

(No Model.)

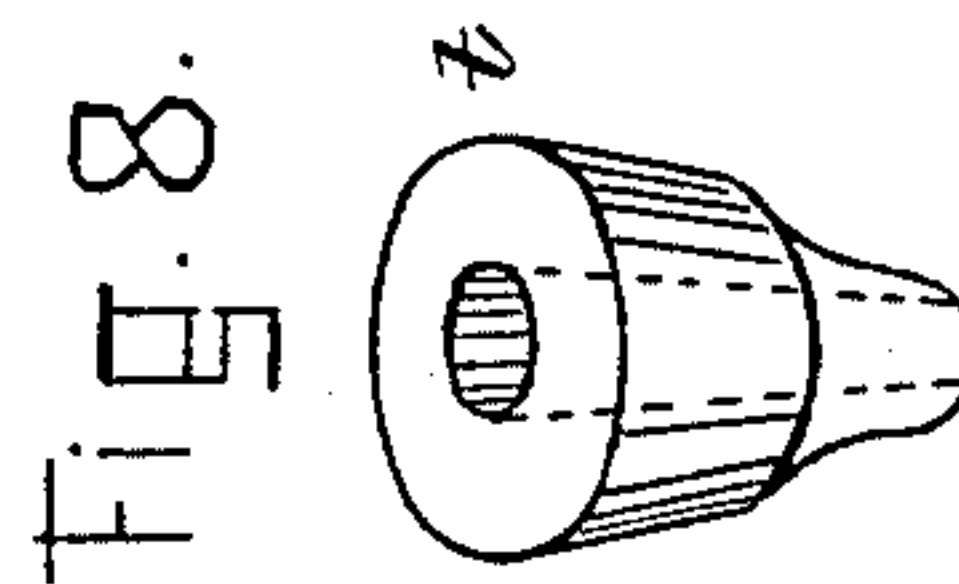
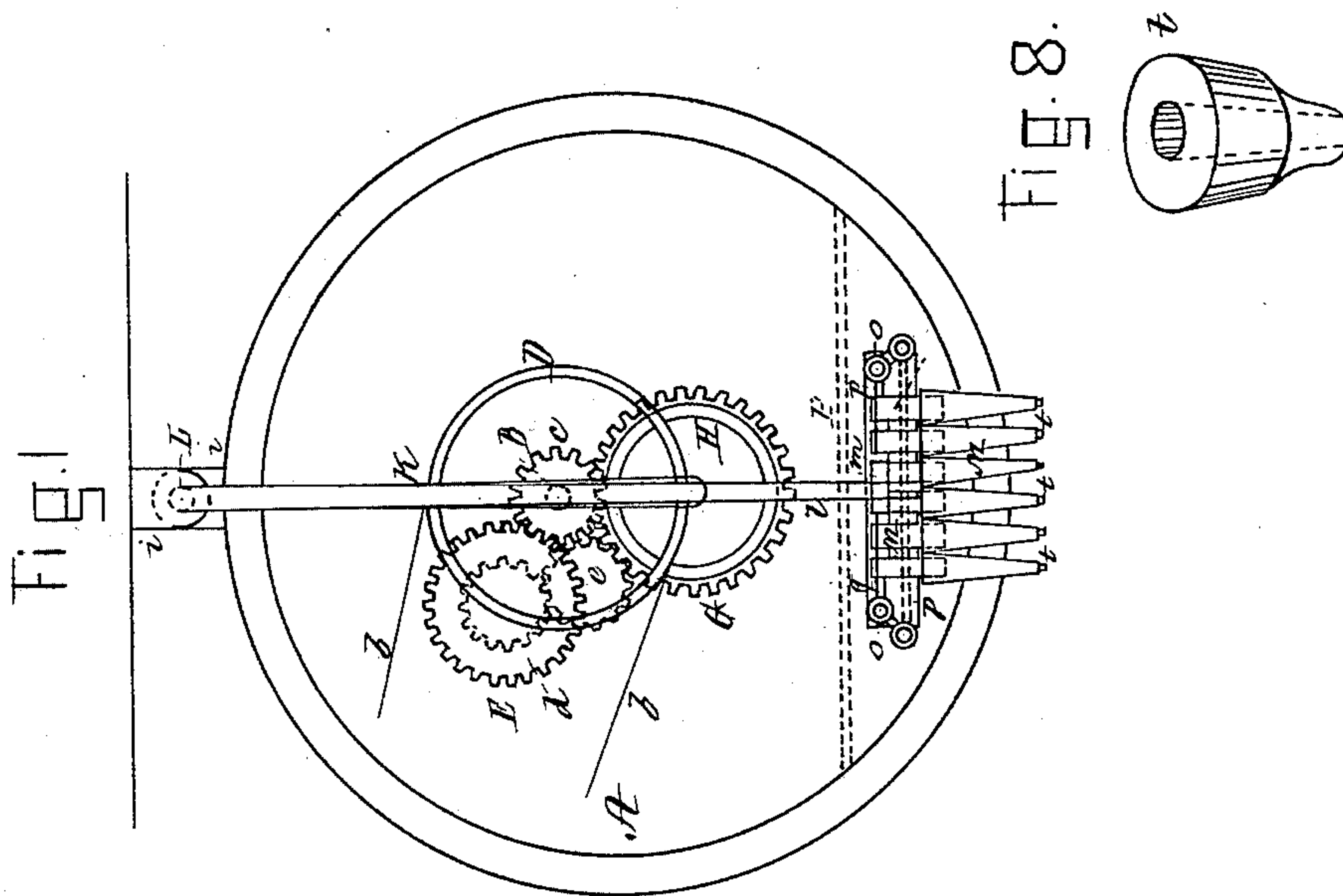
