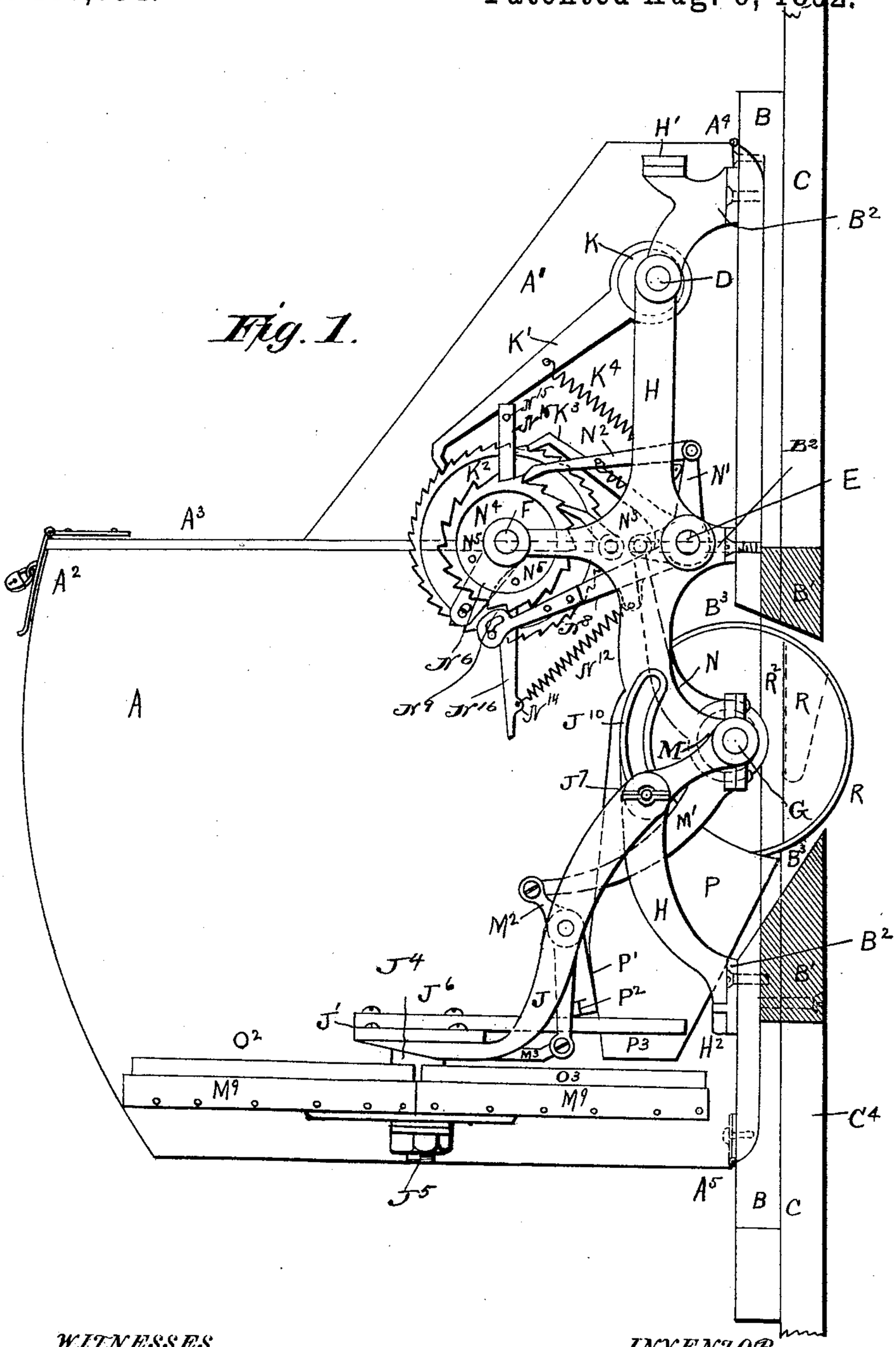
(No Model.) 4 Sheets—Sheet 1.

J. BIGELOW.

GRAIN SAMPLING MACHINE.

No. 480,654. Patented Aug. 9, 1892.

Fig. 1.



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(No Model.) 4 Sheets—Sheet 2.

