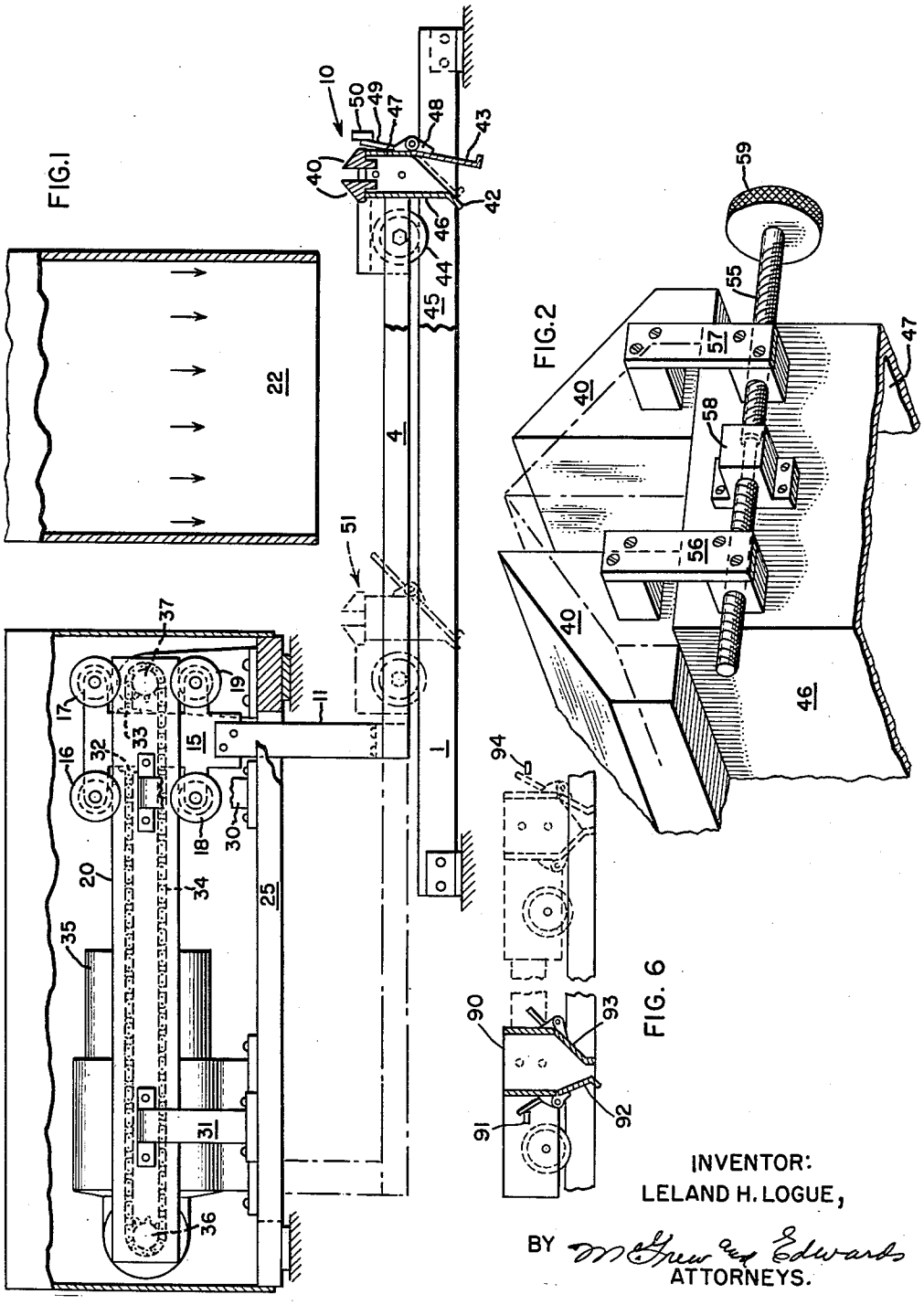
Nov. 12, 1963 L. H. LOGUE 3,110,183

SAMPLE CUTTER

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FIG.3

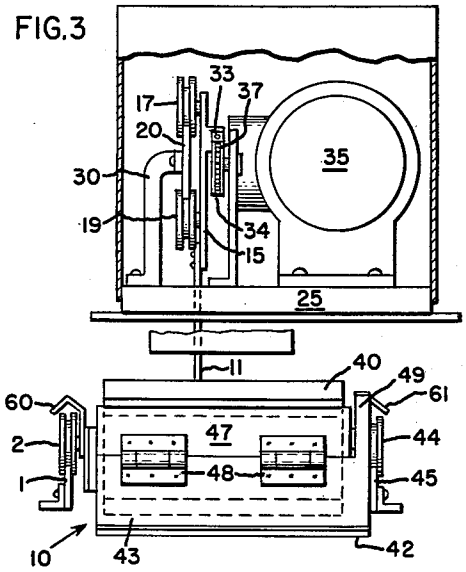


FIG.4

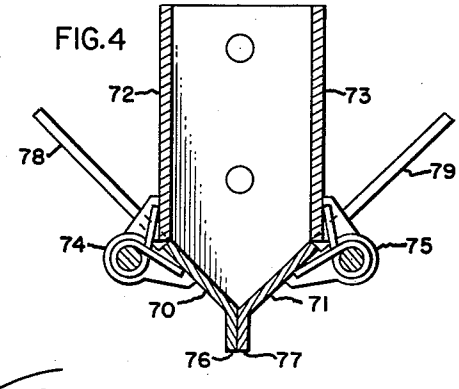
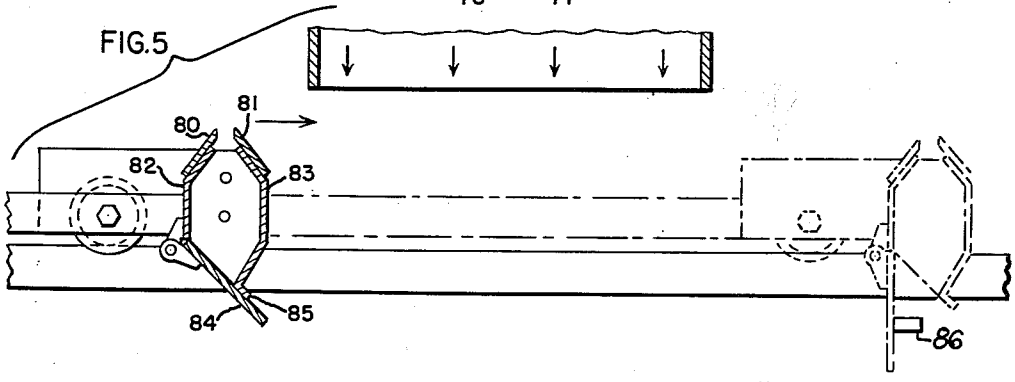


FIG.5



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SAMPLE CUTTER

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6 Claims. (Cl. 73—423)

This invention relates to samplers and more particularly to a cutter type sampler which periodically cuts a stream of material to take a representative sample of such material.

Samplers which take a small fraction of a falling stream of material are known in the art as "cutter" samplers. Such samplers have utilized long chutes periodically moving into and out of a material stream. Such chutes require an excessive amount of headroom in many installations and are not of the self-dumping type.

According to the present invention I have provided a horizontally traveling sampler which includes a simple and effective adjustable sample taker.

Further, my sampling device requires little space for its operation; will deposit the samples taken at a plurality of stations in its sampling cycle; is self-cleaning; and additionally, provides an accurate sample representation of the material stream through which it passes, as well as being capable of self-disposition of samples so taken.

It is, therefore, among the objects and advantages of my invention to provide a novel sampling device, capable of self-disposition of samples taken as well as being self-cleaning.