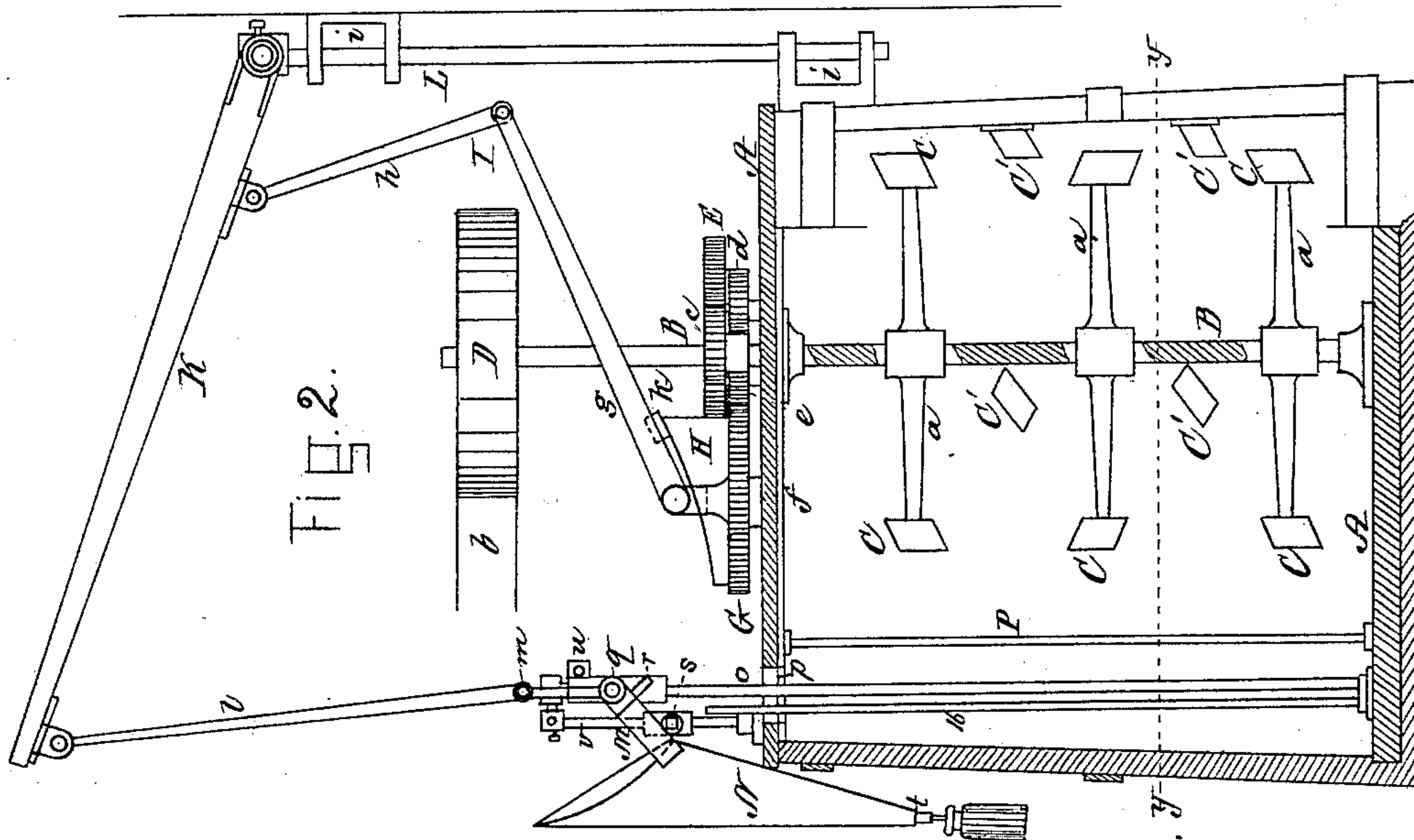
2 Sheets—Sheet 1.