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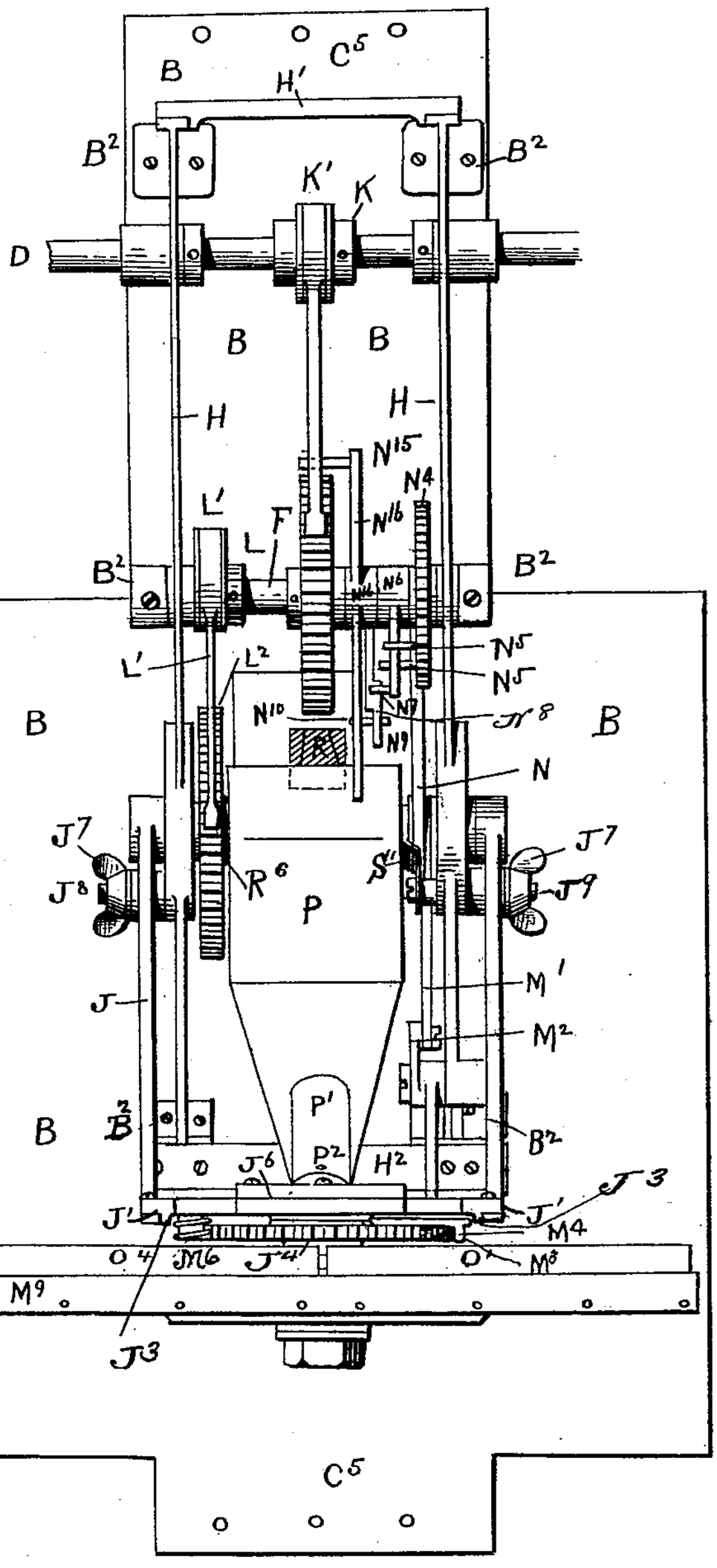
Fig. 2.



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GRAIN SAMPLING MACHINE.

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Fig. 5.

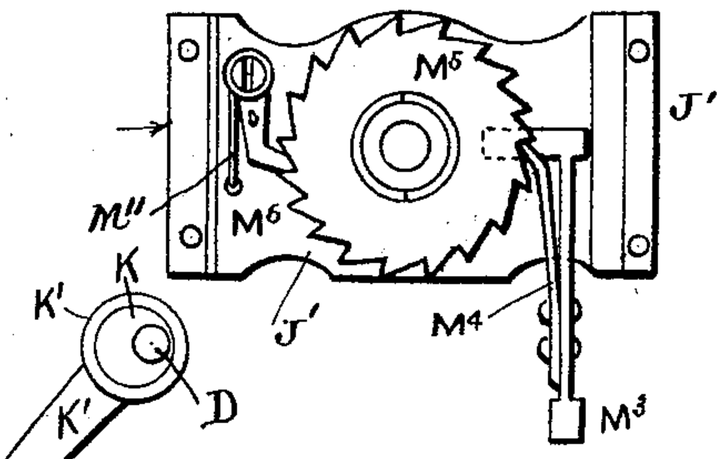


Fig. 3.

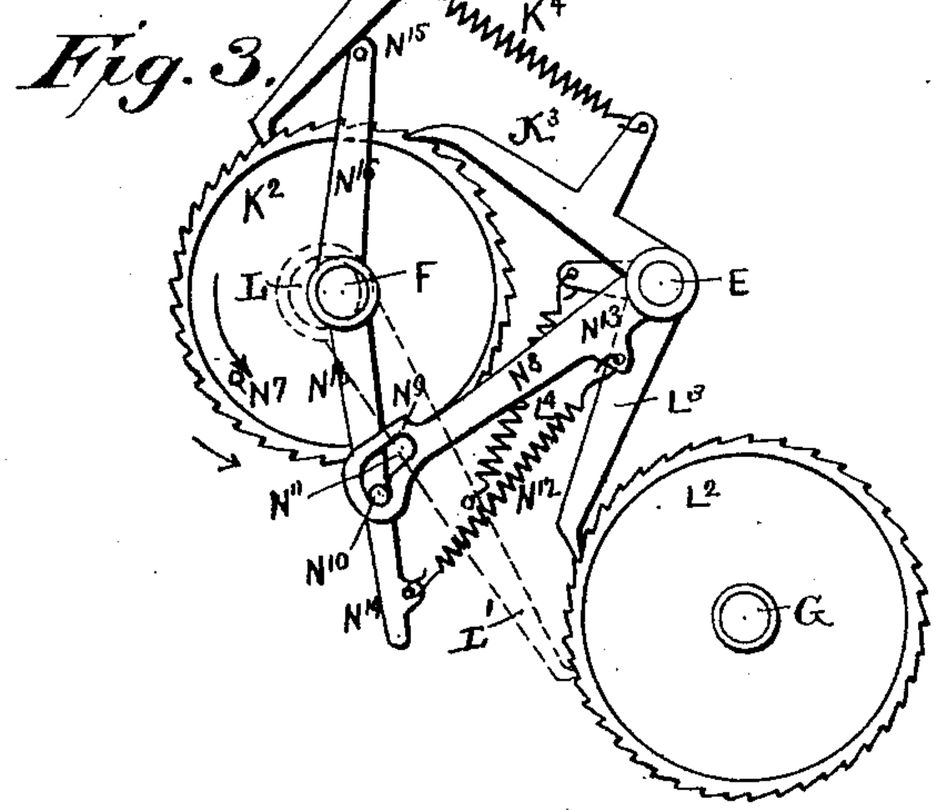


Fig. 8.

