(No Model.) 4 Sheets—Sheet 1.

T. CLARKSON.

SAMPLER FOR GRAIN, MINERALS, &c.

No. 518,915. Patented Apr. 24, 1894.

Fig. 1

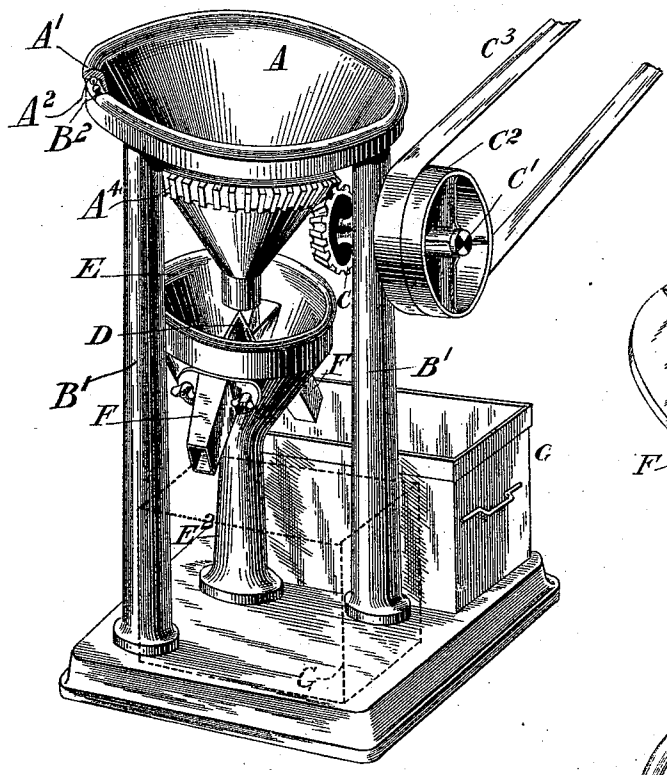


Fig. 5.

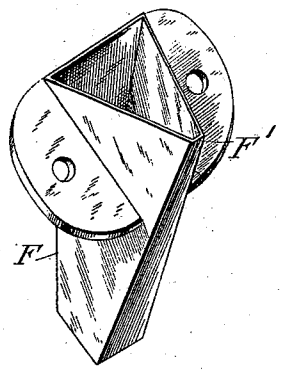


Fig. 4.

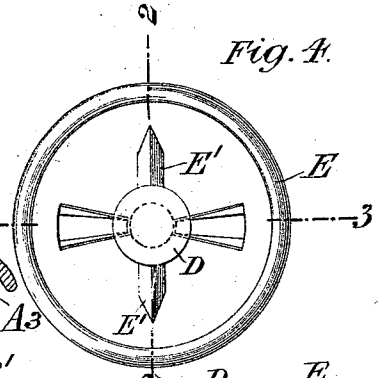


Fig. 2.

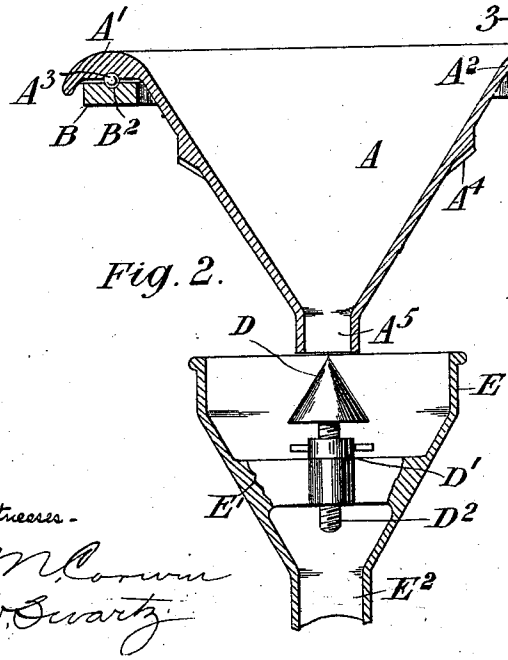
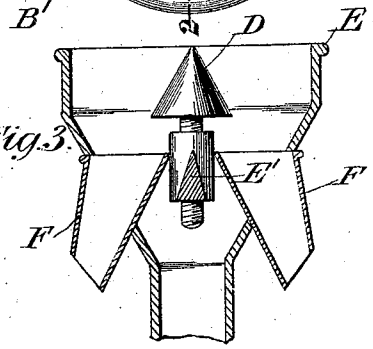


Fig. 3.



