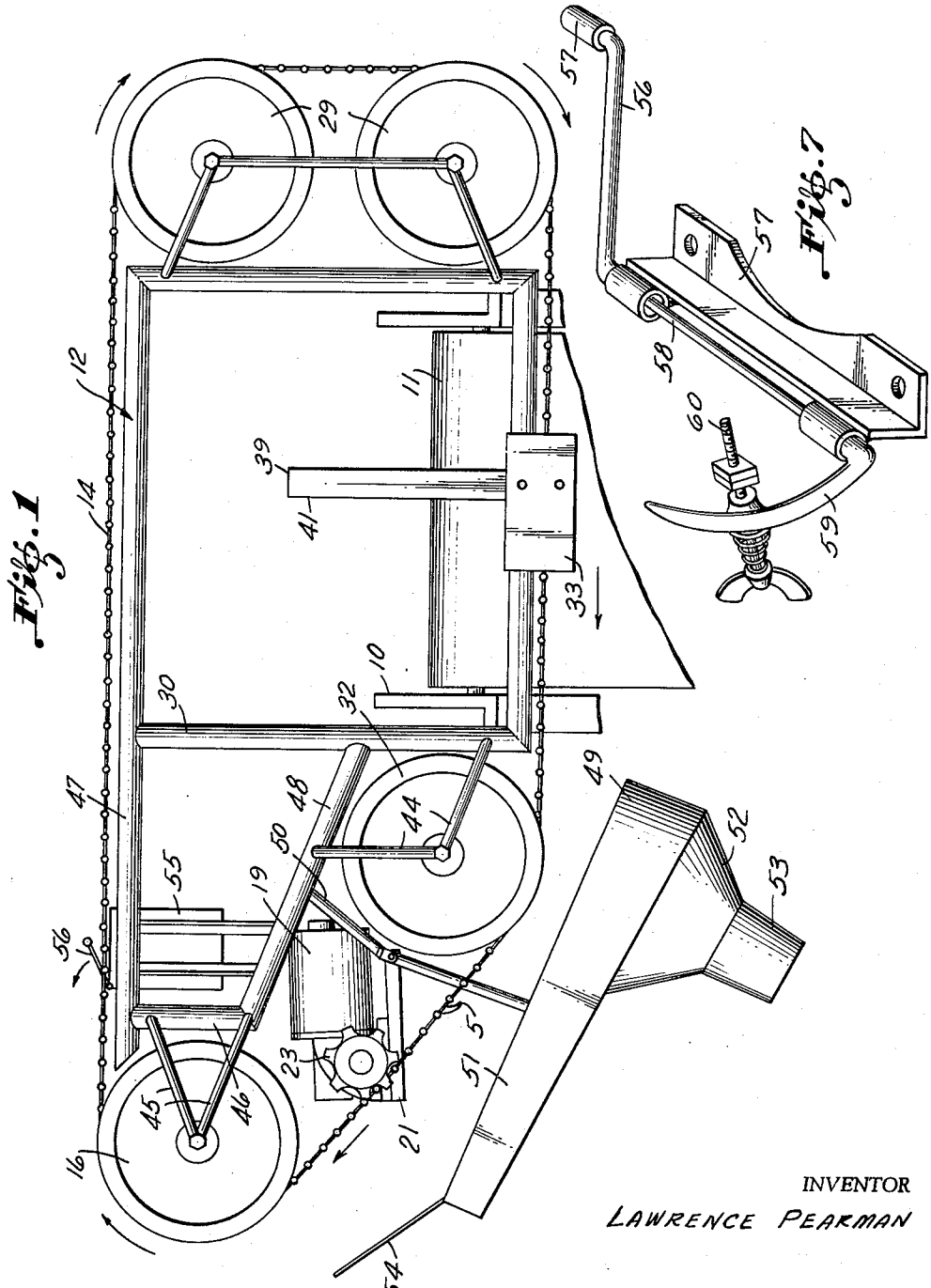
Oct. 24, 1961 L. PEARMAN 3,005,346

AUTOMATIC SAMPLER

Filed Sept. 12, 1957 4 Sheets-Sheet 1



INVENTOR
LAWRENCE PEARMAN

BY
Watson, Cole, Grindle & Watson
ATTORNEYS

Oct. 24, 1961 L. PEARMAN 3,005,346

AUTOMATIC SAMPLER

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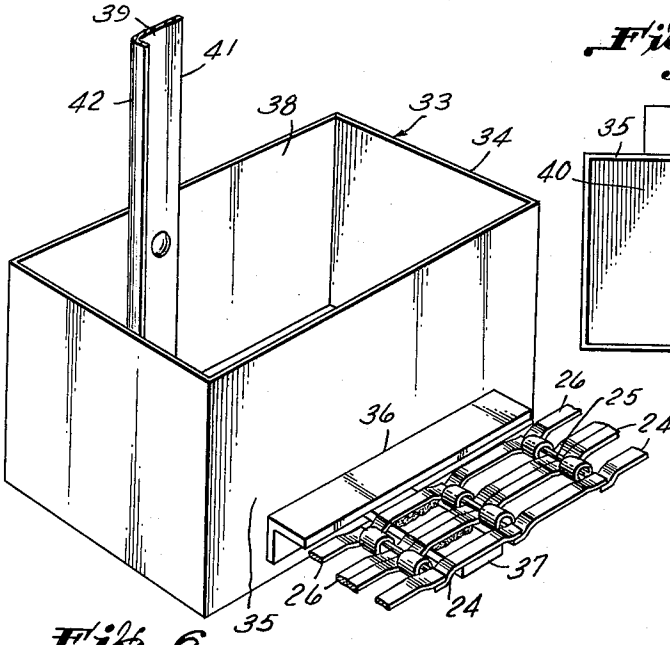