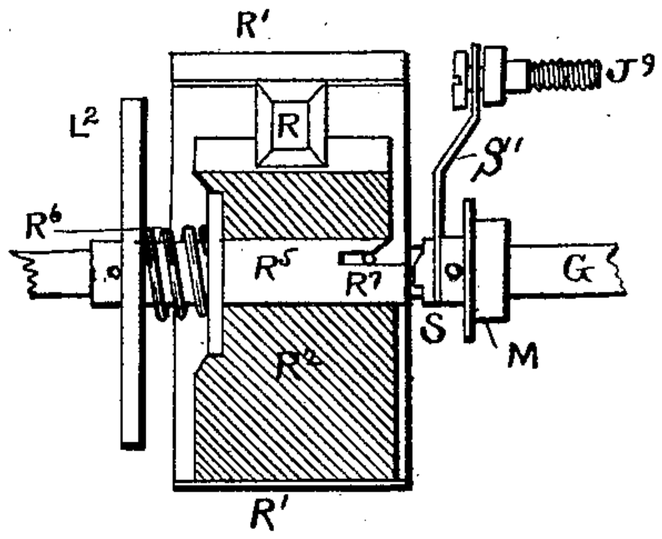
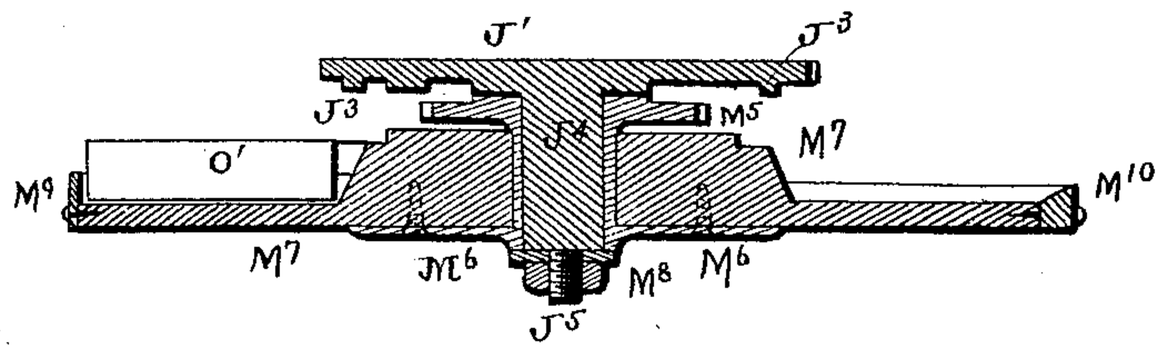


Fig. 4.



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(No Model.) 4 Sheets—Sheet 4.

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GRAIN SAMPLING MACHINE.

No. 480,654. Patented Aug. 9, 1892.

Fig. 6.