Witnesses.

H. M. Corwin

W. W. Swartz

Inventor.

Thomas Clarkson

by his Attorneys

W. Baxewell & Sons

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

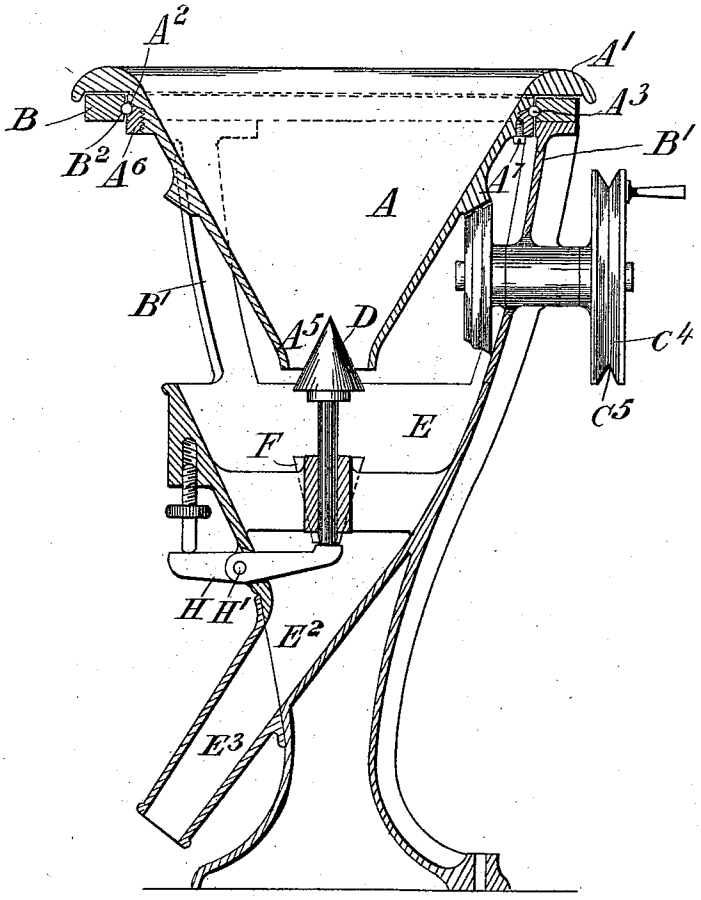
(No Model.) 4 Sheets—Sheet 2.

T. CLARKSON.

SAMPLER FOR GRAIN, MINERALS, &c.

No. 518,915. Patented Apr. 24, 1894.

Fig. 6.



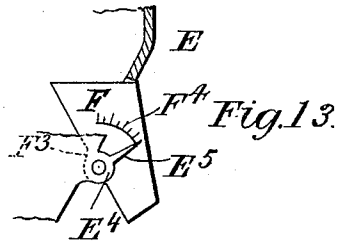


Fig. 13.

Witnesses
H. M. Cousins
W. W. Scoville

Inventor
Thomas Clarkson
by his Attorneys
W. Baxendell & Sons

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

(No Model.) 4 Sheets—Sheet 3.

T. CLARKSON.

SAMPLER FOR GRAIN, MINERALS, &c.

No. 518,915. Patented Apr. 24, 1894.

Fig. 8.