Fig. 6

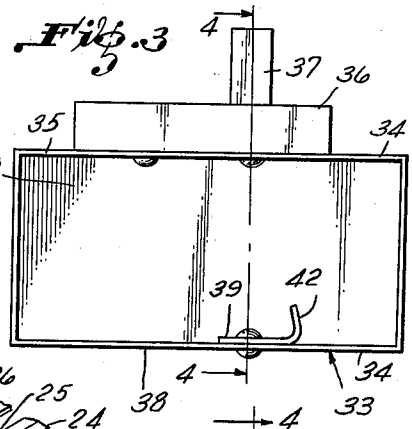


Fig. 3

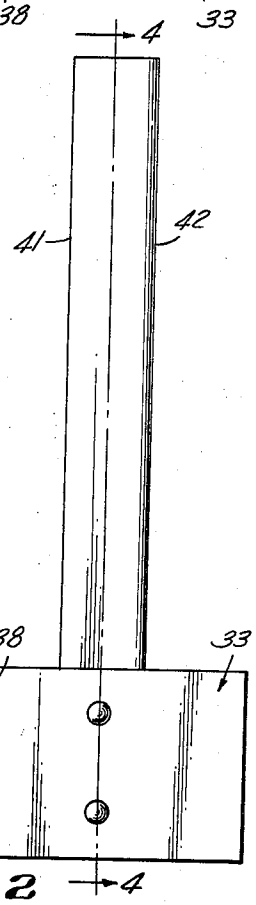


Fig. 2

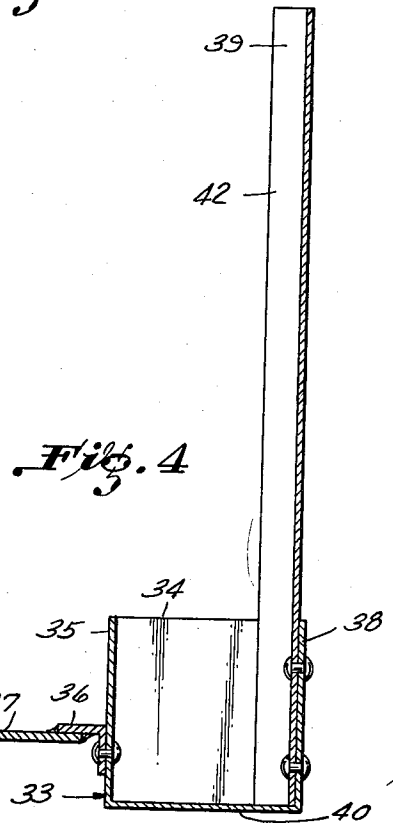


Fig. 4

