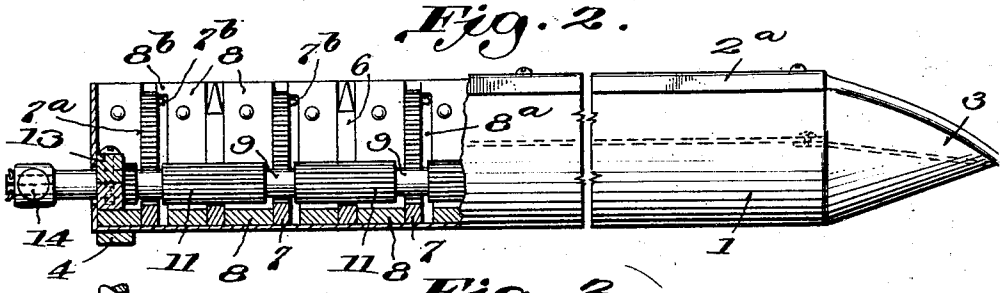


Fig. 3.

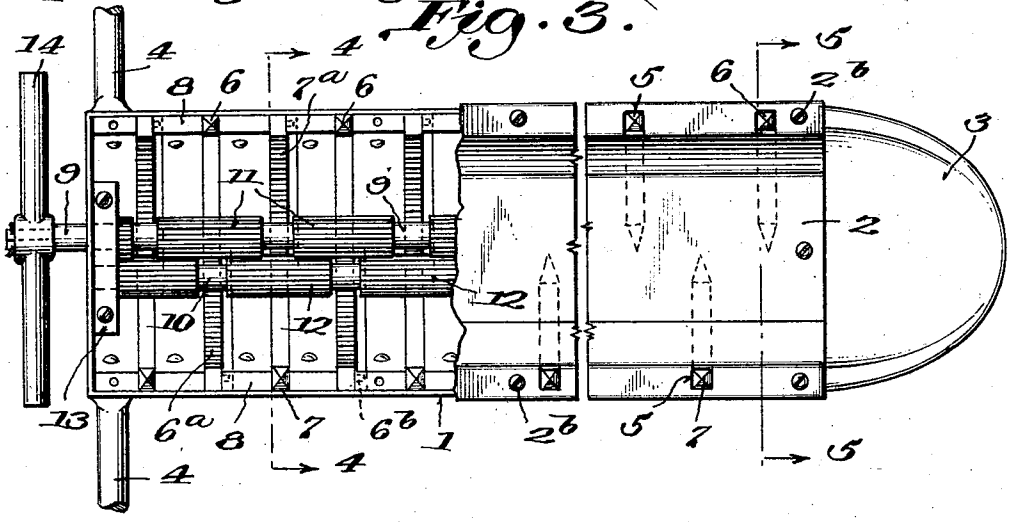


Fig. 4.

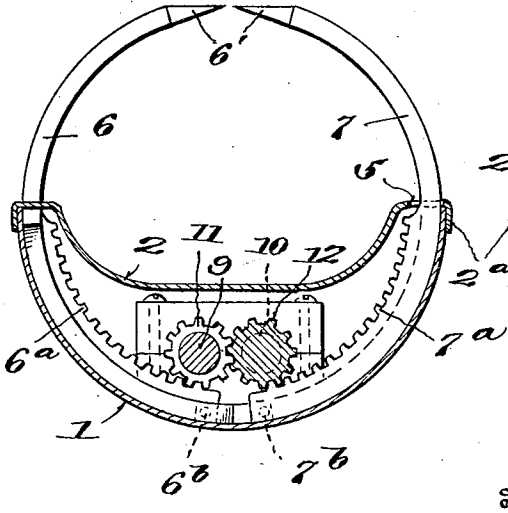
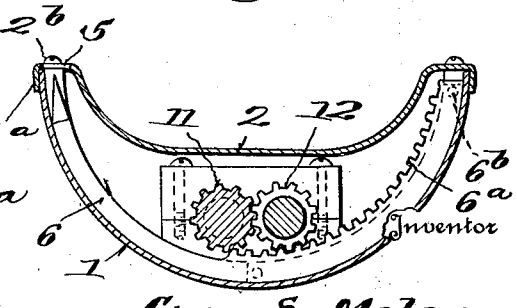


Fig. 5.



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UNITED STATES PATENT OFFICE

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DEVICE FOR SAMPLING BULK MATERIAL

Application filed December 26, 1929. Serial No. 416,673.

This invention relates to devices for taking samples from the interior of a mass of bulk material.

Where the material to be sampled is of a loose freely flowing granular nature, such as sand, ore, wheat, etc., it has long been customary to take samples by means of a hollow rod or the like thrust into the material and having openings or slots into which the material can flow, so that when the hollow rod has been filled with material, it can be withdrawn, bringing the sample with it.