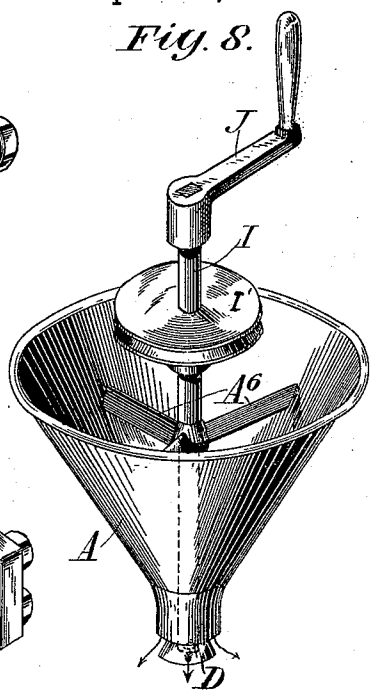


Fig. 7.

Witnesses.
A. M. Corwin
W. W. Swartz

Inventor.
Thomas Clarkson
by his Attorneys
W. Baxendell & Sons.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

(No Model.) 4 Sheets—Sheet 4.

T. CLARKSON.

SAMPLER FOR GRAIN, MINERALS, &c.

No. 518,915. Patented Apr. 24, 1894.

Fig. 9.

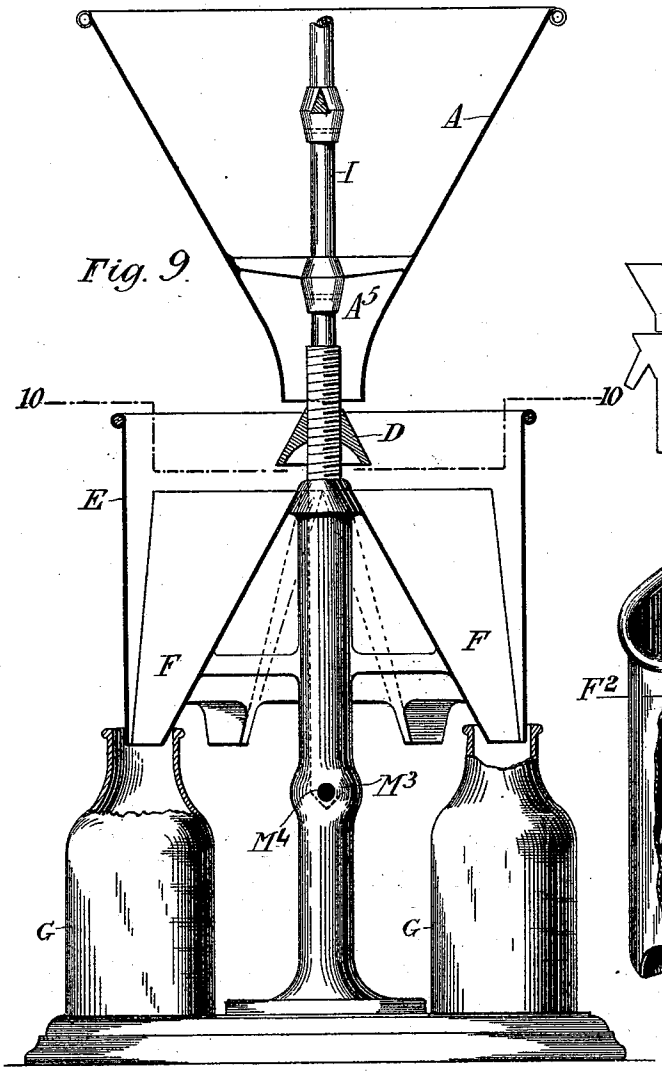


Fig. 12.

