

G. PETERSEN.
 APPARATUS FOR TAKING SAMPLES FROM GRAIN AND THE LIKE.
 APPLICATION FILED JUNE 11, 1912.

1,063,725.

Patented June 3, 1913.

3 SHEETS—SHEET 1.

Fig. 1

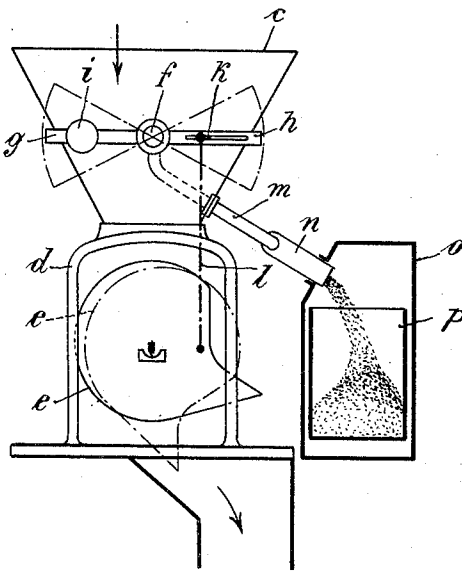


Fig. 2

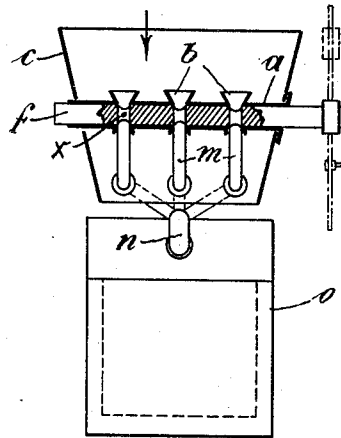
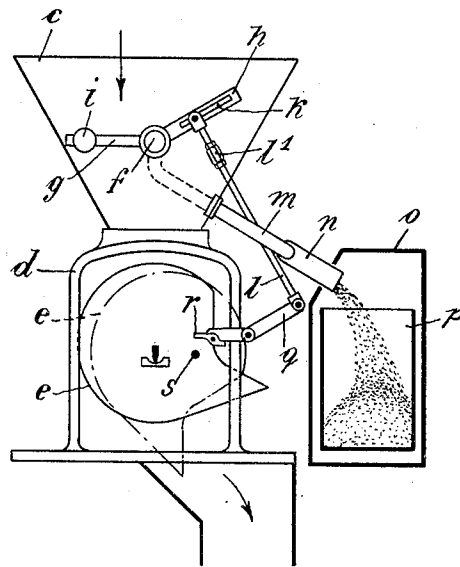


Fig. 3



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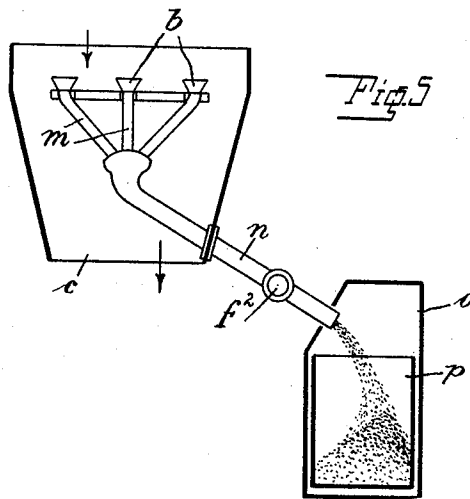
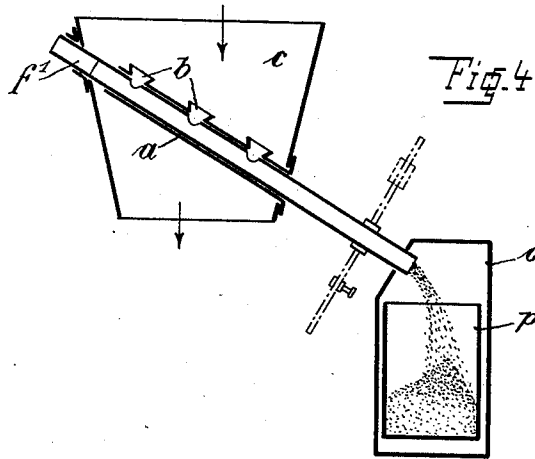
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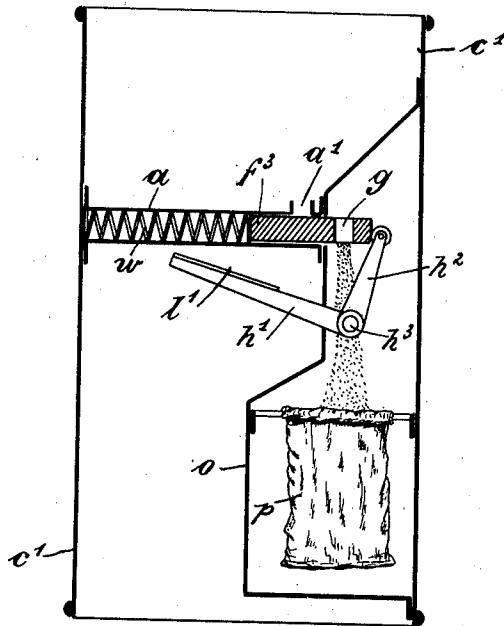
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3 SHEETS—SHEET 3.