INVENTOR
LAWRENCE PEARMAN

BY
Watson, Cole, Grindle + Watson
ATTORNEYS

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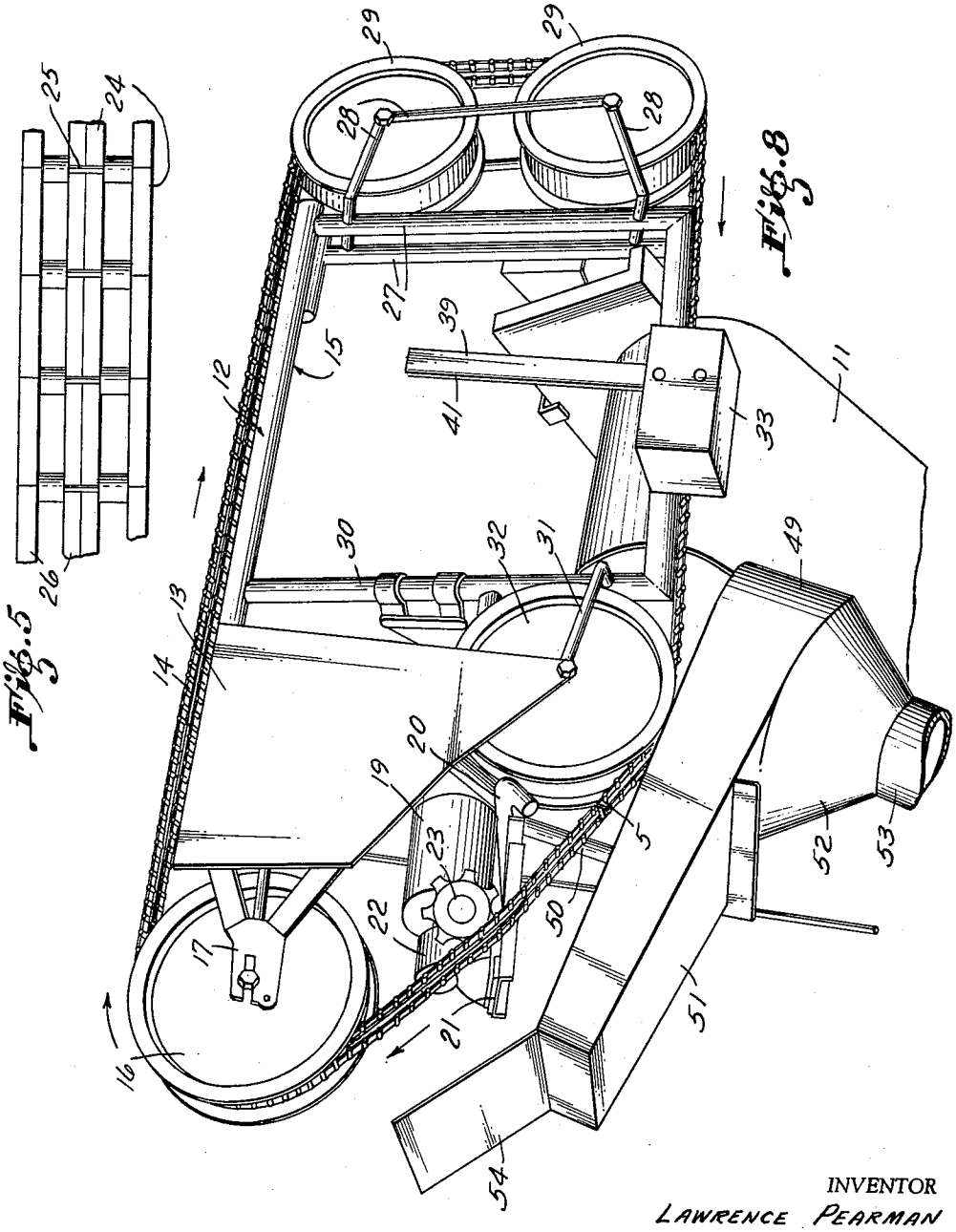