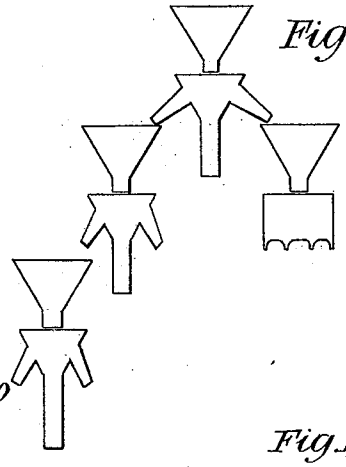
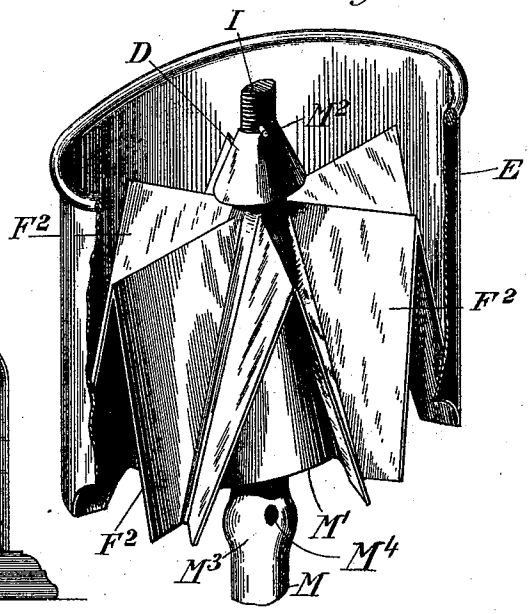


Fig. 11.



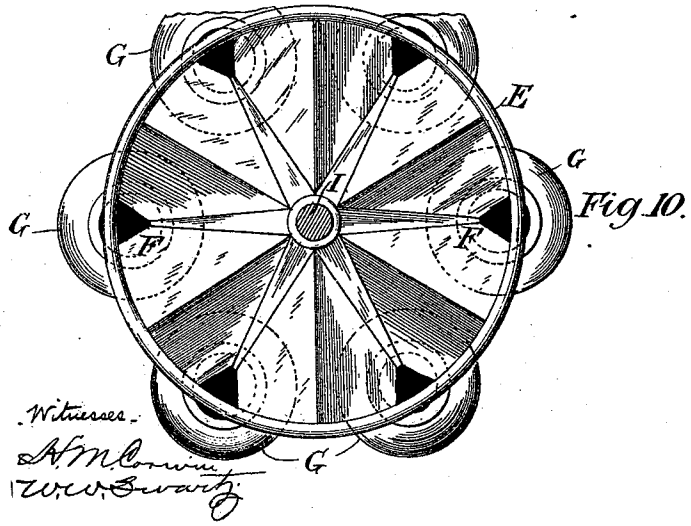


Fig. 10.

Witnesses.
A. M. Conwell
W. W. Swartz

Inventor.
Thomas Clarkson
by his Attorneys
W. Bakewell & Sons.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

THOMAS CLARKSON, OF SUTTON, ENGLAND.

SAMPLER FOR GRAIN, MINERALS, &c.

SPECIFICATION forming part of Letters Patent No. 518,915, dated April 24, 1894.

Application filed July 22, 1893. Serial No. 481,173. (No model.)

To all whom it may concern:

Be it known that I, THOMAS CLARKSON, a subject of the Queen of England, residing at Sutton, county of Surrey, England, have invented certain new and useful Improvements in or Relating to the Sampling of Grain, Minerals, Liquids, and the Like, of which the following is a specification.

This invention is designed to procure reliable samples from granular and other materials such as grain, coffee berries, pulverized minerals and other materials, as well as liquid substances.

