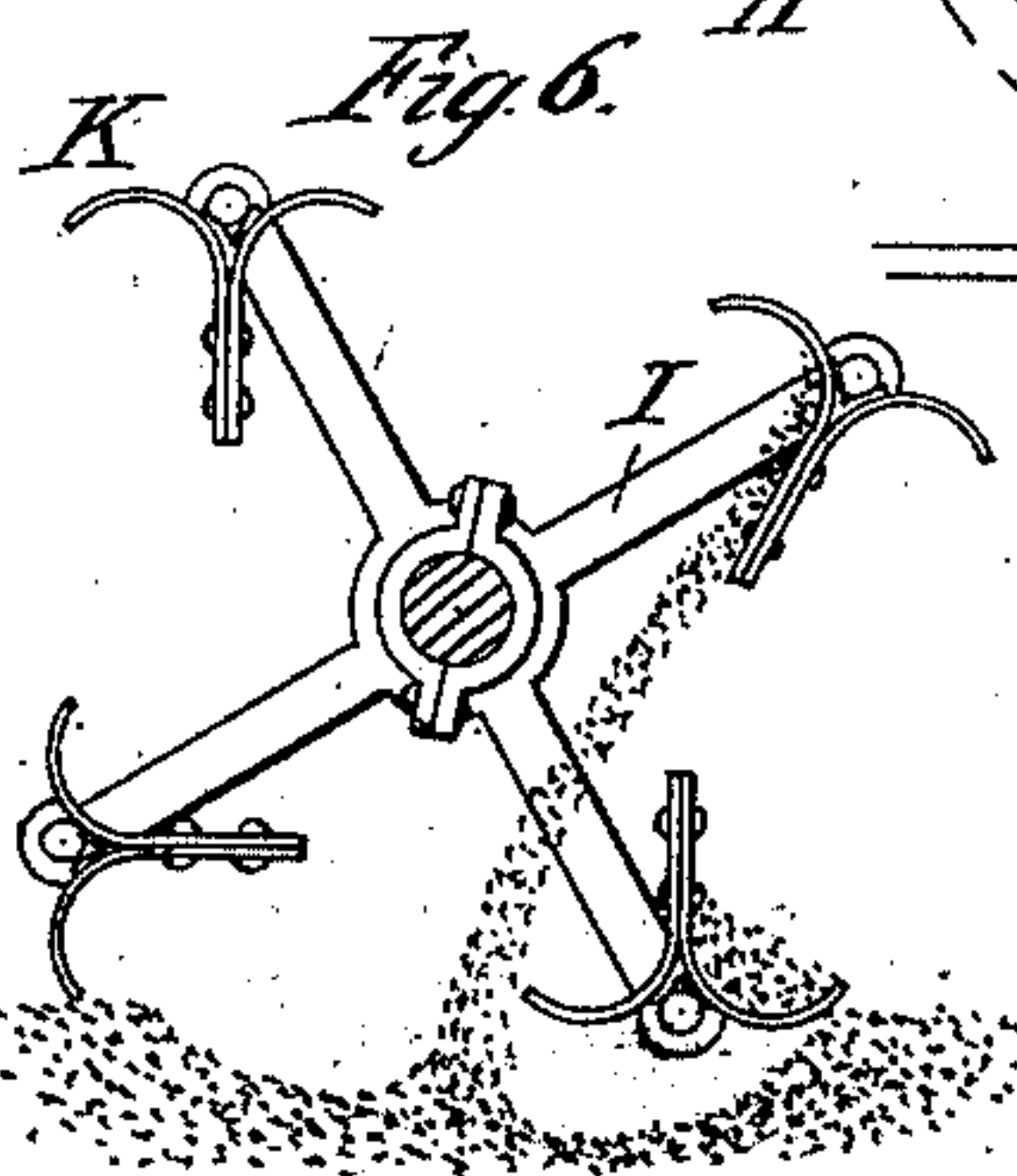