Fig. 5

Fig. 8

INVENTOR
LAWRENCE PEARMAN

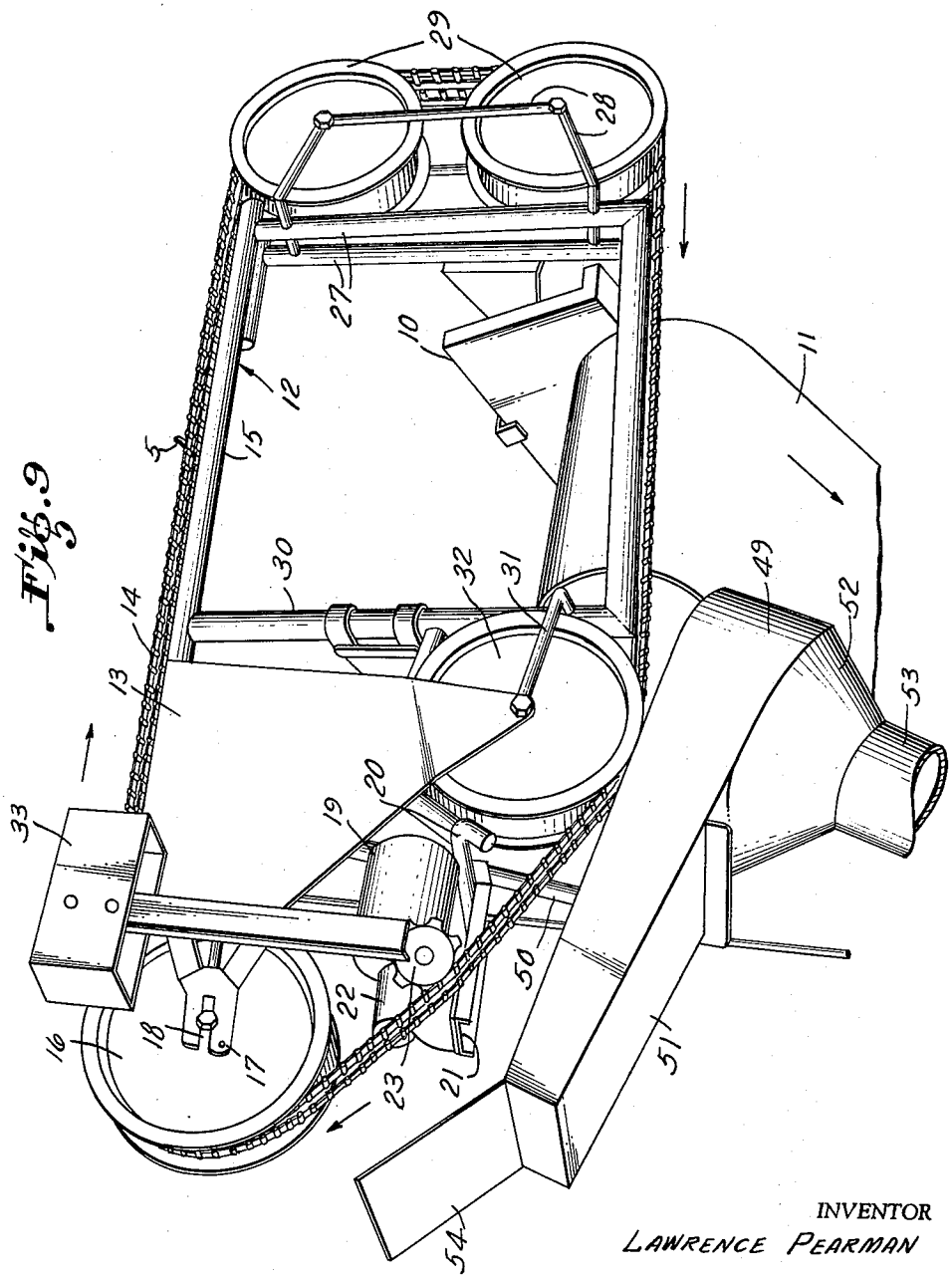
BY
Watson, Cole, Grindle & Watson
ATTORNEYS

Oct. 24, 1961 L. PEARMAN 3,005,346

AUTOMATIC SAMPLER

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Fig. 9



INVENTOR
LAWRENCE PEARMAN

BY
Watson, Cole, Grindle & Watson
ATTORNEYS

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3,005,346 AUTOMATIC SAMPLER

Lawrence Pearman, Box 42, Chula, Ga.

Filed Sept. 12, 1957, Ser. No. 683,481
15 Claims. (Cl. 73—421)

The present invention relates to machines for automatically sampling various materials such as peanuts and all types of nuts, beans, peas and vegetables including hard and soft shells and, more particularly, has reference to a machine to be applied to the end of a conveyor on which the peanuts are conveyed and which are projected as a stream from the end of the conveyor.

It is therefore an object of the invention to apply the machine or appliance to an end of, for example, a conveyor of the belt type so that after the material has been discharged from the end of the conveyor and starts its free fall into a bin, truck or storage area, periodically a bar with sample box sweeps through the free flow of material to thereby take and collect a sample therefrom. It is thus possible to determine by samples, the percentage of the desired product as compared with the waste materials or trash and also to determine the quality and size of such desired product as for example the peanuts. It is therefore a further object of the invention to provide a machine with a sample receiving box which receives the sample material and a trough with conveyor to carry and guide the sample to an inspection point.