Upon a vertical axis is a revolving hopper with an annular opening at the bottom the size of which may be controlled in any convenient manner say by means of a circular and preferably conical cap or valve the position of which may be adjusted by a screw and nut or other suitable means. From the hopper the material to be sampled falls in an annular stream into the receptacle provided for it and it is from this stream that the sample is to be taken. This may be effected by means of one or more scoops or chutes projected into the path of the annular stream and being preferably inclined downward the material which they intercept falls down the chutes into sample boxes or receptacles. Usually a known proportion of the grain will be intercepted and the whole of the sampling may be effected at the one operation, the required quantity, say for example ten per cent., being taken at once; where however it is desired to take a sample of a sample this may be done by providing the apparatus in series placing two or more upon the same or separate shafts but so arranged that the material sampled by the first apparatus is delivered to the second or subsequent apparatus each of which again samples it. Thus in the first apparatus the sampling scoops or equivalent may be made of such size that they will take say one-half of the total amount of grain passing; this will be delivered to the next following apparatus which will again halve or divide the stream by which perhaps twenty-five per cent. of the whole will be obtained or this may be again divided and so on.

The sampling chutes may be made adjustable so that each chute may be adjusted to intercept more or less of the stream as required and a scale and index may be arranged in connection with each chute or all the chutes, so that they can be accurately set to the required position.

If desired chutes of different capacities may be used in connection with the one apparatus.

In the accompanying drawings Figure 1 is an elevation of a complete machine constructed according to this invention, Fig. 2 being a vertical section of part of Fig. 1 upon line 2, 2 of the plan Fig. 4. Fig. 3 is also a vertical section of a portion of Fig. 1 upon line 3, 3 of Fig. 4. Fig. 4 is a plan of the second part of the apparatus shown in Fig. 1, which receives the material from the hopper. Fig. 5 is a detail of one of the receiving chutes. Fig. 6 is a vertical section of an apparatus mainly similar to that shown in Fig. 1 but possessing modifications. Figs. 7 and 8 show an apparatus similar in its operation to Fig. 1 but slightly modified in its details. Fig. 9 is a vertical section of an apparatus similar to that shown in Fig. 1 but modified so as to select six samples instead of, as in Fig. 1, only two. Fig. 10 is a section upon line 10, 10 of Fig. 9, and Fig. 11 is a perspective view of a portion of Fig. 9 partly broken away. Fig. 12 is a diagram illustrating one manner of combining several machines; and Fig. 13 shows the preferred arrangement of the adjustable sampling chute.

Like letters represent like parts throughout the drawings.

A is the hopper which may be of any suitable shape and construction preferably funnel shaped as shown in Figs. 1 and 2 and adapted to be revolved by hand or power; in Fig. 1 it is shown driven by a belt while in Fig. 6 it is shown driven by hand. To facilitate the rotation of the hopper A it is provided with a flange A′ in which is a groove A^2 adapted to rest on a ring of balls A^3 supported upon a ring B carried by the standards B′ or other suitable part of the framing of the apparatus. B is provided with a groove B^2 in which the balls A^3 rest.

The hopper A is provided with a toothed ring A^4 with which gears the bevel wheel C carried upon the shaft C′ passing through a suitable bearing in one of the standards B′ and carrying the fast and loose pulleys C^2

around which passes the belt C^3 for driving as will be well understood. The material which for convenience I will denominate as grain passes from the hopper A by the central bottom opening A^5 falling upon the conical valve or plug D whose apex is in the axial line of the hopper A, D being adapted to be moved nearer to or farther from the orifice A^5 in any convenient manner say by means of the wing nut D′, Fig. 2. The spindle D^2 of the valve D may either screw into a hole bored vertically through the bridge piece E′ of the lower hopper or receptacle E where it can be locked by the nut D′ or it may fit loosely in the hole in the bridge piece E′, being prevented from falling through by the nut D′. For some materials the parts of the apparatus such as the plug D or the sampling chutes F may be loose and adapted merely to fit into suitable openings in the apparatus; in other cases these parts must be properly secured to the machine but as they may at any time require to be adjusted or exchanged for others it is desirable that the fastenings should be readily undone and secured again and I have therefore shown wing nuts in place of ordinary nuts for fastening the chutes F.