Where, however, the material is of a more or less sticky or fibrous nature, and is of such consistency that it will not flow freely into the holes or openings of such a sampling rod, a problem is presented which heretofore, so far as I am aware, has remained unsolved.

One material which it is particularly desirable to sample in this way and which is of such a nature as to render ordinary sampling rods useless, is cotton seed. The seed has a certain amount of lint or fiber adhering to it and when it is shipped in bulk, as for example in freight cars, the seeds cling together and form a compact mass which is substantially non-flowing.

The object of the present invention is, therefore, to provide a sampling device which can be thrust into a mass of clingy fibrous or non-flowing material such as cotton seed, and which, when withdrawn, will bring with it a sample in the form of a core showing a true cross section of the mass.

With the above object in view, and to provide a device of this character which shall be relatively cheap in construction and simple and efficient in operation, the invention consists in the construction and arrangement of parts hereinafter described and claimed, and illustrated in the accompanying drawings, in which:—

Figure 1 is a perspective view of my improved sampling device as it appears when ready for use;

Figure 2 is a side elevation of the same, on an enlarged scale, parts being broken away and parts shown in section;

Figure 3 is a plan view on the same scale as Figure 2, parts being broken away to show the construction;

Figures 4 and 5 are transverse sections substantially on the lines 4—4 and 5—5 of Figure 3, looking in the direction of the arrows, and showing the parts in different positions;

Figure 6 is a fragmentary view similar to Figure 3 but showing a slightly modified construction; and

Figure 7 is a perspective view of one of the jaws shown in Figure 6.

Referring to the drawings in details, my improved device comprises an elongated hollow body 1, shown as semi-cylindrical in shape, and provided with a top plate or cover 2, preferably concave, as shown in Figures 4 and 5. This cover may be secured to the body 1 in any suitable manner. In the drawing, I have shown the cover 2 as provided with flanges 2^a overlapping the side edges of the body 1, and secured in position by means of screws 2^b. To one end of the hollow body thus formed is secured a sharpened or tapered point 3, having a narrow cutting edge so that the device may be readily thrust into a compact mass of material such as cotton seed. To the opposite end of the body is secured a cross bar or handle 4, by means of which the device may be manipulated.

Supported within the body 1 and conforming with the shape of the interior thereof are two series of arcuate spaced fingers or jaws 6 and 7, each extending substantially 180° in length. The ends of these jaws are preferably pointed, as shown at 6′ in Figure 4. The top or cover plate 2 is provided with two series of holes or openings 5, one along each edge, arranged to register with the position of the respective jaws 6 and 7, and through which these jaws may be projected.

The inner ends of each of the jaws 6 and 7 is provided on its inner side with a toothed rack 6^a and 7^a, and these toothed racks are adapted to mesh respectively with two series of pinions 11 and 12, carried by a pair of shafts 9 and 10, which extend longitudinally of the body and which are journalled in two or more bearings such as 13.

It will be observed that the teeth of the

racks 6^a and 7^a extend inwardly beyond the inner edge of the smooth portions of the jaws 6 and 7, and the shafts 9 and 10 are so mounted that each of these shafts clears the toothed racks with which the pinions on the other shaft engage. Thus, the racks on adjacent jaws are engaged by pinions on different shafts. Moreover, the two shafts 9 and 10 are geared together so as to rotate in synchronism. A convenient way of doing this is to make each pinion 11 or 12 considerably longer than required to engage the corresponding rack, the portions of the two pinions projecting beyond the racks being in mesh with each other. In fact, in practice I have found it expedient to form the shafts and pinions of fluted bars, cutting away the flutes or teeth where necessary to permit the arcuate racks to pass, and permitting the flutes to occupy all of the remaining length of the shafts.

One of the shafts as for example the shaft 9, extends through the end wall of the body or casing, and is provided with a handle 14 by means of which it may be turned.

The jaws 6 and 7 are spaced apart and held in position by means of guides or ribs 8, as clearly shown in Figures 2 and 3. One of these ribs is interposed between each pair of jaws. As shown in Figure 2, the ribs are cut away alternately on opposite sides through approximately one-half of their length, as indicated at 8^a, and are provided at the end of such cut away portion with a shoulder 8^b. To the end of each of the rack portions of the jaws is secured a stop pin 6^b or 7^b, and these pins engage the shoulders 8^b to limit the movement of the jaws in one direction. Similar shoulders are formed at the other ends of the cut away portions 8^a of the ribs to engage the stop pins and limit the movement of the jaws in the other direction, such second shoulders being obscured in Figure 3 by the shafts and pinions.

From the foregoing, it will be apparent that the two series of arcuate fingers or jaws are normally housed within the casing or hollow body, so that the device, when ready for insertion into the mass of material, is in the nature of an elongated bar, as shown in Figure 1, having at one end a tapered or sharpened point and at the other end a manipulating handle, and also the operating means for the jaws. In fact, my improved device, in its general appearance and method of handling, is not very unlike an ordinary crow bar.