It is still another object of my invention to provide novel sampling means arranged to provide a selective amount of sample in a predetermined time cycle, and further, may be arranged to deposit samples so taken at a plurality of stations during said cycles.

Still further objects and advantages will become obvious from a study of the description presented hereafter with reference to the appended drawings in which:

FIG. 1 is a side view of a sample cutter installation according to my invention;

FIG. 2 is an enlarged isometric detail of the sampler of FIG. 1 including novel adjusting means;

FIG. 3 is an end view of the apparatus of FIG. 1;

FIG. 4 is a sectional side view of an alternative sample cutter with the cutter blades omitted;

FIG. 5 is a side view of an installation of another alternative sample cutter; and

FIG. 6 is a side elevation of a sample cutter installation arranged for discharge of samples at each end of the course of sample cutter travel.

The installation of FIGS. 1 to 3 includes a pair of track elements 1 and 45 (shown in detail in FIG. 3), arranged for rolling support of wheels 2 and 44. The cutter, generally indicated by reference character 10, is carried by the wheels back and forth through the material falling from feed chute 22.

By means of the member 11 and elongated plate member 4 which is operatively associated with the cutter 10, motion is imparted to the cutter in a manner described hereafter. The member 11 is attached to another plate 15 which has journalled thereon four wheels 16, 17, 18 and 19 for rolling association with track member 20. The track 20 is supported on the surface 25 by braces 30 and 31. The plate 15 also has the ends of a drive chain 34 affixed to brackets 32 and 33 on its vertical edges such that motion induced in the chain by the reversible motor 35 through sprocket wheel 36 in association with sprocket wheel 37, causes the plate 15 to move back and forth along the track 20.

In operation, upon the passage of a predetermined time interval dependent upon operating requirements, the

system of drive chain 34 and the associated connections cause a uniform lateral reciprocating motion to be imparted to the sampler 10 along the tracks 1 and 45 on the wheels 2 and 44. The predetermined periodic time interval is controlled by a timing mechanism (not shown) which periodically breaks the circuit of motor 35 and reverses the direction thereof, and thereafter closes the circuit to cause the sprocket wheel 36 to turn in the opposite direction and thereby cause lateral motion to be imparted to the cutter in the opposite direction.

Alternatively, although it is not shown, a one-way motor may be used in association with a transmission which is adapted to provide the desired backward and forward motion in the travel of the cutter.

The cutter 10 is sectionally shown as having a mouth, composed of a pair of adjustable elements 40 (one method of adjustment is shown in FIG. 2 and shall be referred to hereafter); a body composed of side walls 46 and 47, one of which side walls has a downwardly depending portion 42 and the other of which has mounted thereon a closure member 43. The mounting of the closure member is accomplished by urging means such as a spring hinge 48. FIG. 1 also shows the sample cutter open as it would be at the end of a cutting cycle when the upwardly extending portion 49 of the closure member 43 has been brought against the stop 50 by the motion induced by the associated drive chain 34 as hereinbefore described.

When the portion 49 of the closure member is brought against the stop, substantially the entire bottom of the cutter is opened and the sample falls by gravity to the desired collection device (not shown) leaving a clean empty sample cutter assembly ready for another sampling cycle. Reference character 51 generally indicates the configuration of the sample cutter at the opposite station of its sampling run, outside the feed zone, with the bottom closed.

FIG. 2 is the sample cutter of FIG. 1 showing a double-threaded thumbscrew for varying the sample opening. The double-threaded shank 55 passes through threaded blocks 56 and 57 and is journally supported in member 58. A separating motion is imparted to the mouth elements 40 by appropriate rotation of the knurled knob 59 thus accomplishing the desired opening and closing of the sampler mouth. The mouth as it would be in a completely closed inoperative position is shown in dashed lines.

FIG. 3 is an end view of the system of FIG. 1 indicating the drive arrangement for the cutter and illustrative that a plurality of urging members 48 may be used depending on the width of the cutter. Also, FIG. 3 shows covers 60 and 61 for protecting the wheels and tracks from spilled material and the like.