In the receptacle E and with their inner ends projecting into the path of the annular stream of grain escaping by the orifice A^5 and over the plug D are one or more sampling chutes F whose construction and position will be well understood by reference to Figs. 1, 3, 4 and 5. If desired these chutes may be inserted by the inside of the receptacle E and merely fit suitable openings in the wall of E with a flange to keep them from falling through; for liquids however this plan would not be suitable and it would be necessary to secure the chutes F with a tight joint to the receptacle E by bolts and nuts as indicated in Figs. 1 and 3. The upper ends F′ of the chutes F as is clearly shown in Figs. 1 and 3 project into the path of the annular stream of grain falling over the plug D and intercept a greater or less proportion of it according to the number of the chutes or their size or shape. The chutes F deliver the grain they receive into suitable receptacles say for example the boxes G Figs. 1 and 7, or the sampling bottles G shown in Fig. 9. In Figs. 1 and 7 one of the boxes is shown in dotted lines only so as not to interfere with the part of the apparatus behind the box.

The bridge pieces E′ are shown with a pointed or thin edge upward in all cases so as to prevent lodgment of grain on top of these parts and to interfere as little as possible with the stream of grain. This feature is carried out generally throughout the machine, sloping faces being used, so that no lodgment of material may take place and the machine may be used for sampling different materials without necessitating cleaning.

The description already given will serve substantially for the modification shown in Fig. 6 but in this case the toothed ring A^4 and bevel wheel C and the fast and loose pulleys C^2 are dispensed with and friction driving gear and a hand wheel C^4 are shown in their place the latter having however a groove C^5 in which a cord or round belt can be run if desired. The raising and lowering of the plug D is in this case effected by the lever H pivoted at H′ upon the receptacle E so that when its outer end is depressed its inner end is raised carrying with it the spindle D^2 (which need not be screwed) of the valve D. The bulk of the grain passing through this machine escapes by the orifice E^2 of the receptacle E but while in Fig. 1 this orifice is placed in the vertical axial line of the apparatus in Fig. 6 it is carried out at the side; in both cases a pipe or directing chute E^3 is employed to carry the grain away. In Fig. 6 I have also illustrated an arrangement of the ball bearing differing from that shown in Figs. 1 and 2 in so far as, in this last described example, the groove B^2 is formed in the inner surface of the ring B and the groove A^2 partly in the hopper A and partly in a ring A^6 preferably screwed upon the outside of A and prevented from unscrewing therefrom by a screw A^7 or other convenient means.

In Fig. 7 the operation of the machine is exactly the same as in Fig. 8 the chief difference relating to the shape of some of the parts while different means are shown for revolving the hopper A. The hopper A is substantially the same as before but it is provided with a vertical spindle I carrying on its lower end the plug D; the spindle I is secured in the hopper A by the bridge piece A^6 through which it passes and to which it may be pinned as shown in Fig. 8. The spindle I carries a handle J by which the hopper can be turned or the grooved pulley I′ may be employed for this purpose. The spindle I is supported at its upper end by the bearing K′ of the arm K carried upon the standard B the pivoted cap K^2 being adapted to be moved by its handle K^3 out of the way when it is desired to remove the spindle I and hopper A. At its lower end the spindle I is supported upon the point L′ carried in the bracket L to flanges L^2 of which the receptacle E is bolted or riveted as shown in Fig. 7. The channel or chute E^2 carries the grain from the bottom of the receptacle E (which in this view is shown square with tapered walls) in the same manner as before described while the samples are taken by the sampling chutes F as before described.

The construction and operation of the apparatus shown in Figs. 9, 10, and 11 is substantially the same as that previously described but the receptacle E is shown provided with six of the sampling chutes F each of which would deliver into its proper receptacle G; or if desired each chute may as already explained deliver into another sampling machine where re-sampling is required. A greater or less number than six of the chutes F may be employed. As shown in Fig.