Another object of the invention is to provide a machine with a frame structure, a cutter bar and drive means for a drive chain for the sample box with the cutter bar mounted thereon. The sample receiving box is rigidly connected to the drive chain so that the sample box with the sweep or sampling bar will be carried along with the bar in a substantially vertical plane with the box in a similar position throughout the travel of the box and bar around its complete cycle of operation.

A still further object of the invention is to provide the machine with an interval timer which is automatic in operation to set the machine in motion at certain intervals depending upon the number of samples to be collected in a given time interval of the travel of the material.

Further objects of the invention will be apparent from the following description when considered in connection with the accompanying drawings, in which:

FIGURE 1 is a side elevation of the sampling apparatus according to the invention,

FIG. 2 is a front elevation of the pick-up sample box with deflector bar,

FIG. 3 is a top plan view of the pick-up sample box and deflector bar of FIG. 2,

FIG. 4 is a vertical section of the box and bar taken on line 4—4 of FIG. 3 in the direction of the arrows and line 4—4 of FIG. 2 in the direction of the arrows,

FIG. 5 is a plan view of the detail of a portion of the chain,

FIG. 6 is a perspective view of the sample box with its securing means as fastened on the chain,

FIG. 7 is a perspective view of the detail of the timer arm with the angle iron and mounting bracket,

FIG. 8 is a perspective view of the sampling machine showing the sample box and deflector bar as it sweeps through the material projected from the conveyor belt, and

FIG. 9 is a perspective view similar to FIG. 8 but showing the sample box in a position of unloading its sample after its sweep through the material.

The automatic sampler according to the invention may be used on and may be mounted anywhere it may be desired to obtain periodic samples of materials or products, and particularly of flowable and conveyable substances

and products as the nuts and vegetables. All kinds and types of nuts, beans and peas are readily sampled and in particular this sampler is most adaptable for application to peanuts. The machine is illustrated as mounted on the end of a belt conveyor such as the conveyor **10** with the endless belt **11**.

A suitable frame **12** formed of tubular elements forms a frame to support a plurality of guide wheels **16**, **29** and **32** to control and support the chain **14**. The chain **14** travels around the frame as guided by the wheels and it will be noted that the chain travels around the frame and above and below a central open framework **15** through which the material to be sampled will flow and be projected from the moving belt **11**. In order to adjust the tension in the chain **14** the left-end pulley or wheel **16** is provided in its mounting bracket **17** with a slot **18** to adjust the chain **14** relative to such bracket **17** and thereby the tension in the chain. If desired a shield plate **13** may be secured to the frame **12** to prevent material from falling into the moving parts when material is dumped from the sample box.

In order to drive the chain **14** an electric motor **19** is suitably mounted on an auxiliary frame **20** and by means of a U-shaped platform **21**, a gear box **22** is connected to be driven by the motor **19** and in turn drives the sprocket gear **23**. This gear **23** meshes with the chain **14** to drive the latter. The drive chain **14** is of the type having a double row of aligned links as shown in FIGS. **5** and **6** in which one row of links **24** is connected by pivot pins **25** to a second row of links **26**.

As best seen in FIGS. **8** and **9** the frame **12** is provided with a pair of parallel tubular members **27** to which a smaller series of tubular bars **28** are secured to which the two right end guide pulleys or wheels **29** are secured. A vertical frame bar **30** has the tubular bars **31** secured thereto which latter supports the guide wheel **32**.

The guide wheel **16** is secured on the frame **12** by means of the bars **47** and **48** to which are secured the bars **46** and **45**. All of the bars may be suitably secured together by means of welding or by any other suitable means.

The sample receiving box **33** is open at the top **34** and is provided on the outside surface **35** thereof with a right-angle iron or bracket member **36** secured thereto by rivets and to which is secured a bar **37** by welding. On the other side **38** of the box **33** there is suitably riveted on the inside surface thereof, the cutter or sweep bar **39** which preferably extends to the bottom **40** of the box. The bar **39** has a cutter edge **41** and a deflecting surface or blade **42** at right angles thereto. The bar **39** extends up beyond the box, FIGS. **2** and **4**, to insure a complete sweep through the flowing material to be sampled.