Fig. 6



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APPARATUS FOR TAKING SAMPLES FROM GRAIN AND THE LIKE.

1,063,725.

Specification of Letters Patent.

Patented June 3, 1913.

Application filed June 11, 1912. Serial No. 703,016.

To all whom it may concern:

Be it known that I, GEORG PETERSEN, a subject of the King of Prussia, German Emperor, and residing at present at Nicolaieff, in the Russian Empire, have invented certain new and useful Improvements in Apparatus for Taking Samples from Grain and the Like, of which the following is a specification.

This invention relates to an apparatus intended for use in the wholesale handling of grain and the like; its object proper is to take samples at regular intervals out of either an uninterrupted or an intermittent current of grain or the like, and to collect the numerous small samples, so that all samples together, mixed, give a true representation of the condition of the whole of the bulk of grain thus examined.

A particular object of my invention resides in taking and collecting the samples in such a manner, or by such means, that the quick handling of even very large quantities of grain, for instance in making a large current of grain flow over from a silo or the like into a ship, is not impaired.

In order to make my invention more clear, I refer to the accompanying drawings, in which similar letters denote similar parts throughout the several views and in which:

Figure 1 is a diagrammatical representation of an automatic grain-weighing machine, the hopper of which contains an apparatus constructed according to my invention, the grain weighing machine with its hopper and an outer lever being shown in side-view, and the collecting-vessel for the samples in vertical section. Fig. 2 is a vertical section through the hopper and the sample taking apparatus, drawn at right angles with respect to Fig. 1, in connection with a front view of the sample collecting vessel. Fig. 3 is a representation similar to Fig. 1, the lever at the hopper having another shape and its connection with the lower portion of the weighing-machine being effected by other means. Fig. 4 is a diagrammatical representation of another form of construction of my improved apparatus, the weighing-machine being left away. Fig. 5 is a view similar to Fig. 4, showing again another form of construction; and Fig. 6 is a vertical section through another form of construction intended especially for intermittent currents or rushes (as from bag after bag) of grain, whereas all the before-

mentioned forms of construction are intended for continuous currents.

Referring to Figs. 1 and 2, my invention is shown applied to an automatic weighing-machine, the main parts of the apparatus being mounted in the hopper of the same. I think it proper to remark at this place that there is no positive necessity for this combination or connection, because the sample taking apparatus can be arranged also above the hopper, as well as below the weighing-machine, the said main parts having then an inclosing shell or casing of their own, for instance a vertical cylinder or piece of tube, which forms a portion of the grain-conduit. Now, in the form of construction in question (Figs. 1 and 2), the sample taking apparatus proper consists of a horizontal tube *a* having, in the example shown, three apertures at its upper side and three at its lower side, the lower apertures being exactly below the upper ones which are preferably provided with small funnels *b*. The tube *a* is mounted in the hopper *c* of the weighing-machine *d*, which can be of any appropriate type and requires no particular description in this specification, except, that *e* indicates the known vertically rocking or oscillating scale which is shown in the position of receiving and in the position of letting escape the grain. At any rate, the grain passes through that portion of the grain conduit which contains the tube *a* with the other parts presently to be described. These parts consist first of a shaft *f* having three cross-bores *x* coinciding, or adapted to coincide at intervals, with the apertures of the tube *a*. The shaft *f* is rocked automatically by any suitable means, for instance from the automatic weighing-machine *d* *e*, although any other means capable of rocking or even of rotating shaft *f* may be employed also. In the example shown, the shaft *f* has secured to it outside of the hopper *c* a double-armed lever *g* *h* (in the position represented in Fig. 2, this lever, which is indicated by dotted lines only, has been turned for 90° to show it more distinctly), the arm *g* carrying a counterpoise *i* and the arm *h* having a longitudinal slot *k* within which may be adjusted the upper end of a wire-rope *l* or the like, the lower end of which is affixed to the scale *e* of the weighing-machine *d*. The tube *a* is connected at its lower apertures to three curved pipes *m* which pass through the wall of the