11 the chutes F in this case are slightly different in their construction although their operation is the same as before. In this case a central conical backing or support M′ is carried upon the central standard M which is hollowed to receive the vertical spindle I which carries the hopper A and plug D as previously described with reference to Figs. 7 and 8. The plug D is shown screwing on to the lower portion of the spindle I to facilitate the adjustment, a pin M^2 being shown in Fig. 11 to prevent the plug being screwed too high up and thus unduly closing the orifice A^5. The spindle I is shown in Fig. 9 dotted inside the standard M which may conveniently though not necessarily be swelled out or enlarged at M^3 and a hole M^4 bored to meet the central hole in which the spindle I works. The object of the hole M^4 is to facilitate the cleaning out of any grit from the bottom of the bearing. Upon the conical support M′ are placed the folded pieces of metal F^2 with their apices or joints at the top the channels between the plates F^2 forming the chutes F already described. Naturally if desired the whole of the parts M M′ and F^2 may be cast in one piece.

In Fig. 13 I have illustrated one manner in which I may make the sampling chutes adjustable. This consists in forming upon the said chutes F one or more lugs F^3 which are pivoted preferably between lugs E^4 projecting from the outer surface of the receptacle E. One of these lugs E^4 may carry a fixed pointer E^5 adapted to indicate on a scale F^4 on the side of each sampling chute F the positions into which it must be moved so as to obtain the samples bearing different proportions to the bulk of material passed through the apparatus. The pivot of each of the adjustable sampling chutes F may conveniently be in the form of a screw by tightening which the chute may be held in any desired position. It will readily be seen that as the sampling chute F is made to project more or less into the receptacle E the sample intercepted by it will bear a larger or smaller proportion to the bulk of material passed through E. Any suitable metal or material may be employed for any portions of this apparatus.

In Fig. 12 is diagrammatically illustrated an arrangement of several of these machines arranged upon or around the same vertical axis; each of these machines delivering, as already described in Fig. 1, to one or more other machines arranged concentrically or otherwise around said vertical axis as may be most convenient. The bulk of the grain would travel downward in the direction of the axis while the samples would be delivered to the supplementary machines.

I claim—

1. In sampling apparatus, the combination with a rotatory hopper, having an annular discharge outlet, of a receptacle into which it discharges, and sampling chutes in said receptacle; substantially as described.

2. In a sampling apparatus, the combination with a rotatory hopper and means for rotating the same, of a plug or valve in its outlet arranged to produce an annular stream, and a receiving vessel having a sampling chute projecting thereinto; substantially as described.

3. In a sampling apparatus, the combination with a rotatory hopper, having a projecting flange, a standard provided with a ring having a ball bearing for said flange, means for rotating the hopper, and a receptacle having sampling chutes therein; substantially as described.

4. In a sampling apparatus, the combination with a rotatory hopper having a central outlet, of a receptacle having a central discharge through which the main body of the material is discharged, and one or more sampling chutes projecting into said receptacle; substantially as described.

5. In a sampling apparatus, the combination with a rotatory hopper having a central outlet, of a receptacle having a central discharge through which the main body of the material is discharged, one or more sampling chutes projecting into said receptacle, and receptacles for the material discharged from the sampling chutes; substantially as described.

6. In a sampling apparatus, the combination with a rotatory hopper and means for rotating the same, of an adjustable plug or valve in its outlet arranged to produce an annular stream, and a receiving vessel having an adjustable sampling chute projecting thereinto; substantially as described.

7. In a sampling apparatus, the combination with a rotatory hopper and a receptacle having sampling chutes, of means for adjusting the distance which they project within said receptacle; substantially as described.

8. In a sampling apparatus, the combination with a rotatory hopper and a receptacle having sampling chutes, of means for adjusting the distance which they project within said receptacle, and an index to show the amount of the sample; substantially as described.

9. In a sampling apparatus, the combination with a rotatory hopper and a receptacle having pivoted sampling chutes, of means for adjusting the distance which they project within said receptacle; substantially as described.

In testimony whereof I have hereto set my hand in the presence of the two subscribing witnesses.

THOMAS CLARKSON.

Witnesses:
ALFRED J. BOULT,
HARRY B. BRIDGE.