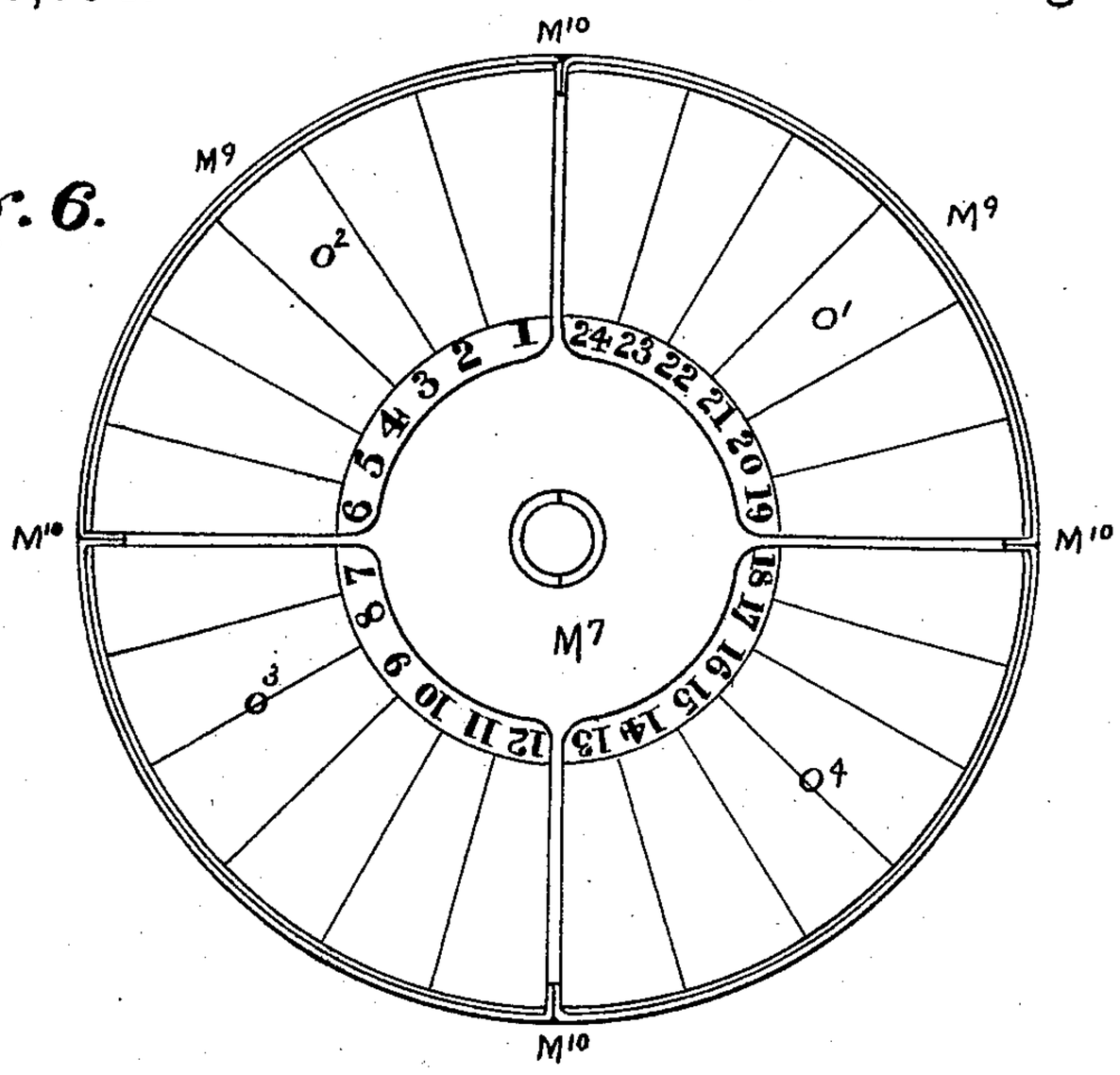


Fig. 7.

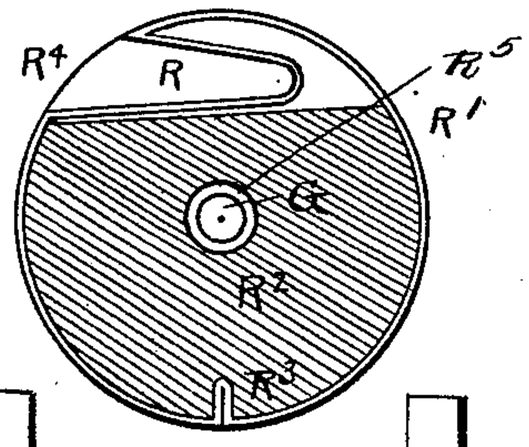
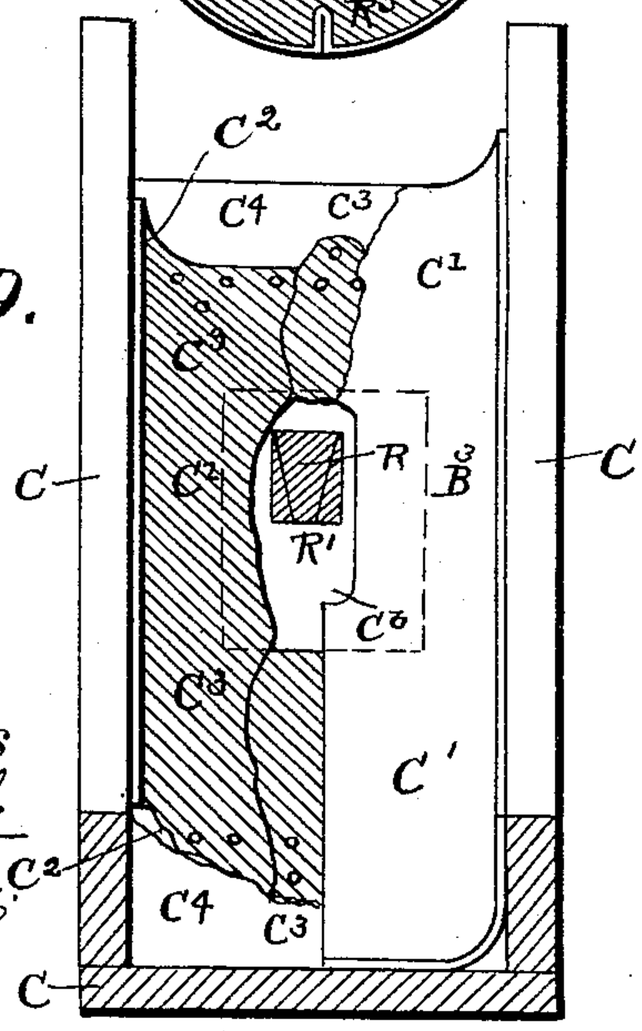


Fig. 9.



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UNITED STATES PATENT OFFICE.

JOHN BIGELOW, OF MINNEAPOLIS, MINNESOTA.

GRAIN-SAMPLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 480,654, dated August 9, 1892.

Application filed April 13, 1891. Serial No. 388,747. (No model.)

To all whom it may concern:

Be it known that I, JOHN BIGELOW, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Sampling-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In the making of flour several grades of wheat are often mixed together, then passed through spouts to the milling machinery, from which it issues through other spouts of various grades of value and generally known as "Patent," "Straight," "Bakers," "Low Grade," "Shorts," "Bran," &c. The greatest care is required to make the proper mixtures of wheat and afterward the proper separation of the flour to insure quality and prevent wastage. At present the millers watch the spouts. Taking out frequent handfuls and hastily examining the same, they make their adjustments accordingly. Still there is often carelessness, especially at night, causing considerable wastage, for instance, by the wheat not being properly mixed or by the bran not being properly cleaned. Coming, as the bran does, to illustrate, from different sources of supply in the mill, it is often difficult to place responsibility where it belongs. To meet this difficulty, I have devised a sampling-machine which at stated intervals will take from any spout to which it may be attached a small sample from the stream flowing in such spout and place it in a receptacle by itself. My mechanism is arranged to take and preserve each by itself any number of samples up to twenty-four. It has an automatic stop, so that the maximum number cannot be exceeded and so the portion in its receptacle-cups duplicated. The interval between the taking of the samples is dependent upon the speed at which the mechanism is driven. The whole mechanism is under lock and key and can be examined by the person desired, preferably the head miller. The receptacle-cups are all numbered, so that on examination of their contents the time and person responsible for any apparent carelessness are easily discovered.

The machine can be used in wheat-elevators or any other place where there are spouts conveying streams of suitable material, and can be driven from the mill-shafts by electric motors, clockwork, or in any other suitable manner.

