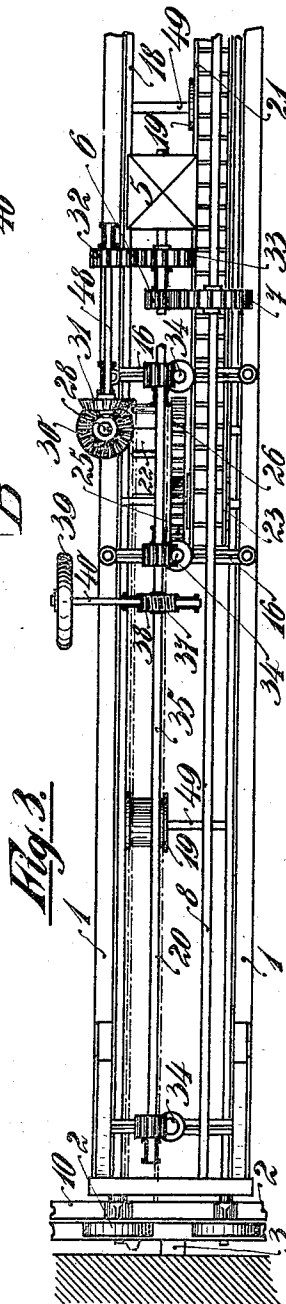
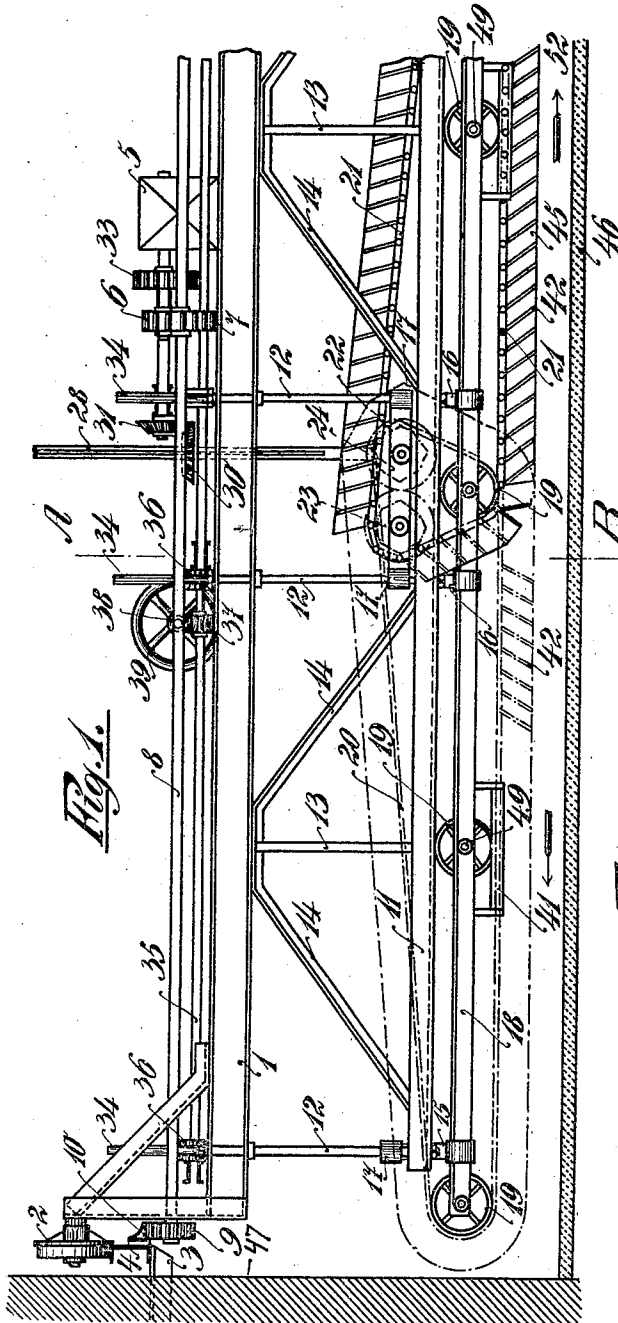


G. WEINBEER.
MALT SPREADING OUT APPARATUS.
APPLICATION FILED APR. 1, 1909.

934,115.

Patented Sept. 14, 1909.
2 SHEETS—SHEET 1.