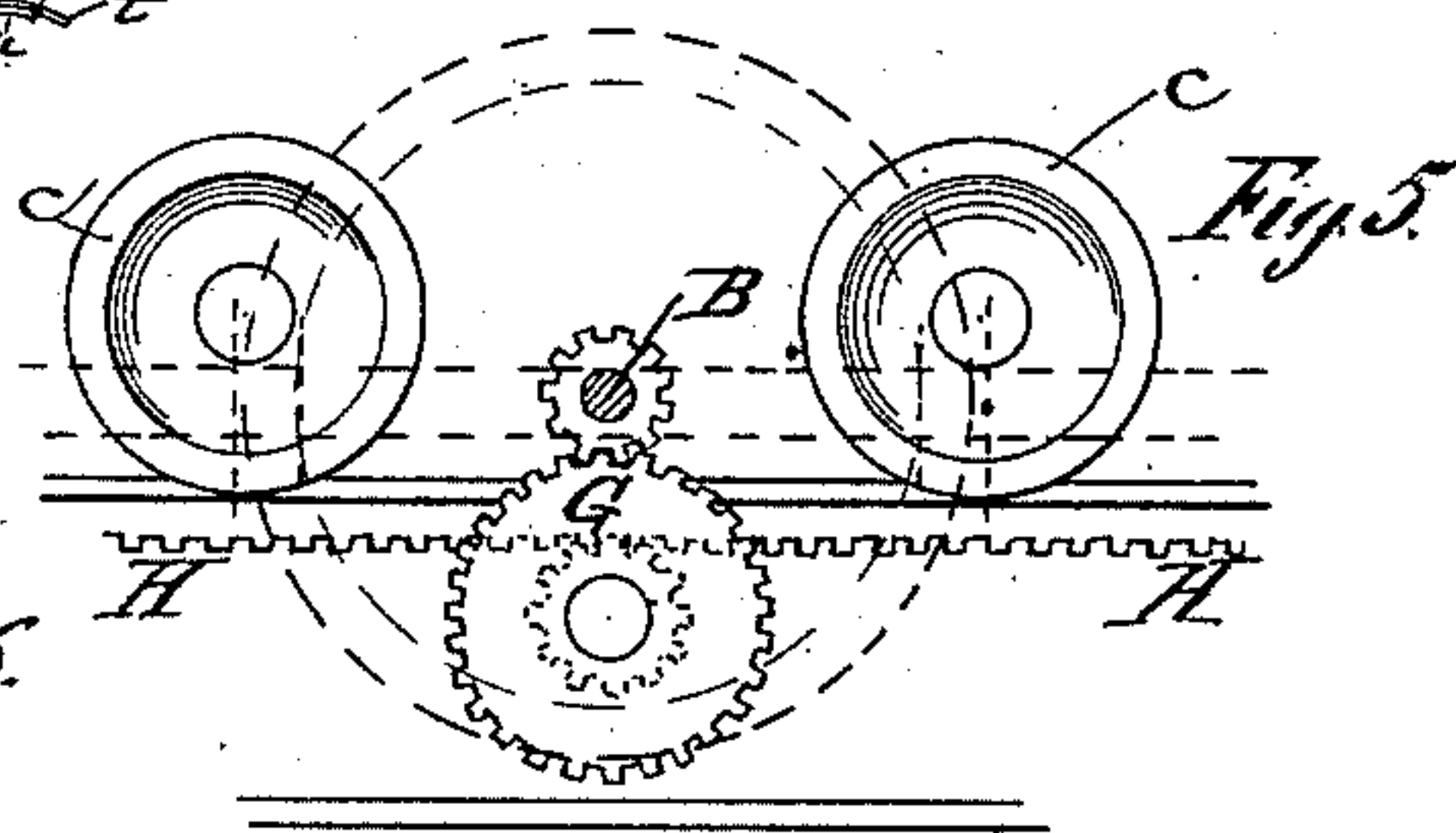