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APPARATUS FOR MIXING LIQUID AND POWDERED SUBSTANCES.

No. 399,276.

Patented Mar. 12, 1889.



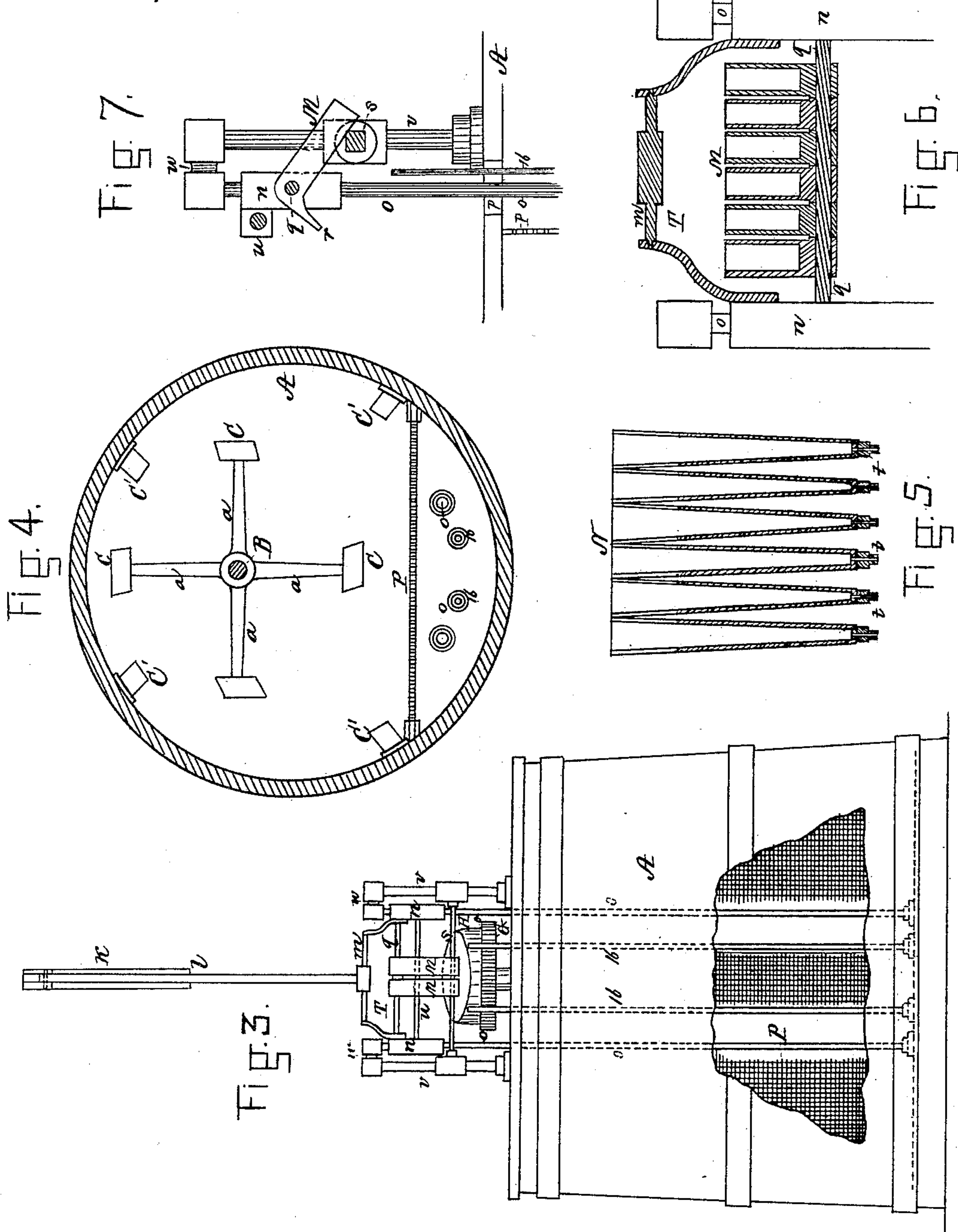
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UNITED STATES PATENT OFFICE.