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Fig. 2.

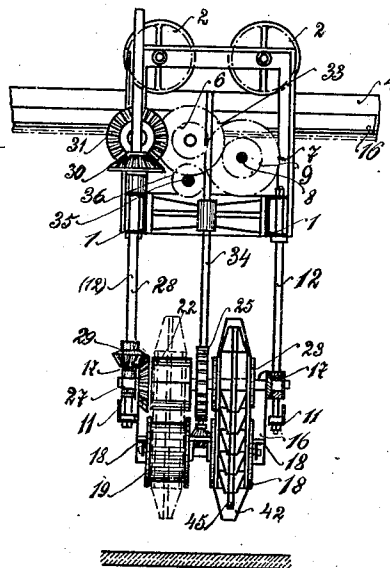
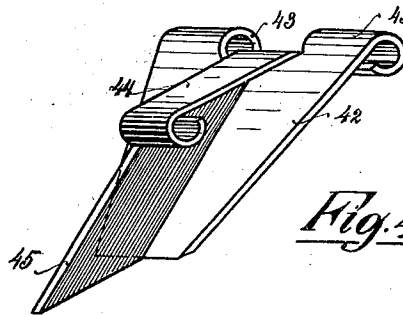


Fig. 4.



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UNITED STATES PATENT OFFICE.

GREGOR WEINBEER, OF NUREMBERG, GERMANY.

MALT-SPREADING-OUT APPARATUS.

934,115.

Specification of Letters Patent. Patented Sept. 14, 1909.

Application filed April 1, 1909. Serial No. 487,182.

To all whom it may concern:

Be it known that I, GREGOR WEINBEER, a citizen of the Empire of Germany, residing at Nuremberg, in the Empire of Germany, have invented a new and useful Malt-Spreading-Out Apparatus, of which the following is a specification.

As is well known, grain is malted by first soaking it with water and then heaping it upon a malting-floor in high and narrow couches, where it is allowed to germinate. During the process of germination it is necessary to remove from time to time the then uppermost layer of grain and to hoard it up at the side of the couch, which is thus gradually spread out, so as to insure uniform germination throughout the whole mass. This spreading-out of the couches was hitherto effected by hand, which is objectionable for two reasons. One reason is, that the then uppermost layer of grain is not removed in a regular and uniform manner, and the other reason is, that this hand-work takes up much time.

My invention relates to an apparatus which is adapted to uniformly spread out a couch, while the thickness of the layer to be removed can be adjusted.

The apparatus comprises a crane adapted to travel on rails over a malting-floor, a frame suspended from the crane, a second frame vertically guided in the frame and extending over the whole length of the crane, one or more endless chains mounted in the second frame to move over rollers and provided with ladles having vertical central ribs, means for simultaneously driving the crane and the endless chain or chains, and means for vertically adjusting the second frame in the frame. The lower parts of the endless chains are parallel to the malting-floor and the central ribs on the ladles form a continuous wall, which prevents the grains in the then uppermost layer from simply shifting to a side in the direction opposite to that in which the crane travels. The central ribs on the ladles also enable the apparatus to correctly work, no matter whether the crane moves on the rails in one or the other direction.

I will now proceed to describe my invention with reference to the accompanying drawing, in which—

Figure 1 is an elevation of an apparatus having two endless chains with ladles and adapted to spread out a couch disposed in

the middle of the malting-floor, a part on the right being broken away, Fig. 2 is a vertical cross section through the same on the line A—B in Fig. 1, Fig. 3 is a plan view of the same, parts being broken away, and Fig. 4 is a perspective view of a ladle with a central rib.

Similar characters of reference refer to similar parts throughout the several views.

Two parallel rails 4 are secured on suitable supports 3 above the malting-floor 46 on both sides for example in walls 47. On these rails 4 four wheels 2, 2 of a crane 1 of any known construction are mounted to roll. A horizontal shaft 8 is mounted in the crane 1 to turn and has fastened on its ends two gear wheels 9, which mesh with two racks 10 fastened at the rails 4. An electromotor 5 of any known construction is disposed on the crane 1 and can be supplied with current from some source in any known manner. The armature shaft of this electromotor 5 carries a pinion 6 and a gear wheel 33. The pinion 6 meshes with a gear wheel 7 fastened on the shaft 8 mentioned above, while the gear wheel 33 meshes with another one 32 fastened on a short shaft 48, which is mounted in the crane 1 to turn. I have merely indicated the bearings for the shaft 48, also the outer bearing for the armature shaft by thick lines, as they may be of any known construction and may be fastened on the crane 1 in any known manner. I have also not shown any bearings for the shaft 8 for the sake of simplicity, as it is obvious to any expert how they can be disposed.