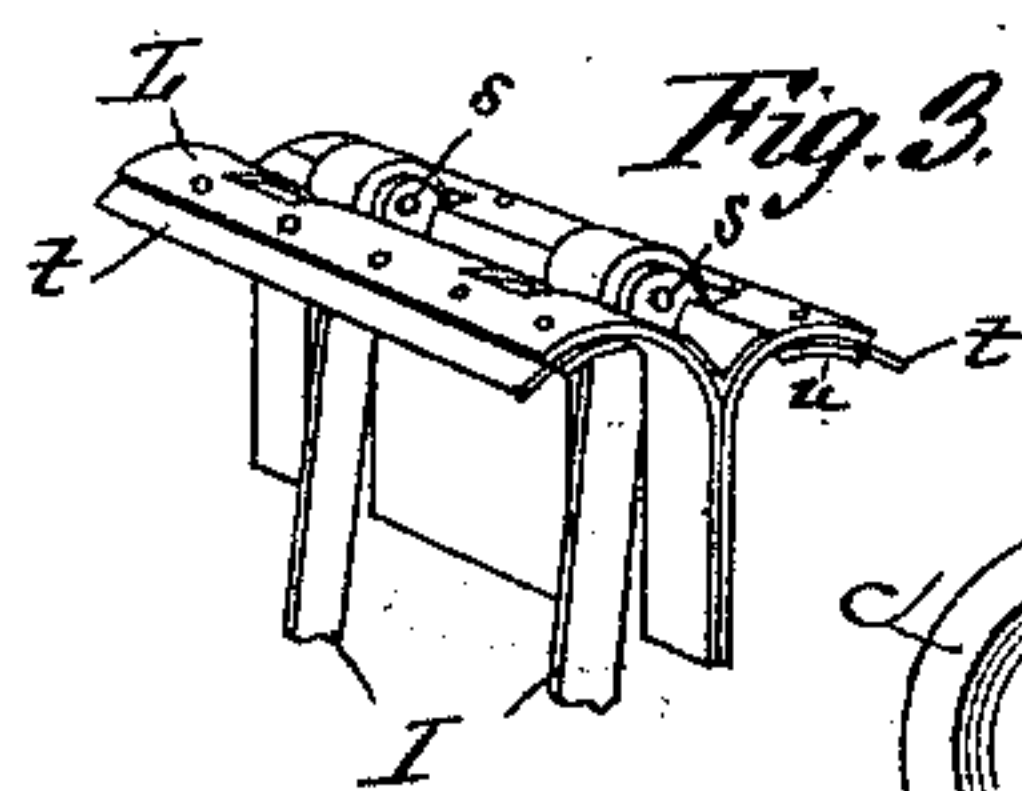
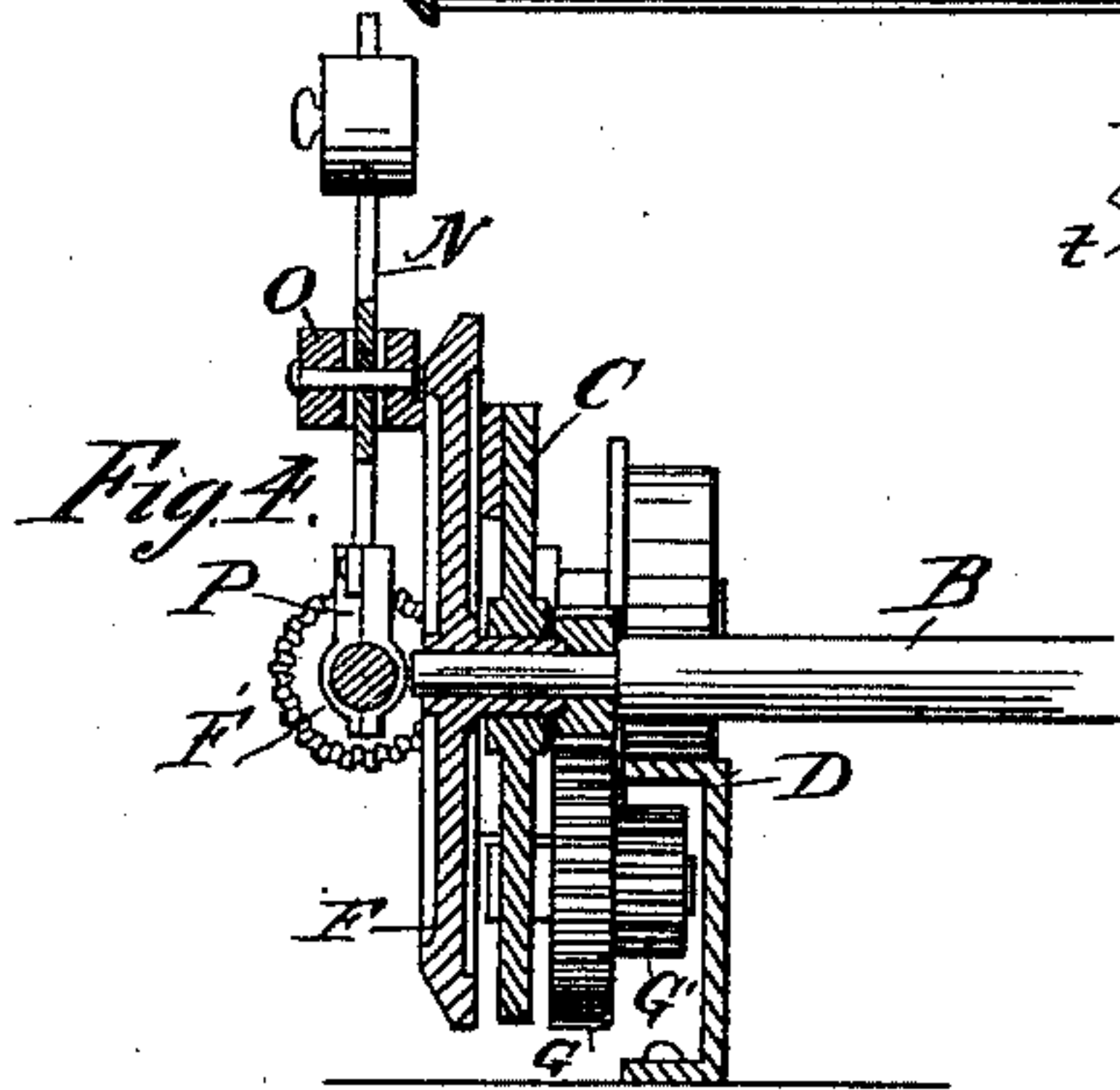