I attain the objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side view showing a portion of the board to which the machine is attached in section. Fig. 2 is a front view. Fig. 3 is a side view of parts of the moving mechanism. Fig. 4 is a sectional view of the revolving tray for holding the receptacle-cups. Fig. 5 is a detail view of part of the operating mechanism of the revolving tray. Fig. 6 is a top view of the receptacle-cups, showing their arrangement of six in a quadrant and numbering. Fig. 7 is a central sectional view of the receiving or sampling cup which takes the material from the spout. Fig. 8 is a view of the mechanism by which said receiving or sampling cup receives a jog or shake at the moment it is being emptied to overcome any packing of the material. Fig. 9 shows details by which connection is made with the spout.

Similar letters refer to similar parts throughout the several views.

The sides of the frame of the machine are indicated by the letters H H, connected at the top by the cross-piece H′ and at the bottom by H^2, Figs. 1 and 2. The frame has four shafts D, F, and G revolving and E stationary.

The power for operating the machine is received by the shaft D from any suitable source. I prefer a belt connection with one of the revolving shafts of the mill. The shaft D has an eccentric K, Fig. 1, which conveys motion to the eccentric-rod K′, Figs. 2 and 3, that serves as a pawl to move the ratchet-wheel K^2, Figs. 2 and 3, which is pinned to the shaft F, Fig. 2.

Swinging freely on the stationary shaft E, Figs. 1 and 3, is the holding-ratchet K^3, which engages with the ratchet-wheel K^2. A connecting-spring K^4, Fig. 3, holds both the pawl K′ and holding-ratchet K^3 in proper relation to the said ratchet-wheel K^2.

On the shaft F is pinned a second eccentric L, the eccentric-rod L′, Fig. 2, of which serves as a pawl to operate the ratchet-wheel

L^2, Figs. 2 and 3, which is pinned to the shaft G, while reverse movement is prevented by the holding-ratchet L^3, Fig. 3, swinging on the shaft E. Both the pawl L′ and holding-ratchet L^3 are held in position by the connecting-spring L^4, Fig. 3. Now if the shaft D makes sixty revolutions a minute and the ratchet-wheel K^2 has sixty teeth it will cause the shaft F to revolve once a minute. Then if the ratchet-wheel L^2 has sixty teeth, since it is actuated by the eccentric L on the shaft F Figs. 2 and 3, it will cause the shaft G to make one revolution in an hour. On the shaft G is also pinned an eccentric M, Fig. 8, by which, through the eccentric-rod M′, Fig. 1, rocking lever M^2, Fig. 1, and swinging rod, M^3, Figs. 1 and 5, the spring-pawl M^4 is reciprocated, conveying movement to the ratchet-wheel M^5, which is prevented from reverse movement by the holding-ratchet M^6, swinging on the frame T′, and held in position by the spring M^{11}, Fig. 5. Now since the shaft G revolves once in an hour and the ratchet-wheel M^5 has twenty-four teeth it follows that the wheel M^5 will make one revolution in twenty-four hours.

On the shaft G is the loose sleeve R^5, carrying the cup R, Figs. 1, 2, 7, and 8, to take the samples from the spout. The construction which I show is a circular wooden disk R^2, Figs. 7 and 8, screwed to the sleeve R^5, Fig. 8. Around the disk is a tin band with its ends caught in the disk at R^3 and soldered together. The wooden disk is cut away on one side, an opening made in the face of the tin band R′, and the cup R inserted segmentally with the same and soldered. The cup can be made of any suitable size, and is so shaped as to receive and discharge its contents easily. The sleeve R^5 is slotted at the end R^7, so as to move freely on a pin through the shaft G, by which pin the cup R is in consequence compelled to rotate with said shaft. At its end R^7 the sleeve R^5 is also notched to receive the tooth in the piece S, Fig. 8, against which it is kept pressed by the spring at its opposite end R^6. The tooth-piece S encircles the shaft G, but does not rotate with it, because the end of its arm S′ engages the fixed set-screw J^9, hereinafter described. The tooth is sharp cut on one end and inclined on the other, somewhat similar to a ratchet-tooth. By this construction the spring-pressure against the sleeve R^5 causes the cup to receive a jog, as the end R^7, which has a shape the reverse of the piece S, passes off and jumps to the bottom of the tooth on the piece S. I time this jog to occur at the time the cup R is emptying itself to insure clearance.

Since the conveying-spouts of a mill are set at different angles varying from about forty-five degrees to nearly vertical, and also since my mechanism is intended to be secured to the bottom of the spout in order to have the receptacle-cups O′ O^2 O^3 O^4, Figs. 4 and 6, stand level, or nearly so, I attach the cross-piece J′ which supports the revolving tray M^7, that holds the said cups to the arms J J, which swing on the shaft G, Figs. 1 and 2, one on either side of the frame H, and are made fixed and stationary at the angle desired by the thumb-nut J^7 and the bolts J^9 J^8, Fig. 2, which pass through slots J^{10}, Fig. 1, in and engage the frame H on either side. The projection J^3 on the under side of J′ are simply shoulders against which the arms J are screwed. Since the eccentric-rod M′, which conveys motion to ratchet-wheel M^5, encircles the eccentric M, also on the shaft G, it follows that an adjustment of the arms J within the limits of the slot J^{10}, Fig. 1, in the frame H will not change the proper working of said ratchet-wheel M^5.