When it is desired to take a sample of bulk material such as cotton seed, the device is thrust into the mass as far as desired. The handle 14 is then turned, thus rotating the two shafts 9 and 10, and by means of the racks and pinions, projecting the two series of fingers or jaws outwardly through the openings 5 into the position shown in Figure 4. These jaws when in this position, it will be seen, enclose or embrace between themselves and the concave top or face 2 of the body a core of the material to be sampled. When, therefore, after the jaws have been thus projected, the device is withdrawn from the mass of material, it brings with it a core corresponding in length to the distance the device was thrust into the mass, and this core represents a true cross section of the material. Thus it can be readily determined whether a carload of cottonseed, for example, is of the same grade or quality throughout.

While I have shown the body formed of sheet metal with the ribs or guides 8 secured thereto, as by riveting, it will, of course, be understood that the body and ribs may be cast integral, if desired, and that in this case, the point 3 will also be cast with the body.

The spacing of the jaws will, of course, be determined by the nature of the material for which the device is designed, the more fibrous or the coarser the material is, the farther apart will the jaws be placed.

On the other hand, if the material is unusually fine or of a semi-fluent nature, it may be desirable to place the jaws so close together that there is but a very small space between them. For this purpose, I may employ the construction illustrated in Figures 6 and 7, in which the jaws, instead of being of uniform cross section throughout, may have their outer half widened by providing it with webs 15, as shown in Figure 7. These webs may be either cast integral with the rest of the jaw, or may be formed of sheet material and secured thereto. These webs or flanges 15 are constructed to overlie the guide strips or ribs 8, as shown in Figure 6, and the distance between the adjacent edges of the webs of the jaws need be no greater than the width of the tail or rack portion thereof. Otherwise, the construction and operation of the modification shown in Figures 6 and 7 is the same as that above described.

What I claim is:

1. A sampling device for bulk material comprising an elongated closed, hollow body adapted to be inserted into the material, and means normally housed within said body and out of contact with the material for embracing a portion of the material adjacent to but outside of said body to form a core.

2. A device for taking a sample of a mass of material, comprising an elongated body of substantially uniform section throughout and having a sharpened end adapted to be thrust into the mass, and means carried by said body for embracing a portion of the material adjacent to but outside of said body, to form a core of a length substantially coextensive with said body.

3. A device for taking a sample of a mass of material, comprising a hollow bar adapted to be thrust into the mass and a series of fingers normally housed within said bar and disposed along the length thereof for embracing a portion of the material adjacent to but outside of said bar to form a core.

4. A device for removing a sample of material from a mass, comprising an elongated body having opposed jaws disposed at the edges thereof and normally housed within said body, and means for projecting said jaws from said body toward each other so as to embrace a core of material between themselves and said body.

5. A device for removing a sample of material from a mass, comprising an elongated body of semi-cylindrical shape, having a concave face, opposed arcuate jaws disposed at the edges of said face and normally housed within said body, and means for projecting said jaws from said body toward each other so as to embrace a core of material between themselves and said concave face.

6. A device for removing a sample of material from a mass, comprising an elongated, bar shaped body, a series of jaws disposed at each edge of said body and normally housed within the same, and means for simultaneously projecting the two series of jaws toward each other so as to cause them to embrace a core of material between themselves and said body.

7. A device for removing a sample of material from a mass, comprising an elongated, bar shaped body, a series of jaws disposed at each edge of said body and normally housed within the same, and means extending throughout the length of said body and operable from one end thereof for simultaneously projecting the two series of jaws toward each other to embrace a core of material between them.

8. A device for removing a sample of material from a mass, comprising an elongated, bar shaped body, tapered at one end and provided at the other end with a handle by means of which it may be thrust into the mass of material, opposed jaws carried by said body and normally housed within the same, and means operable from the handle end of said body for simultaneously projecting said jaws toward each other to embrace a core of material between them.

9. A device for removing a sample of material from a mass, comprising an elongated body of semi-cylindrical shape, a series of arcuate jaws disposed at the edge of said body, and normally housed within the same, a rack formed on a portion of each jaw, an operating shaft extending longitudinally of said body, and pinions carried by said shaft engaging said racks, whereby, upon rotating said shaft, said jaws may be projected from said body.

10. A device for removing a sample of material from a mass, comprising an elongated body of semi-cylindrical shape, two series of opposed arcuate jaws movably mounted in said body and normally housed within the same, a rack formed on a portion of each jaw, a pair of operating shafts geared together and extending longitudinally of said body and a plurality of pinions carried by each shaft, the pinions on each shaft engaging the racks on one series of jaws, whereby, when said shafts are rotated, said opposed series of jaws are simultaneously projected from said body.

In testimony whereof I affix my signature.

GUY S. MELOY.