hopper *c* and are united at their outer or lower ends by a common pipe *n* extending into a casing *o*. This latter contains a vessel *p* the purpose of which is to collect the many small samples which together form one large sample giving a true proof of the true condition of the whole bulk of grain treated.

The many small samples are obtained by the movement of the shaft *f*. The grain which is supposed to pass constantly through the hopper *c* passes also into the bores of said shaft every time when these bores coincide with the funnels *b*, and thus with the pipes *m*, too. The shaft *f* is rocked or oscillated from the scale *e* by the mediation of the rope or rod *l* and the lever *g* *h*, as described, and the many small samples of grain are taken at regular intervals determined by the action of the weighing-machine, and they are taken out of the middle, as well as from the sides of the current of grain, so that the whole collection gives actually a true proof for the true condition of that grain. It is obvious that practically the same manner of operation may be had by making the shaft rotate instead of oscillate, and the same results as described may be obtained by displacing the shaft *f* longitudinally to and fro, so as to establish and break in constant and regular succession the communication between the funnels *b* and the pipes *m* by means of the bores *x*.

In the form of construction shown in Fig. 3, the shaft *f* is moved not incessantly, but there are alternately times of motion and times of rest. The rod *l* is connected to the scale *e* not directly, but by the mediation of a double-armed lever *g*, one arm of which is connected with the rod *l*, and the other arm of which is provided with a pawl *r* co-operating with a pin *s* secured to the scale *e*. In the drawing, this pin is supposed to be in that position which corresponds to the emptying position of the scale. Therefore, on the scale returning to its position of loading, the pin *s* moves upward and passes from below the pawl to above it, moving the pawl, but not the lever *g*. But when the scale *e* turns into emptying position, the pin *s* strikes from above upon the pawl *r*, moving not this pawl *per se*, but together with the lever *g*, the rod *l*, and the shaft *f*, and consequently the samples are taken intermittently in practically the same manner as has been described with respect to Figs. 1 and 2.

Fig. 4 shows a simplified form of construction, in which the tube *a* has an inclined position in the hopper *c*, and in which the shaft *f* is replaced by an inclined tube *f*¹. There are in this form of construction no special pipes, such as *m* and *n*, Figs. 1-3, but the tube *f*¹ forms a substitute for them all, the grain gliding down within this tube

to the casing *o* and into the vessel *p*. The tube *f*¹ is oscillated either in the same manner or by the same means, as the shaft *f*, Figs. 1-3, or it is moved in another manner, for instance rotated, the means for effecting this being, of course, appropriate ones.

Instead of opening and closing the various separate apertures, as in Figs. 1-4, and instead of employing a shaft or a tube for that purpose, I may make use of a stationary inner tube, as in the form of construction shown in Fig. 5. The funnels *b* form immediately the upper ends of the pipes *m*, and the common pipe *n* contains a cock *f*² or similar contrivance which is operated automatically either from the weighing-machine or by any other means. The three (or more) funnels *b* need not be arranged in one line, but they may be arranged otherwise, for instance so as to represent a triangle. I wish it, however, to be understood that I do not confine myself at any rate to a plurality of funnels or equivalent parts or apertures, but in some cases it may suffice to make use of one only; and it is not absolutely necessary to provide that one sample taking element or that plurality of sample taking-elements, in the middle portion or, generally, within the sectional area of the hopper of the weighing-machine or of some other portion of the grain-conduit, but there are cases where the one or more apertures may be provided in the wall of the hopper or some other inclined part of the grain-conduit, it being understood, that there are at any rate controlling-organs for intermittently opening and closing the sample conducting pipes. Instead of operating such controlling organ compulsorily, for instance by connecting it to a weighing-machine, I may employ the kinetic energy of the grain in motion to actuate the operating parts of the device. This is possible especially in those cases where there is not a continuous current of the grain, but where sacks of grain are emptied by throwing their contents into and through a hopper, piece of tube, or the like. In such a case, the kinetic energy of the separate masses of grain may be used for pressing down a flap which then acts like a motor to actuate the other movable parts of the apparatus. I have shown such a form of construction of my invention in Fig. 6, which is distinguished from the other forms of construction also in so far as it is not connected with any other machine or apparatus, but forms a portable apparatus of its own. The tube *a* which is held by and within a large iron vessel *c*¹ open at both ends and serving as conduit for the grain forms a guide for a slide *f*³ reaching partly out of said guide *a* and having a bore *g* in this projecting part. The slide *f*³ is at one end under the pressure of a spring *w*, and at the other end under the pressure