Any suitable means may be used to receive the sample material after being scooped out of the material flow and as a preferred construction a catch trough **49** is provided to be suspended by the bars **50** from the frame **12** at the left end of the machine, FIGS. **1**, **8** and **9**. An elongated section **51** is added to the main portion which is above the funnel-like outlet **52** leading into the outlet tube **53** which latter leads to a sample collecting member, not shown. A shield **54** is mounted on the left end of the section **51** to catch any material which may drop out of the sample box as it travels over or past the pulley **16**.

In order to time the periodic movement of the sampling box, a timing device and control **55** is secured on the frame **12** and is provided with a trigger finger **56**. The finger **56** is movable in a bracket **57**, FIG. **7**, secured on the control **55** and by means of a shaft **58** connected to a lever **59**, an arm **60** is connected to operate the timing switch, not shown. The timer which may be of the

"Cramer" type is an interval timer with a wide selection of time ranges and is of course automatic. The timer provides for push button starting, automatic shut-off and instantaneous reset to control the electrically operating equipment as the motor 19. In operation a knob on the timer is set to the desired interval and automatic periodic operation takes place. While any suitable timing mechanism may be used, it has been determined that the "Cramer" automatic reset interval timer is very effective and reliable for the purpose of periodically and automatically operating the sampling machine. A suitable projection 61 is secured to the drive chain 14 so that it moves the timer arm when motion is imparted to it by the projection. This movement keys the timer.

The machine operates as follows:

FIGS. 8 and 9 show the two effective positions during the operation of the machine for interval sampling. With the timer set for the required interval of timing with the start of the sampling of the material flowing through the frame 15 from the belt 11, the box 33 and the sweep bar 39 travel in the direction of the arrows, that is clockwise with the chain 14 around the wheels. As the bar 39 sweeps through the material flowing and projected from the belt 11, the bar cuts through the material flow and as the material strikes the deflecting blade 42, it will fall into the box 33 to be carried thereby over the trough 49 around the pulley 32 and up the inclined portion and finally around the pulley 16 to be inverted as it traverses around the latter to the position of FIG. 9 where the material is dumped into the trough 49 as it is inverted. In the position of FIG. 9 the box 33 has struck the finger 56 to arrest the box 33 due to the stoppage of the motor 19 and after the set time interval has elapsed the timer 55 "releases" the box again by starting the motor 19, the sprocket 23 and the chain 14 to repeat the sampling cycle.

The chain 14 is suitably provided with a projection member 5 secured to one of the links of the chain some distance ahead of the box and cutter bar relative to its direction of travel. This projection 5 is adapted to contact a roller 57 on the free end of the finger 56 to thereby raise the timer arm or finger in the direction of the arrow, FIG. 1, approximately 3/16 of an inch. One of the functions of the arm 56 is to press a button on the timing device and this timer then completes the operation. When the projection 5 strikes the arm 56, the momentum of the chain and sample box carries the projection 5 past the arm 56 which allows the projection arm to drop back to normal position.

The sample of the material collected in the box 33 as the blade 39 sweeps through the material projected through the frame 12 by the belt 11 as in the position of FIG. 1, is ultimately dumped into the section 51 of the trough 49 and then it falls down through the tube 53. This latter takes place when the box 33 is inverted as in the position of FIG. 9. It is, of course, possible to adjust the timer control 55 so that the sampling functions at such desired time interval depending upon various conditions and particularly when it is desired to sample of the product being conveyed. Each sampling cycle is started by the timer when the latter energizes the motor to again start the movement of the drive chain and the box secured thereto.

It is, of course, possible to run the machine continuously so that a sample of the material is scooped from the material flow upon each passage of the bar 39 through the material and as the box travels then over the trough 49 in the inverted position, FIG. 9, the material will be dumped out of the box 33.

If it is found during the running of the machine that the chain 14 is too loose it is only necessary to adjust the pulley 16 in its bearing to maintain the tension in the chain at the desired amount. It will be apparent that the bar 39 with the knife edge 41 actually cuts its way through the material flow or stream as the latter leaves the belt 11 and starts to curve around the upper end of the conveyor.

The invention is not to be confined to any strict conformity with the showing in the drawings, and changes or modifications may be made therein in so far as such changes or modifications work no material departure from the salient features of the invention as set forth and defined in the appended claims.