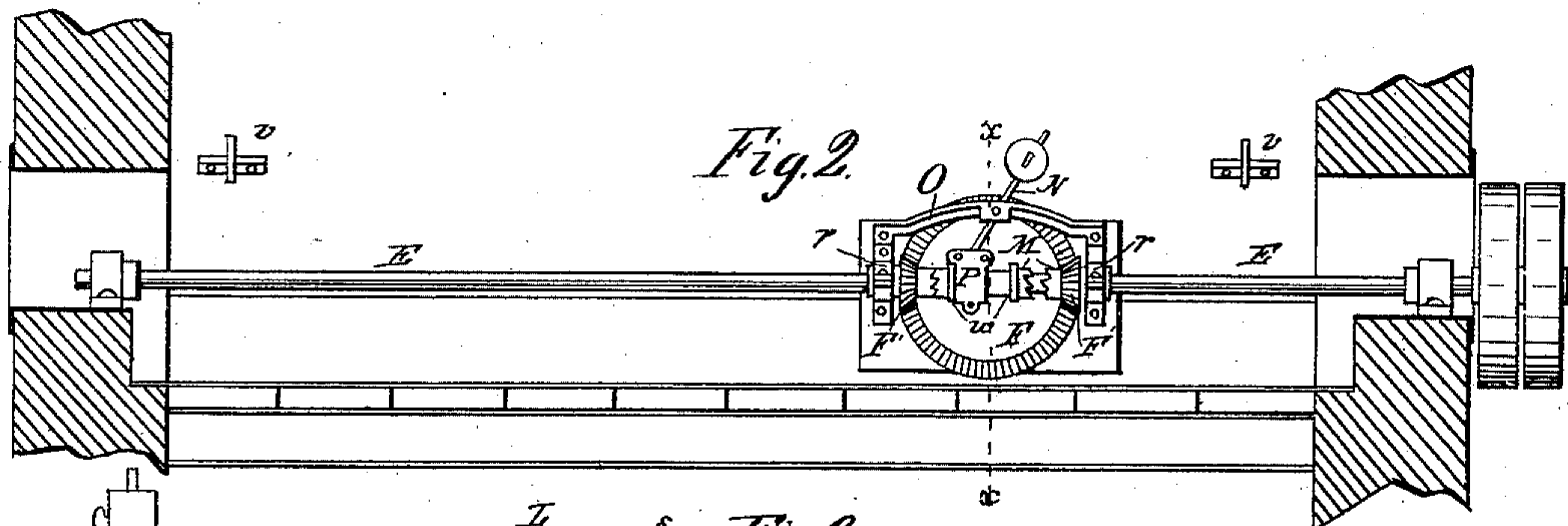