The tray M^7, Figs. 4 and 6, is a circular disk centrally attached to a sleeve M^6, which in turn is fitted so as to revolve freely on the post J^4, that projects from the bottom of the cross-piece J′, connecting the arms J. The sleeve M^6 is held in position on said post J^4 by the nut M^8 and bolt J^5 and is attached to and rotated by the ratchet-wheel M^5, for which said post also serves as a shaft. The tray M^7 has a raised outer edge M^9 and is quartered, as shown at M^{10}, Figs. 4 and 6. The receptacle-cups I make quadrants of a circle with an aggregate number of divisions to correspond with the ratchet-wheel M^5. In this instance, since the ratchet-wheel has twenty-four teeth, there are twenty-four cups, six in each quadrant, and consecutively numbered "1" to "24," Figs. 4 and 6. When arranged for use, they are set in the tray, as shown in Fig. 6, from which when filled they can be easily removed, one quadrant at a time, for examination of their contents. The eccentric M on the shaft G is so timed as to convey movement through the ratchet-wheel M^5 to the tray M^7 and cups O′ O^2 O^3 O^4, Fig. 6, while the cup R is taking a sample from the stream flowing in the spout C, and that they shall remain stationary while said cup R is emptying itself into the conducting-spout P and one of the tray-cups, which are alternately brought beneath its mouth P^3, is receiving the contents. The conducting-spout P is held in its proper relation to the sampling-cup R and the tray M^7, with its cups, by receiving its support through the shoulder P′, detachably connected by the pin P^2 with and resting on the block J^6, which in turn is screwed to the cross-piece J′. On the eccentric M, Fig. 8, is also placed the eccentric-rod N, Fig. 1, connecting with the rocking lever N′ on the shaft E. Swinging on the opposite end of said lever N′ is the pawl N^2, held in spring connection with the ratchet-wheel N^4 on the shaft F, and attached to the frame H is the holding-ratchet N^3, also held in spring connection with said ratchet-wheel.

The ratchet-wheel N^4, Fig. 2, has two pins N^5 N^5 riveted in its side a sufficient distance apart to allow the piece N^6, which swings freely on the shaft F and passes between them considerable freedom. The piece N^6

also has a pin N^7, riveted near its end and long enough to project over the inclined plane on the piece N^9, which is attached to the piece N^8, that swings freely on the shaft E. Through the piece N^9 is the L-shaped slot N^{11}, Fig. 3. Engaged to this slot is the pin N^{10}, attached to the shipping-lever N^{16}, which rocks on the shaft F. On the opposite end of the lever N^{16} is the pin N^{15}, which projects beyond and beneath the eccentric-rod pawl K′, Fig. 2. The lever N^{16} is connected at N^{14} by the spring N^{12} with the piece N^8 at N^{13}, Fig. 3. When the pin N^{10} of the lever N^{16} rests on the shoulder of N^{11}, as shown in Fig. 3, the pin N^{15} is out of contact with the pawl K′; but when the pin N^{10} is at the opposite end of the slot N^{11} the pin N^{15} on the lever N^{16} is thrown up sufficiently to lift the pawl K′ from connection with the ratchet-wheel K^2, and further movement of the machine mechanism is stopped. The pin N^7 in the piece N^6 is carried round by the pins N^5 in the ratchet-wheel N^4 in the direction of the arrow, Fig. 3. When it strikes the inclined plane N^9, it forces it back, removing the shoulder-support beneath the pin N^{10}, which being free, and the lever N^{16}, to which it is attached, being acted upon by the spring N^{12} at N^{14}, the pin N^{10} is drawn down to the lower end of the slot N^{11}, the opposite end of the lever N^{16} is thrown up and the pin N^{15} lifts the pawl K′ out of action. Since the ratchet-wheel N^4 has the same number of teeth as the ratchet-wheel M^5 and they are both acted upon by the same eccentric, it follows that the machine is stopped when the tray-cups are full, or at the end of twenty-four hours. The piece N^6 is allowed freedom between the pins N^5 N^5 of the ratchet-wheel N^4, so that the pin N^7 can be pushed forward and out of contact with the inclined plane N^9 without movement of the ratchet-wheel N^4 when the machine is started up by placing the pin N^{10} again on the shoulder of slot N^{11}, as shown.

The machine thus described is attached at B^2, Figs. 1 and 2, to a board B and has a sheet-metal cover A A′, Fig. 1, divided on the line A^3 into two parts. The lower part A is attached to the board B by a hinge at A^5, Fig. 1, and the upper part A′ is also attached to the board B by a hinge at A^4. The two parts can thus be swung away, so as to leave the machine entirely exposed, allowing the mechanism and the cups O′ O^2 O^3 O^4 to be easily reached or be securely covered and locked at A^2, Fig. 1, from interference. The circumference R′ of the cup-carrying disk is arranged to project within and beyond the bottom of the spout C, Fig. 1, to which the machine may be attached, for which reason I attach to the bottom of the board B another board B′ of the thickness of the bottom board C of the spout, and I make an opening B^3 in the board B and the board B′, as shown sectionally in Fig. 1 and in outline at B^3, Fig. 9.

To put the machine in position on the spout, the bottom board C, Fig. 1, of the spout is cut away sufficiently to receive the board B′, and the board B is screwed top and bottom at C^5 to the bottom of the spout C. A slot, half the width of which is shown at C^6, Fig. 9, is cut through the bottom tin lining C′ of the spout. This slot has the width of the mouth of the sampling-cup R and about the length of the arc of the segment, which its carrying-disk describes within the bottom of the spout.

Beneath the tin lining C′ of the spout and above the sampling-cup-carrying disk R′, Fig. 9, I tack a piece of soft felt C^3 to the bottom C^4 and the sides C^2 of the spout in order to prevent the flour or other material from escaping into the machine through the opening B^3, Fig. 1. An opening is made in this felt to correspond with the opening C^6, Fig. 9, in the tin C′. The sides of the opening B^3, Fig. 1, can also be covered by felt, so that the mouth of the sampling-cup R will not be open from the time it has been filled in the spout until it is ready to be emptied.