of an arm h^2 forming part of a bell-crank lever $h^1 h^2$ fulcrumed at h^3 . The arm h^1 has affixed to it a plate l^1 upon which the grain drops. Thereby, the lever $h^1 h^2$ is
 5 turned and the slide f^3 is moved into the tube a as far as to bring the bore g below an aperture a^1 provided on the upper side of the tube a . The plate l^1 is depressed as soon as the grain commences to fall through
 10 the vessel or casing c^1 , and on the bore g coinciding with the aperture a^1 a certain small portion of the grain is received in that bore. When the rush of the grain has ceased, the slide is moved to its former po-
 15 sition by the spring w , and the small sample of grain contained in the bore g is carried out of the tube a so as to become free and drop into the collecting chamber o , or into the bag p respectively.

20 Reverting to Fig. 3, I state by way of supplement, that I prefer to make the bar or rod l of two parts connected by a helical spring inclosed in a casing l^1 . Owing to this arrangement, the rod l is capable of an elon-
 25 gation, if some rigid particle contained in the grain should perhaps become clamped in at an edge of a bore x (Fig. 2).

Having now described my invention, what I desire to secure by a patent of the United
 30 States is:

1. In an apparatus for taking samples from a continuous or intermittent current or rushes of wholesale quantities of grain or the like, the combination with a portion of
 35 the grain-conduit, of a tube extending into the path of the grain inside said portion; a plurality of lateral apertures in said tube adapted to intercept sample quantities from said grain; a vessel adapted to receive and
 40 collect all said sample-quantities, a connection or connections between said apertures and said vessels; and means for automatically closing and opening the said apertures.

2. In an apparatus for taking samples
 45 from a continuous or intermittent current or rushes of wholesale quantities of grain or the like, the combination with a portion of the grain-conduit, of a tube extending into

the path of the grain inside said portion; a plurality of lateral apertures in said tube
 50 adapted to intercept sample quantities from said grain; a vessel adapted to receive and collect all said sample-quantities, a tube or tubes leading from said apertures to said
 55 vessel, and automatic means for alternately establishing and interrupting the connection between the said apertures and said tube or tubes.

3. In an apparatus for taking samples from a continuous or intermittent current
 60 or rushes of wholesale quantities of grain or the like, the combination with a portion of the grain-conduit, of a horizontal tube extending crosswise into and through said
 65 portion; a plurality of apertures in the upper and lower wall portion of said tube; means located inside said tube and adapted to establish and interrupt alternately and automatically the connection between the
 70 upper and the lower apertures; a vessel adapted to receive and collect the sample-quantities taken by the opened upper apertures; and connections between the lower
 apertures and said vessel.

4. In an apparatus for taking samples
 75 from a continuous or intermittent current or rushes of wholesale quantities of grain or the like, the combination with a portion of the grain-conduit, of a horizontal tube extending crosswise into and through said por-
 80 tion; a plurality of apertures in the upper and lower wall portion of said tube; a shaft inside of said tube; cross-bores in said shaft adapted to coincide with said apertures; means for automatically turning said shaft;
 85 a vessel adapted to receive and collect the sample-quantities taken by the opened upper apertures; and connections between the lower apertures and said vessel.

In testimony whereof I affix my signature
 90 in presence of two witnesses.

G. PETERSEN.

Witnesses:

RICHARD LIPPMANN,
 WILLI POEIL.