I claim as my invention:

1. An automatic sampling machine adapted to be secured on the upper or outer end of a traveling belt of a conveyor comprising a frame mounted on the conveyor and having an opening therein through which the material to be sampled is to be projected, a plurality of pulleys rotatably mounted on the frame, a chain mounted around the pulleys and guided thereby to pass around the opening formed by the frame, a sample receiving box secured on the chain to be operated thereby and carried around the frame and past the opening through which the material is projected, a cutter bar secured to the box and projecting therefrom outwardly and having a cutting edge and a deflecting surface extending beyond the box, and means mounted on the frame and connected to drive the chain to pull the box and cutter bar with its deflecting surface through the projected material as the box passes under the projected material flow.

2. An automatic sampling machine adapted to be secured on the upper or outer end of a traveling belt of a conveyor comprising a frame mounted on the conveyor and having an opening therein through which the material to be sampled is to be projected, a plurality of pulleys rotatably mounted on the frame, a chain mounted around the pulleys and guided thereby to pass around the opening formed by the frame, a sample receiving box secured on the chain to be operated thereby and carried around the frame and past the opening through which the material is projected, a cutter bar secured to the box and projecting therefrom outwardly and having a cutting edge and a deflecting surface extending beyond the box, means mounted on the frame and connected to drive the chain to pull the box and cutter bar with its deflecting surface through the projected material as the box passes under the projected material flow, and a timer device mounted on the frame having means operated by the sample collecting box and connected to the drive means to start and stop the latter for periodic sample taking from the material flow.

3. An automatic sampling machine adapted to be secured on the upper or outer end of a traveling belt of a conveyor comprising a frame mounted on the conveyor and having an opening therein through which the material to be sampled is to be projected, a plurality of pulleys rotatably mounted on the frame, a chain mounted around the pulleys and guided thereby to pass around the opening formed by the frame, a sample receiving box secured on the chain to be operated thereby and carried around the frame and past the opening through which the material is projected, a cutter bar secured to the box and projecting therefrom outwardly and having a cutting edge and a deflecting surface extending beyond the box, means mounted on the frame and connected to drive the chain to pull the box and cutter bar with its deflecting surface through the projected material as the box passes under the projected material flow, a timer device mounted on the frame having means operated by the sample collecting box and connected to the drive means to start and stop the latter for periodic sample taking from the material flow, and means on the chain to operate the timer device upon each complete cycle movement of the chain around the frame.

4. In a sampling machine to be mounted adjacent a material flow from which samples are to be taken, a sample collecting device comprising a pick-up box to

receive a sample of the conveyed material and provided with an open top, and a cutter bar secured in the box projecting therefrom and having a cutting blade with a cutting edge and a deflecting blade at approximately right angles to the cutting blade so that the deflecting blade will guide the material cut from the material flow by the blade into the box, said bar being supported on a bottom of the box and riveted to one side of the box by means of the cutting blade.

5. In a sampling machine to be mounted adjacent a material flow from which samples are to be taken, a sample collecting device comprising a pick-up box to receive a sample of the conveyed material and provided with an open top, and a closed bottom with side surfaces, and a cutter bar secured to one of the side surfaces and extending from the bottom and out of the box beyond the open top, said cutter bar having a cutting blade with a cutting edge and a deflecting blade at approximately right angles to the cutting blade so that the deflecting blade will guide the material cut from the material flow by the blade into the box.

6. In a sampling machine to be mounted adjacent a material flow from which samples are to be taken, a sample collecting device comprising a pick-up box to receive a sample of the conveyed material and provided with an open top, and a closed bottom with side surfaces, and a cutter bar secured to one of the side surfaces and extending from the bottom and out of the box beyond the open top, said cutter bar having a cutting blade with a cutting edge and a deflecting blade at approximately right angles to the cutting blade so that the deflecting blade will guide the material cut from the material flow by the blade into the box, and said cutter bar having a curved junction when viewed in cross section at the merging zone of the cutting edge with the deflecting blade.

7. An automatic sampling machine adapted to be secured on the upper or outer end of a traveling belt of a conveyor comprising a frame mounted on the conveyor and having an opening therein through which the material to be sampled is to be projected, a plurality of pulleys rotatably mounted on the frame, a chain mounted around the pulleys and guided thereby to pass around the opening formed by the frame, a sample receiving box secured on the chain to be operated thereby and carried around the frame and past the opening through which the material is projected, a cutter bar secured to the box and projecting therefrom outwardly and having a cutting edge and a deflecting surface extending beyond the box, means mounted on the frame and connected to drive the chain to pull the cutter bar with its deflecting surface through the projected material as the box passes under the pro-projected material flow, and means for adjustably mounting one of said pulleys to adjust the tension in the chain.