A frame is suspended from the crane 1 and is shown to consist of two parallel horizontal angle-bars 11, 11, eight vertical rods 12, 12, four vertical studs 13, 13 and eight struts 14, 14.

A second frame is vertically guided in the first frame and is constructed as follows. Two parallel horizontal angle-bars 18 are connected with one another near their ends by two brackets 15 and near their middles by two brackets 16, 16, which brackets are all provided at their ends with eyes 17, 17, that are guided on the vertical rods 12, 12. The four brackets 15, 16 are in their middles rigidly connected with four vertical racks 34, 34, which mesh with four gear wheels 36 fastened on a horizontal shaft 35, that extends over the whole length of the crane 1. The shaft 35 is mounted to turn in bearings,

which are equally merely indicated by thick lines and can be disposed on the crane 1 in any known manner. A worm wheel 37 is keyed upon the shaft 35 and meshes with a worm 38, which can be operated from a hand-wheel 39 by means of its shaft 40. I have also merely indicated by thick lines the bearings for the worm shaft 40 for the sake of clearness.

The two horizontal bars 18, 18 are provided with suitable holes or eyes, in which five shafts 49, 49 are fastened. On the middle shaft 49 two rollers 19, 19 are mounted to turn, while on the other shafts 49, 49 only one roller 19 each are mounted to turn. The eyes 17, 17 of the two inner brackets 16, 16 are in pairs connected together by horizontal bars 24, 24, in which the shafts of two preferably octagonal driving rollers 22, 23 are mounted to turn. These two shafts are geared together by means of two gear wheels 25 and 26. In the bar 24 on the left in Fig. 2 the lower end of a vertical shaft 28 is mounted to turn, while it is in any known manner prevented from vertically moving. The shaft 28 is put in gear with that of the driving roller 22 by means of bevel wheels 29 and 27. The shaft 28 passes through some bearing (not shown) in the crane 1 and through a bevel wheel 30 upward and is longitudinally splined (Fig. 1). The bevel wheel 30 is in any known manner prevented from longitudinal motion on the shaft 28 and meshes with another bevel wheel 31 keyed upon the shaft 48 mentioned above. It will be seen, that the bevel wheel 30 can drive the vertical shaft 28 for any position of the second frame described above. An endless chain 20 indicated by dotted lines passes over the driving octagonal roller 22 and three guiding rollers 19, 19, while another endless chain 21 shown in full lines passes over the other driving octagonal roller 23 and the three other guiding rollers 19, 19. Each endless chain 20 or 21 consists of two parallel endless series of links and cross bolts connecting them and serving as their pivots. These bolts pass each through two eyes 43, 43 of a ladle 42 (Fig. 4) and the eye 50 of a neighboring ladle 42.

In Fig. 4 the ladle 42 is shown to be trapezoid, disposed transversely and made in one with two eyes 43, 43, a horizontal bar 44 with an eye 50 and a vertical central rib 45. From an inspection of Fig. 4 it will be obvious, that the several ladles 42, 42 when connected with the respective endless chain 20 or 21 interlock one another. It is also evident, that as each ladle 42 is supported by two bolts, its correct position during its travel over the couch is insured. The vertical central rib 45 of each ladle 42 is a parallelogram and therefore its free edge is in close proximity or in contact with neigh-

boring ladle 42, as long as the ladle 42 passes through a straight part of its travel. The central ribs 45 of all the ladles 42 on the lower horizontal part of either of the two endless chains 20 or 21 form a wall in the longitudinal vertical plane of the endless chain and this wall serves a purpose which will be presently explained. Four guides 41, 41 are preferably provided on the two horizontal bars 18, 18 for guiding the lower parts of the endless series of links of the chains 20, 21, so as to prevent them from sagging.