BENJAMIN DALTON MILLIKEN, OF SOMERVILLE, MASSACHUSETTS.

APPARATUS FOR MIXING LIQUID AND POWDERED SUBSTANCES.

SPECIFICATION forming part of Letters Patent No. 399,276, dated March 12, 1889.

Application filed July 10, 1888. Serial No. 279,585. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN DALTON MILLIKEN, of Somerville, in the county of Middlesex and State of Massachusetts, have invented certain Improvements in Apparatus for Mixing Liquid and Powdered Substances and for Filling Bottles and other Receptacles Therewith, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a plan of an apparatus of the class referred to constructed in accordance with my invention. Fig. 2 is a side sectional elevation of the same. Fig. 3 is a front elevation, some parts being omitted. Fig. 4 is a horizontal section on the line *y y* of Fig. 2. Fig. 5 shows the cups by which the mixture is taken up to the spouts. Fig. 6 represents the conveying-spouts; Fig. 7, a detail, (enlarged,) to be referred to; Fig. 8, a removable nozzle.

The following devices, which, when assembled together, constitutes the prominent feature of my invention, are a revolving agitator for mixing the ingredients, a strainer for eliminating foreign matter therefrom, and a cup or series of cups for filling bottles or other receptacles, the said devices being so constructed and arranged as to simultaneously perform their functions in a continuous, reliable, and harmonious manner.

In the said drawings, A represents a tank or receptacle preferably of the form of a cylinder or frustum of a cone within bearings, in which, to one side of the center of the same, is located an upright shaft, B, provided with a series of adjustable arms, *a*, carrying inclined blades C, the interior of the tank being also provided with a series of inclined blades, C', permanently secured thereto at heights intermediate of the planes of two contiguous sets of blades, C. The shaft B projects above the tank A and has secured to its top a pulley, D, which is driven by a belt, *b*. A short distance above the tank the shaft carries a pinion, *c*, which engages with a toothed wheel, E, having thereunder on its axis a pinion, *d*, Fig. 2, which drives a pinion, *e*, which engages with a toothed wheel, G, secured to a short stud, *f*, projecting up from its bearing

secured to the top of the tank. Immediately above the wheel G is a cam, H, of the form seen in Figs. 1 and 2. To the top of the stud *f* is pivoted the bottom of an arm, *g*, of a compound lever, I, the upper end of said arm being pivoted to the lower end of an arm, *h*, pivoted to a long beam, K, whose lower end is pivoted to a standard, L, the several pivotal points being capable of adjustment and the standard being supported in brackets *i i*.

k is a friction-wheel on the under side of the arm *g* and located in the path of the cam H, on the upper surface of which it rests.

To the upper outer end of the beam K is pivoted the upper end of a long rod, *l*, to the foot of which is pivoted the middle of a horizontal bar, *m*, extending between vertical blocks *n n*, which slide up and down upon vertical guides *o o*, projecting up from the bottom of the tank A and up through a wide slot, *p*, cut in its top, the bar *m* and blocks *n n* forming the cross-head T of the filling device now to be described.

q is a horizontal rod extending between the sliding blocks *n n* (below the bar *m*) and having pivoted thereto a series of cups, M, each of the exact capacity of a bottle to be filled, Fig. 6. The cups may be pivoted independently of each other, or may be pivoted in groups to said rod *q*, each one, or one of a group, being provided at its bottom with a teat or projection, *r*, which, when the cups are full and rising vertically from the tank, strikes against a horizontal cross-rod, *s*, and tips the cups over into an inclined position, so as to empty their contents into a corresponding number of funnel-shaped spouts, N, separated from each other by partitions, Fig. 5, each cup draining its entire contents into its proper spout. The lower end of each spout is contracted to a diameter smaller than the mouth of the bottle, and is provided with a removable tubular nozzle, *t*, to facilitate its being cleansed should it become clogged, Fig. 8.

u is a horizontal brace for holding the tops of the vertical guides *o o* immovably in their proper relative adjusted position to insure the free reciprocating movement of the filling device, and also serves as a guard or stop for preventing the cups from swinging backward out of their vertical position, Fig. 7.