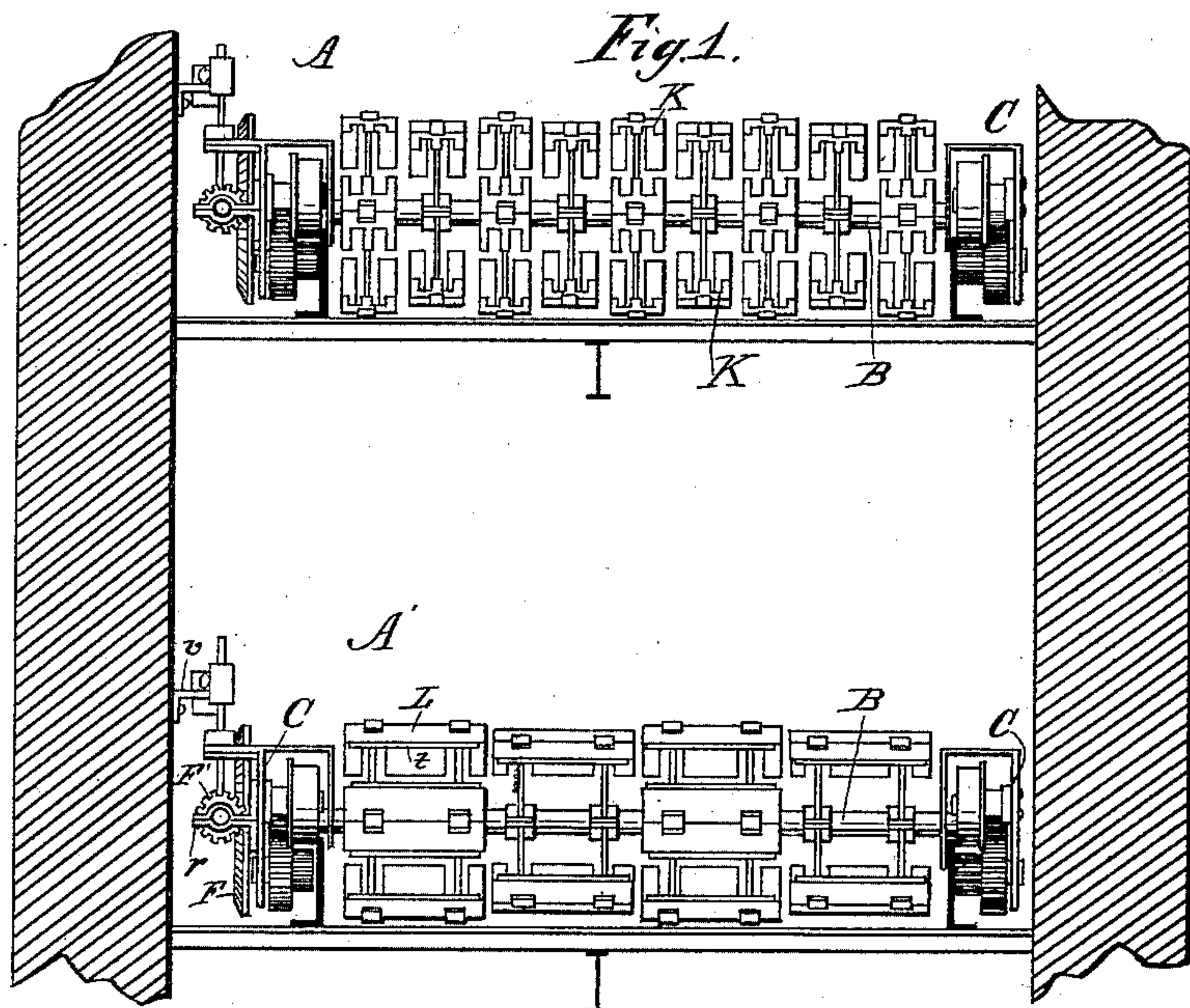