It depends upon the circumstances, how the electromotor 5 and the hand-wheel 38 should be controlled. Some stage or foot-board and some source of current (not shown) may be disposed on the crane 1 or the frame described, so that the operator can easily reach the hand-wheel 39 and set the electromotor 5 to work or reverse or stop it. Or some electric system of any known kind may be disposed for supplying current from some point within or without the malting-floor to the electromotor 5 and the hand-wheel 39 can be operated from either end of the malting-floor.

The malt spreading-out apparatus is operated as follows: The soaked grain is heaped in a high and narrow couch in the middle upon the malting-floor 46 (Fig. 1). At the commencement the second frame of the apparatus occupies its uppermost position, so as to leave the upper layer of the couch clear of the endless series of ladles 42. When it is desired to remove the uppermost layer from the couch and to hoard it up on both sides, the hand-wheel 39 is operated for so much lowering the second frame with the endless chains, that the ladles 42 on the latter engage in the couch to the desired depth, whereupon the electromotor 5 is set to work. Then the crane 1 will travel on the rails 4 in the longitudinal direction of the malting-floor 46, the pinion 6 driving by the gear wheel 17 and the shaft 8 the two gear wheels 9 meshing with the racks 10. At the same time the gear wheel 33 will drive by the parts 32, 48, 31, 30, 28, 29, 27 one octagonal roller 22 in one direction and by the gear wheels 26, 25 the other octagonal roller 23 in the opposite direction, so that the two endless series of ladles 42 will move in the direction of the two arrows 51 and 52 in Fig. 1. Each ladle 42 will cut a narrow shallow furrow into the couch and move the grain forward to the respective side of the couch, where it is allowed to fall down. The wall formed of the central ribs 45 will prevent the parts of the uppermost layer from shifting to the side opposite to the direction in which the crane 1 travels. This wall also enables the apparatus to work correctly, no matter, whether the crane 1 travels in one or the other direction. As both motions of the

crane 1 and of the endless series of ladles take place at the same time, it is obvious, that each ladle 42 is enabled to cut a fresh furrow following that cut by the preceding ladle 42. As the uppermost layer is removed by the two endless series of ladles to both sides of the couch, it is obvious, that the malt can be gradually spread out by the apparatus, until it covers the whole malting-floor 46.

The malt spreading-out apparatus can be varied in many respects without departing from the spirit of my invention.

I claim:

1. In a malt spreading-out apparatus, the combination with a frame adapted to be moved over a malting-floor, of a second frame vertically guided in said frame and extending over the whole length of same, means for vertically adjusting said second frame, endless chains located in said second frame in vertical planes at right angles to the direction in which said frame moves, the lower parts of said endless chains being parallel to the malting-floor, means for simultaneously moving said frame and said endless chains, and ladles connected with said endless chains while interlocking one another, each ladle being disposed transversely and having a vertical central rib which extends to the next ladle.
2. In a malt spreading-out apparatus, the combination with a crane traveling over a malting-floor, of means for driving said crane, a frame vertically guided in said crane and extending over the whole length of same, means for vertically adjusting said frame, endless chains located in said frame in the longitudinal direction of said crane, the lower parts of said endless chains being parallel to the malting-floor, means for driving said endless chains, and ladles connected with the links of said endless chains while interlocking one another, each ladle being disposed transversely and having a vertical central rib which extends to the next ladle.
3. In a malt spreading-out apparatus, the combination with a crane traveling on tracks over a malting-floor, of a frame suspended from said crane, a second frame vertically guided in said frame and extending over the whole length of said crane, means for vertically adjusting said second frame, endless chains located in said second frame in the longitudinal direction of said crane, the lower parts of said endless chains being parallel to the malting-floor, a mechanism for driving said crane, means for driving said endless chains, a motor for simultaneously actuating said mechanism and said means, and ladles connected with the links of said endless chains while interlocking one another, each ladle being disposed transversely and having a central rib in the verti-

cal longitudinal plane of the endless chain which rib extends to the next ladle.

4. In a malt spreading-out apparatus, the combination with a crane traveling on tracks over a malting-floor, of a frame vertically guided in said crane and extending over the whole length of same, means for vertically adjusting said frame, driving and guiding rollers in said frame, endless chains running over said driving and guiding rollers in vertical planes at right angles to the direction in which said crane travels, the lower parts of said endless chains being parallel to the malting-floor and each endless chain consisting of two parallel endless series of links and cross bolts connecting them, means for simultaneously driving said crane and said driving rollers for moving said endless chains, and ladles connected with said endless chains, each ladle being disposed transversely and having eyes for engaging two neighboring bolts of the endless chain while interlocking in those of the neighboring ladles and also having a vertical central rib which extends to the next ladle.