FIG. 4 is an enlarged sectional view of an alternative sample dumping arrangement according to this invention for use in streams where a large flow of material is entering through the feed chute and wherein samples are to be disposed of at both sides of the sampling run rather than at a single station as with the cutters of FIGS. 1 to 3 and 5. Instead of a single closure member supported on one of the side walls as in the cutter of FIG. 1, two closure members 70 and 71 are attached, one each on each of the side walls 72 and 73 by urging means such as spring hinges 74 and 75. Cutter blades similar to blades 40 of FIG. 1 have not been shown but may be provided when desired. The downwardly depending portions 76 and 77, respectively, of the closure members 70 and 71 form a material-holding relationship when in a closed position, similar to the extending portion 42 of side wall 46 and closure member 43 of FIG. 1. Thus, by placing stops similar to stop 50 of FIG. 1, at each end of the cutting cycle for bumping association with the up-

wardly extending portions 78 and 79, respectively, of the closure members 70 and 71, one sample is taken in each pass. This differs from the cutters of FIGS. 1 and 5 wherein two passes are made to accomplish a sample. Of course, as with the cutters of FIGS. 1 and 5, the second pass will be a predetermined period of time after the first pass, except that with the cutter of FIG. 4, there is a complete sample discharged in each pass.

FIG. 5 is an alternative system using an alternative cutter. The drive for the cutter is similar to that of FIG. 1 and therefore is not shown. The cutter consists of adjustable mouth elements 80 and 81 carried in association with side walls 82 and 83. The side wall 82 has a spring urged closure member 84 in a substantially material-holding relationship with the extending portion 85 of the side wall 83. The closure member is opened by bumping association with stop 86 in a manner similar to that of FIG. 1.

Another cutter design which would accomplish sample dumping at a plurality of stations in the sampler's cycle, such as for example, both sides of the sample run, is shown in FIG. 6 as operating in a driven arrangement of the type shown in FIGS. 1 and 5. The sample cutter 90 is shown in section at the left hand dumping station which includes a stationary stop member 91 disposed to engage an outwardly extending portion of a hinged side member 92 of the cutter at the end of its course of travel and thereby move the member 92 to a bottom opening position for discharge of the contained sample. The extending portion of side 92 is located outside of the path of fall of the contents which are collected in a suitable receptacle at the station. On the return course, a similar, hinged side member 93 engages a stop 94 disposed at the right hand station to engage the extending portion of side member 93 and discharge the contents of the cutter. As shown, the lower ends of side members 92 and 93 are bent to lie in flat abutting relation and effect a liquid seal. The hinging arrangement includes springs (not shown) which return the sides 92 and 93 to their normally closed position as soon as the extended portion is moved away from its associated stop.

Having thus described various manners of practicing the novel concepts of my invention, I wish it understood that I do not desire to be limited to the specific illustrations and description hereinbefore set forth, but rather by the scope of the appended claims.

I claim:

1. In a sampler of the type having means for movement of its material container back and forth through a sample-taking zone to stop positions at two points outside said zone, and providing a uniform rate of movement for each pass, and a time-controlled operating cycle, the improvement which comprises a pair of hinged material-confining surfaces, each surface having a portion adapted to cooperate with the other and abut in substantially material-holding relation to each other movable about their hinges for gravitational discharge of material from the container by separation of said surfaces and each of said surfaces having an exterior portion extending upwardly from the hinged portion, means adjacent each of the stop positions in the path of the upwardly extending portions extending for engagement therewith so as to move one of the hinged surfaces away from the abutting material-holding position on arrival of the container at one of said stop positions and thereby effect a gravitational discharge of the contents at such positions, and said hinged members being spring biased for movement into said abutting substantially material-holding position when the extension portion is moved out of contact with said means so as to confine a sample in the container in the next pass through the sample-taking zone.