P. WEINIG.
Malt-Turning Machine.

No. 223,086.

Patented Dec. 30, 1879.



Witnesses:
J. B. Townsend
Ch. B. Allison.

Inventor:
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per P. C. Dyrenforth,
Attorney.

UNITED STATES PATENT OFFICE

PAUL WEINIG, OF HANAU, PRUSSIA, GERMANY.

IMPROVEMENT IN MALT-TURNING MACHINES.

Specification forming part of Letters Patent No. **223,086**, dated December 30, 1879; application filed September 20, 1879; patented in Germany, December 8, 1878.

To all whom it may concern:

Be it known that I, PAUL WEINIG, of the city of Hanau, in the Kingdom of Prussia, Germany, have invented certain new and useful Improvements in Malt-Turning Machines; and I hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, of which—

Figure 1 is a cross-section of an upper and lower kiln, showing the two forms of my apparatus; Fig. 2, a side view of the pulley-shaft and gearing; Fig. 3, a detail view of a lower bucket; Figs. 4 and 5, detail views of the pulley-shaft, truck, and gearing; and Fig. 6, a sectional view, illustrating the mode of operation of the buckets.

I have already obtained German Letters Patent for my said machine, the same being dated at Berlin, December 8, 1878, and numbered 6,825.

My invention relates to a machine for turning and stirring the malt in kilns during the process of drying.

Malt-agitating machines have heretofore been constructed in which a shaft having fixed radial stirring-arms extends across the kiln from side to side, such shaft having a rotary motion imparted to it by means of a pulley-shaft and gearing, and a progressive motion by having its extremities cogged and arranged to turn upon racked trams, the direction of revolution, and hence of progress, being reversed at the proper times by means of a weighted lever, which brings up against stops at or near the opposite ends of the kiln, and operates a sliding clutch upon the pulley-shaft analogous to those employed in planing-machines and the like, whereby the shaft and stirrers while revolving move automatically back and forth from end to end of the malt-kiln. Machines of this class are a great improvement upon the plan in vogue before their invention of turning the malt by hand with ordinary shovels, the latter mode being by far the less effective, seriously injurious to the health of the operatives, and much the more expensive in the end, owing to the large number of hands required for the purpose and the high prices which arduous and unwholesome work of this nature commands.

The machines for this purpose hitherto constructed have, however, been defective in several particulars. One of these is, that the racks which carry the shaft forward and backward are upon the upper sides of their respective trams, whereby they serve to catch the malt which is thrown up at the edges of the kiln and soon become filled, thereby raising the shaft and arms above the desired level and impeding the action of the machine, and also causing a considerable waste of malt by crushing. Another is, that they rather stir than turn the malt; a third, that the arms, being fixed and rigid throughout, have no tendency to conform to the floor of the kiln, (the latter being depressed under a burden of malt to a varying extent within certain limits, depending both upon the quantity of malt and the degree of dryness,) for which reason it becomes necessary to exercise great care in setting and maintaining the shaft at just the proper level—a thing of no little difficulty with so ponderous a machine; and a fourth, that the shaft carrying the stirrers revolves at a speed equal only to the progressive movement, whereas much better results are obtained by multiplying the revolutions of this shaft with respect to such progressive movement.