5. In a malt spreading-out apparatus, the combination with a crane traveling on tracks over a malting-floor, of a mechanism for driving said crane, a frame vertically guided in said crane and extending over the whole length of same, means for vertically adjusting said frame, two driving and several guiding rollers mounted in said frame to turn, two gear wheels connecting said two driving rollers, a second mechanism for driving one of said two driving rollers, two endless chains passing over said driving and guiding rollers in parallel vertical planes at right angles to the direction in which said crane travels and each extending from the middle to either end of the frame, the lower parts of said endless chains being parallel to the malting-floor and each endless chain consisting of two parallel endless series of links and cross bolts connecting them, a motor for simultaneously driving said two mechanisms, so that the lower parts of the two endless chains move in opposite directions, and ladles connected with said two endless chains, each ladle being disposed transversely and having eyes for engaging two neighboring bolts of the endless chain while interlocking in those of the neighboring ladles and also having a central rib in the vertical longitudinal plane of the endless chain which rib extends to the next ladle.

6. In a malt spreading-out apparatus, the combination with a crane traveling over a malting-floor, of a frame suspended from said crane, a second frame vertically guided in said frame and extending over the whole length of said crane, means for vertically adjusting said second frame, driving and guiding rollers mounted in said second

frame to turn, two endless chains passing over said driving and guiding rollers in parallel vertical planes at right angles to the direction in which said crane travels and each extending from the middle to either end of said second frame, the lower parts of said endless chains being parallel to the malting-floor and each endless chain consisting of two parallel endless series of links and cross bolts serving as their pivots, a mechanism for simultaneously driving said crane and said driving rollers, an electromotor for actuating said mechanism, so that the lower parts of the two endless chains move in opposite directions, and ladles connected with said two endless chains, each ladle being disposed transversely and having eyes for engaging two neighboring bolts of the endless chain while interlocking in those of the neighboring ladles and also having a central rib in the vertical longitudinal plane of the endless chain which rib extends to the next ladle.

7. In a malt spreading-out apparatus, the combination with a crane traveling over a malting-floor, of a frame suspended from said crane and comprising vertical rods, a second frame guided on the vertical rods of said frame and extending over the whole length of said crane, vertical racks secured in said second frame, a shaft mounted to turn in said crane and extending over the whole of its length, gear wheels on said shaft and meshing with said vertical racks, means for actuating said shaft, driving and guiding rollers mounted in said second frame to turn, two endless chains passing over said driving and guiding rollers in parallel vertical planes at right angles to the direction in which said crane travels one extending from the middle to one side end and the other to the opposite side end of said second frame, the lower parts of said two endless chains being parallel to the malting-floor,

ladles connected with the links of said two endless chains while interlocking one another, each ladle being disposed transversely and having a vertical central rib which extends to the next ladle, a mechanism for simultaneously driving said crane and said driving rollers, and an electromotor for actuating said mechanism, so that the lower parts of the two endless chains move in opposite directions.

8. In a malt spreading-out apparatus, the combination with a crane traveling over a malting-floor, of a frame vertically guided in said crane and extending over the whole length of same, means for vertically adjusting said frame, two rollers mounted in said frame to turn, two gear wheels connecting said two driving rollers, a vertical shaft mounted in said frame to turn and longitudinally guided in said crane, bevel wheels connecting said vertical shaft with one of said two driving rollers, a horizontal shaft mounted in said crane to turn, bevel wheels connecting said vertical shaft with said horizontal shaft, a mechanism for driving said crane, an electromotor, a gearing connecting said electromotor with said horizontal shaft and said mechanism, guiding rollers mounted in said frame to turn, two endless chains passing over said two driving rollers and said guiding rollers and one extending from the middle to one side end and the other to the opposite side end of said frame, the lower parts of said two endless chains being parallel to the malting-floor, and ladles connected with the links of said two endless chains while interlocking one another, each ladle being disposed transversely and having a central rib which extends to the next ladle.

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