2. In a sampler of the type having means for movement of its material container back and forth on guide means through a sample-taking zone to stop positions at two points on opposite sides of said zone, and providing a uniform rate of movement for each pass, and a time-controlled operating cycle, the improvement which comprises a pair of hinged material-confining surfaces of the container, each surface having a portion adapted to cooperate with the other and abut in substantially material-holding relation to each other and movable about their hinges for gravitational discharge of material from the container by separation of said surfaces, and means on each said hinged surface disposed to contact a stop means at an end of said guide means toward which it advances so as to move said hinged surface away from said abutting material-holding relation on arrival of the container at said stop position and thereby effect a gravitational discharge of the contents at such position, and said hinged members being spring biased for return movement into said abutting substantially material-holding position when the contact means is moved out of contact with said stop so as to confine a sample in the container in the next pass through the sample-taking zone.

3. In a sampler of the type having means for movement of its material container back and forth through a sample-taking zone to stop positions at two points on opposite sides of said zone, and providing a uniform rate of movement for each pass, and a time-controlled operating cycle, the improvement which comprises a pair of hinged material-confining surfaces on the container, each surface having a portion adapted to cooperate with the other and abut in substantially material-holding relation to each other and movable about their hinges for gravitational discharge of material from the container by separation of said surfaces, and each of said surfaces having outwardly-extending means, means at each stop position disposed in the path of one said outwardly-extending means for engagement therewith so as to move one of the hinged surfaces away from the abutting material-holding position on arrival of the container at said stop position and thereby effect a gravitational discharge of the contents at such position, and said hinged members being spring biased for return movement to said abutting substantially material-holding position when the outwardly-extending means is moved out of contact with said lower means so as to confine a sample in the container in the next pass through the sample-taking zone.

4. A bottom dump sample cutter comprising two separable, upright side members spaced at their tops to form a sample inlet end members cooperating with the side members to form a sample container, said side members having depending converging portions normally in contact to form a sample-confining, bottom closure, each side member having a hinged support on a substantially horizontal axis and an extension surface outside the path of fall of the contents of the cutter whereby movement of an extension surface against a stationary surface rotates the associated side member to a sample dumping position, and means for returning each side member to its normal closing position as it is moved away from a contacted stationary surface.

5. A sample cutter system, comprising a track disposed in the path of a gravitational fall of material to be sampled and having its ends beyond the path of fall, a carriage supporting a bottom-dump sample cutter for movement along said track between two stations located adjacent its ends and beyond the path of fall, said cutter having converging surfaces forming a normally closed bottom through which samples are discharged by gravity at a selected station, the converging surfaces having a hinged mounting on the carriage for rotation to a bottom opening position for discharge of contained samples from the cutter, a member connected to the hinged surface and extending outside the path of fall of the contents of the sample cutter, a stationary stop at each selected station in the path of an extension surface for moving the hinged surface to a bottom opening position on contact therewith, means associated with the hinged surface for returning it to bottom closing position as the extension sur-

face is moved away from the stop, and means for moving the carriage along the track from one station to the other in a time-controlled cycle.

6. A sample cutter system, comprising a track disposed in the path of a gravitational fall of material to be sampled and having its ends beyond the path of fall, a carriage supporting a bottom-dump sample cutter for movement along said track between two stations located adjacent its ends and beyond the path of fall, said cutter having converging liquid-sealing surfaces forming a normally closed bottom through which samples are discharged by gravity at the respective stations, each converging surface having a hinged mounting on the carriage for its rotation to a bottom opening position for discharge of contained samples from the cutter, a member connected to each hinged surface and extending outside the path of fall of the contents of the sample cutter, a stationary stop at each

station in the path of the nearest extension surface for moving its associated hinged surface to a bottom opening position on contact therewith, means associated with each hinged surface for returning it to bottom closing position as the extension surface is moved away from the stop, and means for moving the carriage along the track from one station to the other in a time-controlled cycle.

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