The object of my invention is, by overcoming all the foregoing defects, and also by means of various other improvements, to produce a malt-turning machine far more effective than any hitherto in use.

To these ends my invention consists, first, in having the shaft rest at each end in a truck running upon smooth trams, the rack being underneath the said trams, and the progressive motion induced by intermediate gearing; secondly, in providing the radial arms with shovels or buckets duplex in form, whereby they scoop in either direction, and pivoted upon the said arms and weighted in such manner that they oscillate back and forth within prescribed limits, whereby they conform readily to the floor of the kiln, and tilt suddenly at a given point in their revolution, discharging their contents, completely overturned, upon the floor; and, furthermore, in various details of construction, all as hereinafter more fully set forth.

Referring to the drawings, A is the upper,

and A' the lower, kiln. It is proper to state here, however, that my invention is equally applicable where only a single kiln is employed.

B is the shaft extending across each kiln, and resting at each end in a truck, C, on flanged wheels *c c'*, running upon smooth trams D at the sides of the kiln parallel with the walls of the same. Motion is imparted to the shaft B by means of the pulley-shaft E, resting in bearings *r* upon the truck, or by any other suitable driving-power, and beveled gearing F F', in the usual way. The extremities of the shaft B are cogged, as shown, and engage each with a large cog-wheel, G, below it, said cog-wheel being suspended in journals upon the truck C, and carrying a pinion, G', which in turn engages with a rack, H, upon the under side of the tram D. Thus the revolution of the shaft B creates a progressive movement likewise, the latter being slow in proportion, owing to the disparity of size between the cogged extremity of the shaft B and the wheel G, and hence correspondingly slow revolution of the pinion G', through which the progressive movement is effected.

In order to keep the tracks perfectly free from malt I usually provide the truck at each end with sweepers set at an angle, whereby they sweep the kernels into the interior of the kiln. It is also an advantage to employ an apron or protector on the inside of the truck to keep the malt out of the gearing.

I I are the arms carrying the buckets or shovels K and L. The arms I are attached to the shaft by means of ordinary clamping-collars, as shown, and are made to radiate from the shaft at varying and irregular angles with respect to each other, for reasons which will hereinafter appear.

A description of the buckets and their mode of operation is as follows: The buckets K are of the form which I adopt for the upper kiln, and L the form for the lower. This difference of construction is rendered essential by the difference in the character of the malt in the earlier stage from that in the later stage of the process. When introduced green into the upper kiln much of the malt is in the form of cakes or clods, caused by the intertwining of the roots and sprouts; and the office, therefore, of the buckets therein employed is to break up and separate these cakes as well as to turn them. This will serve to explain the reason for the claw-like construction of the buckets K.

Each bucket K consists of two plates of sheet metal, each slotted from its base upward for about two-thirds (more or less) of its height, and having its upper half curved over, as shown, the curved upper part being suitably slotted from its edge inward to form claws.

The plates are firmly bolted together with their curved parts extending outward in opposite directions, and the slots are set across the tops of the arms I, and the buckets pivoted thereto by means of bearings *s*, projecting from one of the plates, as shown, above the

center of gravity, whereby the lower part tends to hang vertically from the pivot. The lower part may be additionally weighted, if necessary. Thus, when an arm is on the upper side of the shaft, the bucket thereon hangs vertically in line with the said arm, and as the whole revolves the buckets continue to hang vertically, falling more and more out of line with the arm until the upper end of the slot in one of the curved buckets brings up against the arm. The bucket then remains fixed at an angle of, say, twenty degrees with the arm, and in this position is carried over the floor of the kiln, scooping up a portion of the malt. The bucket then continues in the same fixed position up the opposite side for a short distance, (depending upon the angle of oscillation and the location, higher or lower in the bucket, of the center of gravity,) when it tilts suddenly with the weight of the lower part to the same angle on the opposite side of the arm, (being restrained from going farther by the limit of the slot in the other half of the bucket,) discharging its contents back upon the floor.