Rising from each side of the front of the tank in a position contiguous to the tops of the vertical guides *o o* is a short standard, *v*, the top of which is connected by a brace, *w*, with the top of the contiguous guide to give additional stiffness and security thereto, and the two standards are connected by a horizontal brace, *s*, the rear surface of which is located in or slightly in front of the vertical plane passing through the outer front surfaces of the cups and immediately in the path of their teats or projections *r*, by which the cups are tipped into the position for emptying their contents into their respective spouts *N* when ascending from the tank through the slot *p* in its top.

The empty cups during their descent into the tank and when full during their ascent are kept in a vertical position by a pair of upright rods or guides, *16*, secured at their bottoms to the bottom of the tank, the tops of these guides extending up to within a short distance of the horizontal brace *s*, the front of the cups bearing against the guides *16* until nearly into their position to discharge their contents into the spouts, being held in their upright position till they pass above the brace *s*.

P is a sheet of wire-gauze attached to a frame secured in a vertical position within the tank a short distance back of the path of the reciprocating filling device, the function of this gauze sheet being to strain the liquid contents of the tank and prevent the passage into the cups of any foreign matter—such as pieces of wood or solid or fibrous substances—which may chance to be in the ingredients mixed together in the larger (rear) portion of the tank, this strainer also serving to prevent any agitation of the mixture within the smaller front portion of the tank in which the filling-cups are located, and avoiding any splashing over of their contents when full.

Operation: The liquid ingredients being poured into the tank *A*, the vertical shaft *B* is rotated, causing the inclined blades *C* to stir them together and dashing them against the stationary inclined blades *C'*, secured to the interior of the tank, after which the powdered substances are added and the ingredients thoroughly incorporated, the powdered substances being held in solution, as desired, by the revolving mixer. The parts being in the position shown in Fig. 2, with the highest point, *17*, of the cam *H* under the friction-wheel *k* of the arm *g*, and the shaft *B* revolving, the filling-cups are at their highest elevation. As the cam continues to revolve, the point *17* passes from under the wheel *k* and the cups *M* are free to descend by gravity through the slot *p* into the tank and into the mixture, which, by reason of the strainer *P*, is brought into a quiescent state in the portion of the tank in front of it. As the cam continues to revolve, the filling-cups ascend, and just before the highest point, *17*, of the cam passes under the friction-roll *k* the projec-

tions on the under side of the cups are brought into contact with the under side of the horizontal brace *s*, and the cups are tipped into a position for them to empty their contents into their respective spouts *N*, from the nozzles of which the contents flow into the bottles held thereunder, the contents of each cup being of the exact capacity of each bottle to be filled. A series of bottles having been filled, and as the cups are again descending for another charge, another set of bottles are brought into position with their mouths surrounding the nozzles, the vertical guides keeping the cups in their upright position till they are again filled, and while they are rising until their front surfaces pass above the guides and their projections *r* again come against the under side of the brace *s*, by which they are again tipped and emptied, the several operations of mixing the ingredients, straining them of impurities, filling the cups, and emptying their contents through the spouts into the bottles, being performed in a continuous and reliable manner.

When it is desired to discontinue filling bottles, it is simply necessary to place a stop under one of the sliding blocks *n n* of the cross-head of the filling device, when it is raised to its highest elevation by the point *17* of the cam coming under the friction-roll *k*. This can be done by hand or by any well-known automatic device.

When the filling-cups are arrested from moving, the shaft and its agitating-blades *C* may continue to revolve and the ingredients be mixed and thoroughly incorporated independently of the operation of filling the bottles.

One of the uses to which my improved apparatus may be applied is the manufacture of stove-enamel, &c., which is composed of certain liquid and powdered ingredients; but it is evident that other liquids for various purposes, or powdered substances only, may be mixed and filled into bottles or other receptacles by my apparatus in the same continuous and satisfactory manner.

I claim—

The tank *A*, with a slot, *p*, in its top, a strainer, *P*, located in the tank, one or more filling-cups, *M*, pivoted to a reciprocating cross-head, *T*, a series of levers connected with the cross-head, and one or more spouts, *N*, in combination with a revolving mixer, a series of toothed gear actuated by the shaft of the same, and a cam, *H*, secured to one of said gear, one, *g*, of the levers connected with the cross-head being located in the path of said cam and being periodically raised thereby, all constructed to operate substantially in the manner and for the purpose specified.

Witness my hand this 16th day of June, 1888.

BENJAMIN DALTON MILLIKEN.

Witnesses:

N. W. STEARNS,
GRACE B. FRASER.