The sampling-cup R has a wide mouth, but narrows at the sides to a rounded bottom, so as to empty itself easily. It has an opening through and is placed segmentally, Fig. 7, beneath the tin face R′, which covers the disk R^2, that is attached to the sleeve R^5. When by the rotation of the shaft G its mouth is passing the opening C^6, Fig. 9, in the tin bottom lining C′ of the spout C, the cup R acts as a scoop, Fig. 1, and catches itself full from the stream flowing in such spout. Once full, of course the further flow of the stream in the spout passes over it. As the cup R by continued rotation of the shaft passes beyond the opening C^6, Fig. 9, is covered and closed by the blank face R′, Fig. 9. The cup R retains its contents until it is brought, with its mouth facing downward, over the conductor P, when the jog or shake, before described, occurs and the contents pass out down through the conductor P and into one of the receptacle-cups in the tray M^7.

The operation of the machine is as follows: Having brought the pawl K′ into action on the ratchet-wheel K^2, Fig. 2, by lifting at N^{14} the end of the lever N^{16} and placing its pin N^{10} so that it will rest on the shoulder N^{11}, Fig. 3, (by which action the lever-pin N^{15} is dropped down and out of contact with said pawl K′,) the motion received by the shaft D is conveyed through the eccentric K and pawl K′ to the ratchet-wheel K^2, thence through the shaft F, eccentric L, and pawl L′ to the ratchet-wheel L^2, and thence through the shaft G, sleeve R^5, and disk R^2 to the sampling-cup R, which revolves in a direction opposite to the flow of the stream in the spout from which the sample is to be taken. By the word "spout" I mean a conduit for either wheat, flour, bran, or any other similar granulated or powdered substance. While the sampling-cup R is being brought up and taking its sample from the spout C the eccentric M on the shaft G, acting through the eccentric-rod M′, crank-lever M^2, pawl-carrying piece M^3, and spring-pawl M^5, moves the ratchet-wheel M^4 forward one tooth.

This in turn moves the tray M^7 around correspondingly and brings a receptacle-cup beneath the mouth P^3 of the conductor P. During the reverse movement of the eccentric M, which is half the revolution of the shaft G, one of the receptacle-cups remains stationary beneath the mouth of the conductor P, and during this time the sampling-cup R by continued rotation is brought into a vertical position, facing downward into the conductor P. Then the shoulder R^7 of the sleeve R^5, which carries said cup, passes off the steep edge of the tooth-piece S, Fig. 8, which is stationary. The spring R^6 between the ratchet-wheel L^2, which is pinned to the shaft G, and the side of the sleeve R^5 causes a sudden sidewise movement of the latter, like a shake or jog, and the contents of the cup R are emptied into the conductor P and conveyed through its mouth P^3 into its special receptacle-cup. Except with material likely to pack, it is not a necessity that the cup R should be jogged or shaken while being emptied. While the sampling-cup R is being emptied the eccentric M, acting on the rod N, lever N′, and pawl N^2, moves the shipper ratchet-wheel forward one tooth and withdraws for its next action while said sampling-cup is being filled. By continued movement the sampling-cup is again filled and a new receiving-cup is brought beneath the conductor-mouth. Then the sampling-cup passes around and its contents are emptied, as described. During this latter movement the shipper-ratchet is moved forward a tooth. By the construction shown after twenty-four revolutions of the shaft G all of the receiving-cups and the tray are filled, and the shipping-pin is brought by the shipper-ratchet, as described, against the inclined plane of the shipper-holding piece, which is forced back. The shipper support-pin loses the shoulder on which it rests. The shipper-lever is drawn down by its spring and its opposite end thrown up, which through its pin lifts the eccentric-rod pawl of the driving-shaft out of action with its ratchet-wheel and further movement of the machine is stopped. The machine then remains idle until opened by the person having it in charge, its contents examined, if desired, and it is again placed in order and started.

While the details of the operating mechanism, number of receiving-cup, and speed may be changed, I regard the taking periodically of samples from the spout or other conveyer, placing them each in a receptacle by themselves, automatic stoppage when all of said cups are full, the preserving of the samples free from interference for convenient examination and comparison, and the arrangement by which the receiving-tray can be made horizontal, notwithstanding the differing angles of the spouts, without interfering with the turning and working of the mechanism, leading features of my invention.

It will be observed that since the conductor P receives its support from the piece J^6, attached to the cross-piece J′, connecting the arms J J, which swing on the shaft G, and since the jogging-piece S, also encircling the shaft G, is connected at S′ with the holding-bolt J^9 of the arm J, Figs. 2 and 8, notwithstanding any adjustment of the arms J to meet the angle of the spout to which the machine may be attached, the conductor P is kept vertical over the tray-cups and the jogging occurs at the time the sample-cup is discharging.

The receptacle-cups O′ O^2 O^3 O^4, instead of being grouped together, as shown, may each be separate. Neither is it necessary for the spirit of my invention that they should revolve on a tray, as they may be made to present themselves to the conductor-mouth, attached to one endless chain or belt, or in any other suitable manner. It of course is apparent that the shipper-ratchet N^4, since it has the same number of teeth as the tray-ratchet M^5 and is moved by the same eccentric M, will not only cause the shipper N^{16} to stop the machine when the tray-cups are full, but can be set so as to cause the machine to be stopped at any lesser period.

I claim—

1. An organized machine in which are combined the following elements, viz: the spout through which the stream flows, and a cup or like article adapted to be moved in and filled by said stream, and a receptacle to receive the contents of said cup, whereby the machine can take periodically a sample from a stream flowing in a spout and place it in a receptacle by itself, substantially as described.