8. An automatic sampling machine for peanuts to be secured on the ejection end of a traveling belt conveyor comprising an endless chain, means for mounting the chain for movement adjacent the ejection end of the conveyor, a sample receiving member secured to the chain and having a cutter bar with a deflector surface projected therefrom and adapted to pass through the peanut stream ejected from the conveyor, and means for moving said receiving member and cutter bar so that the latter passes through the peanut stream in one run of the receiving member and in another run of the receiving member the latter is in a dumping position.

9. An automatic sampling machine according to claim 8, in which means are provided to intermittently operate the chain to actuate the receiving member and cutter bar through the runs to intermittently collect the samples of peanuts.

10. An automatic sampling machine according to claim 8, in which a timing device is provided to be set and operated by the receiving device for intermittent operation.

11. An automatic sampling machine for peanuts to be secured on the ejection end of a traveling belt conveyor comprising an endless chain, means for mounting the chain for movement adjacent the ejection end of the conveyor, a sample receiving member secured to the chain and having a cutter bar with a deflector surface secured thereto in a projecting state and adapted to pass through the peanut stream ejected from the conveyor, and means for moving said receiving member and cutter bar so that the latter passes through the peanut stream in one run of the receiving member and in another run of the receiving member the latter is in a dumping position, said chain being composed of laterally aligned links in parallel rows interconnected as to lateral adjacent links by pivot pins.

12. An automatic sampling machine for peanuts to be secured on the ejection end of a traveling belt conveyor comprising an endless chain, means for mounting the chain for movement adjacent the ejection end of the conveyor, a sample receiving member secured to the chain and having a cutter bar with a deflector surface secured to and projecting from the member and adapted to pass through peanut stream ejected from the conveyor, means for moving said receiving member and cutter bar so that the latter passes through the peanut stream in one run of the receiving member and in another run of the receiving member the latter is in a dumping position, said chain being composed of laterally aligned links in parallel rows interconnected as to lateral adjacent links by pivot pins, and a bar connected to the sample receiving member to hold the cutter bar substantially rigid to prevent deflection by the peanut stream, said bar being also connected to the chain.

13. An automatic sampling machine for peanuts to be secured on the ejection end of a traveling belt conveyor comprising an endless chain, means for mounting the chain for movement adjacent the ejection end of the conveyor, a sample receiving member secured to the chain and having a cutter bar with a deflector surface secured to and projecting from the member and adapted to pass through the peanut stream ejected from the conveyor, means for moving said receiving member and cutter bar so that the latter passes through the peanut stream in one run of the receiving member and in another run of the receiving member the latter is in a dumping position, said chain being composed of laterally aligned links in parallel rows interconnected as to lateral adjacent links by pivot pins, and a bar connected to the sample receiving member to hold the cutter bar substantially rigid to prevent deflection by the peanut stream, said bar being also connected to a plurality of adjacent links as a permanent and rigid connection.

14. An automatic sampling machine for peanuts to be secured on the ejection end of a traveling belt conveyor comprising an endless chain, means for mounting the chain for movement adjacent the ejection end of the conveyor, a sample receiving member secured to the chain and having a cutter bar with a deflector surface secured to and projecting from the member and adapted to pass through the peanut stream ejected from the conveyor, means for moving said receiving member and cutter bar so that the latter passes through the peanut stream in one run of the receiving member and in another run of the receiving member the latter is in a dumping position, said chain being composed of a plurality of aligned links in parallel rows, and a bar rigidly connected to the sample receiving member and to a plurality of adjacent links as a permanent and rigid connection to hold the bar substantially rigid to prevent deflection by the peanut stream.

15. An automatic sampling machine for peanuts to be secured on the ejection end of a traveling belt conveyor comprising an endless chain, means for mounting the chain for movement adjacent the ejection end of the conveyor, a sample receiving member secured to the chain and having a cutter bar with a deflector surface secured to and projecting from the member and adapted to pass

through the peanut stream ejected from the conveyor, means for moving said receiving member and cutter bar so that the latter passes through the peanut stream in one run of the receiving member and in another run of the receiving member the latter is in a dumping position, said chain being composed of a plurality of interconnected links, and a bar rigidly connected to the sample receiving member and to at least one of the links as a permanent and rigid connection to hold the bar substantially rigid to prevent deflection by the peanut stream.

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