It is evident that by setting the arms at different angles, as before described, fewer of the buckets are caused to pass through the malt at the same time than would otherwise be the case, thus reducing the strain to a minimum, and, moreover, rendering it uniform instead of intermittent.

The construction of the buckets above described, so far as it goes, and the mode of attaching them to the arms, are the same in regard to the buckets upon the lower shaft. The latter, however, are broader, are provided with two slots instead of one, and are pivoted to two arms set side by side to give them the requisite firmness. Moreover, they have not the claw-like construction of the upper ones, and they are provided with strips or blades of india-rubber, *t*, projecting from their edges, as shown. I prefer to secure these strips in position by means of a metal strip, *u*, laid upon them and riveted to the bucket, as clearly represented in Fig. 3, though any other convenient means may be adopted. Their purpose is to act on the grains lying so close to the floor as to have been untouched by the buckets, and keep the openings in the floor free for the passage of the heated air. With my machine, however, the quantity of malt untouched by the buckets will be comparatively small, for the buckets may, and should, be so hung as to touch against the floor just before the lowest point in the revolution is reached. No obstruction is caused thereby, as the buckets readily yield upward on their pivots under a moderate pressure against the floor.

If desired, brushes may project upward from the center of each bucket L, being interposed between the plates forming the opposite halves of the said buckets, and extending a short distance beyond the buckets; or, if preferred, brushes may be attached to the buckets at

their edges instead of the rubber strips, *t*, shown and above described.

The reversal of the machine is effected in substantially the same manner as in planing-machines and the like by means of a clutch, *M*, which slides upon the pulley-shaft, and is operated automatically by means of a weighted lever, *N*, having its fulcrum in a yoke, *O*, upon the truck *C*, this weighted lever meeting stops at proper points upon the walls of the kiln, and being thus thrown over to the opposite side of the perpendicular, moving the clutch (which latter is attached to its lower arm) along the shaft and causing it to engage the beveled-gear wheels *F* in turn. These obviously turn the main gear-wheel *F* in contrary directions. It is intended that the stops shall merely serve to carry the weighted lever *N* over the perpendicular or dead-point, and that the said lever by its own gravity shall operate the clutch. For this reason the lower end of the lever is attached by a ball-and-socket joint to the upper flange of a sliding collar, *P*, on the clutch, said collar, when the weight is thrown over the center, bringing up against one or the other of the flanges *v*.

I do not limit myself to the method hereinbefore described of constructing the buckets. They may, if preferred, be cast in a single piece, or made in any other way, provided they are given the prescribed form.

What I claim as new, and desire to secure by Letters Patent, is—

1. A malt-turning machine in which the revolving shaft carrying the arms is journaled at each end in a truck running on smooth rails, said rails having each a rack on its under side, which operates in conjunction with gearing set in motion by the said revolving shaft to give a progressive motion to the truck, substantially as described.

2. A malt-turning machine in which oscillating buckets are attached to the extremities of arms projecting from the revolving shaft, and scoop the malt from the floor as the shaft revolves, and tilt at a given point in their revolution, discharging their contents, said buckets being duplex in form, whereby they operate in like manner whichever way the shaft revolves, substantially as described.

3. The buckets *K*, duplex in form, whereby they scoop in either direction, slotted and pivoted to the arms of the revolving shaft, as shown, whereby they oscillate within prescribed limits, and having a claw-like construction, all as and for the purposes set forth.

4. The buckets *L*, duplex in form, slotted and pivoted to the arms of the revolving shaft, as shown, whereby they oscillate within prescribed limits, and provided with the rubber strips *t*, as and for the purposes set forth.

PAUL WEINIG.

In presence of—

Dr. G. RADEMACHER,
A. S. HOGUE.