2. An organized machine in which are combined the following elements, viz: a conveying-spout and a receptacle or cup adapted to be moved in the stream flowing in said spout, and a series of other movable receptacles to receive in order the contents of the first cup or receptacle, and suitable stop mechanism whereby automatically the machine is stopped when any desired number of the last-named receptacles have been filled.

3. The combination of a conveying-spout with an organized machine for taking samples from the stream flowing in said spout, having a sampling-cup R projecting within the interior of said spout and set segmentally with the arc of its own (cup R) revolution, substantially as and for the purpose set forth.

4. The combination of the sampling-cup R, means to impart a jog or shake to the same when it is being emptied, the conductor P, and receptacle-cups O′, &c., substantially as and for the purpose described.

5. The combination of the sampling-cup R, conductor P, receptacle-cups O′, &c., and the revolving tray M^7, substantially as and for the purpose described.

6. A sample-taking mechanism attachable to the bottom of a spout, set at an angle, combined with a tray having automatic adjustable connection with the operating mechanism and capable of an adjustment to com-

pensate for the angle of the spout, so that it may hold its receptacle-cups approximately horizontal, substantially as shown and described.

7. In a sampling-machine, substantially as described, a stationary vertical shaft carrying a horizontal receptacle-cup-bearing tray and a ratchet-wheel with a holding-pawl and an operating-pawl to give a periodical revolving movement to said tray around said shaft, substantially as and for the purpose described.

8. In a sampling-machine, substantially as described, a stationary vertical shaft carrying a horizontal revolving cup-bearing tray and removable receptacle-cups constructed so as to be set around said shaft and to be carried in suitable divisions by said tray, substantially as and for the purpose described.

9. In a sampling-machine, the combination, with a chute or passage for the material to be sampled, of a movable support or carrier, a number of receptacles removably secured to said carrier, each receptacle having a distinguishing character, and means for intermittingly removing a portion of the material from the chute and depositing it in one of the receptacles, substantially as set forth.

10. In a sampling-machine, the combination, with a chute or passage for the material to be sampled, of a movable support or carrier adjacent to the chute, a number of receptacles arranged in series in the carrier, each series being removable from the carrier and provided with distinguishing characters, and means for intermittingly removing a portion of the material from the chute and depositing it in one of the receptacles, substantially as set forth.

11. A sampling-machine for the purpose set forth, having an automatic stopping device arranged to act after any desired number of its receptacle-cups within the maximum number shall have been presented to the mouth of its conductor-spout and filled, whereby whatever may be the motive power applied to the machine, and notwithstanding inattention on the part of the person having the machine in charge, only such cups as may be desired will be filled and the contents of the receptacle-cups will not be duplicated, substantially as shown and described.

12. The combination of the ratchet-wheel N^4, the swinging piece N^6, and its pin N^7 with the ratchet-pawl K′, stripper-lever N^{16}, and the holding-piece N^8, having an inclined plane N^9, the rotating pin N^7 engaging piece N^8, all as and for the purposes set forth.

13. The combination of the driving-shaft D, eccentric K, eccentric-rod pawl K′, ratchet-wheel K^2, shaft F, eccentric L, eccentric-rod pawl L′, ratchet-wheel L^2, and shaft G, and the segmentally-arranged cup, constructed and adapted to operate substantially as and for the purpose set forth.

14. The combination of the shaft G, sleeve R^5, disk R^2, cover R′, and segmentally-arranged cup R, substantially as and for the purpose set forth.

15. The combination of the shaft G, the spring R^6, arranged to exert pressure, as shown, cup R, and disk R^2, having a slot-and-pin connection R^7 with said shaft, and a toothed connection with the stationary tooth-piece S, substantially as and for the purpose described.

16. In a sampling-machine, the combination, with a chute, of a shaft G, journaled adjacent thereto, swinging arms J, secured at their upper ends to said shaft, a movable carrier secured to the lower end of said arms and provided with receptacles, a cupped sleeve secured to the shaft G and adapted to be rotated within the chute and to intermittingly remove a portion of the material therefrom and deposit it in one of the receptacles of the carrier, a sleeve S, encircling the shaft and provided with an arm S′, said sleeve S engaging with said cupped sleeve and adapted to give it a jog, and a bolt or screw J^9 for engaging with the arm of the sleeve and varying the time that the cupped sleeve is jogged by the sleeve S, substantially as set forth.

17. The combination of the shaft G, eccentric M, eccentric-rod M′, lever M^2, pawl-carrying piece M^3, spring-pawl M^4, and ratchet-wheel M^5, substantially as and for the purpose set forth.

18. In a sampling-machine, the combination, with a shaft F, two ratchet-wheels K^2 and N^4, mounted thereon, the wheel N^4 being provided with pins N^5, an armed sleeve N^6, loosely mounted on the shaft and provided with a pin N^7, a piece N^9, having a slot and also an inclined portion against which the pin N^7 engages, a lever N^{16}, having a pin N^{10} in the slot of the piece N^9, a pin N^{15} at the opposite end of said lever, and an arm K′, engaging with the ratchet-wheel K^2, the pin N^{15} being adapted to engage with the arm K′ and disengage it from the wheel K^2, and thereby stop the rotation of the wheel N^4 and arrest the movement of the receptacle-carrier, substantially as set forth.

19. The combination of the shaft F, ratchet-wheel N^4 and pins N^5, piece N^6 and pin N^7, shaft E and piece N^8, with inclined plane N^9 and slot N^{11}, and the shipper-lever N^{16}, with pins N^{10} and N^{15}, substantially as and for the purpose set forth.

20. In a sampling-machine for the purpose described, the combination of an inclosing case, a periodically-acting sampling-cup, a horizontal cup-bearing tray, and mechanism for actuating said sampling-cup and said tray, substantially as described.

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

JOHN BIGELOW.

Witnesses:
CHARLES T. THOMPSON,
E. K. FAIRCHILD.