

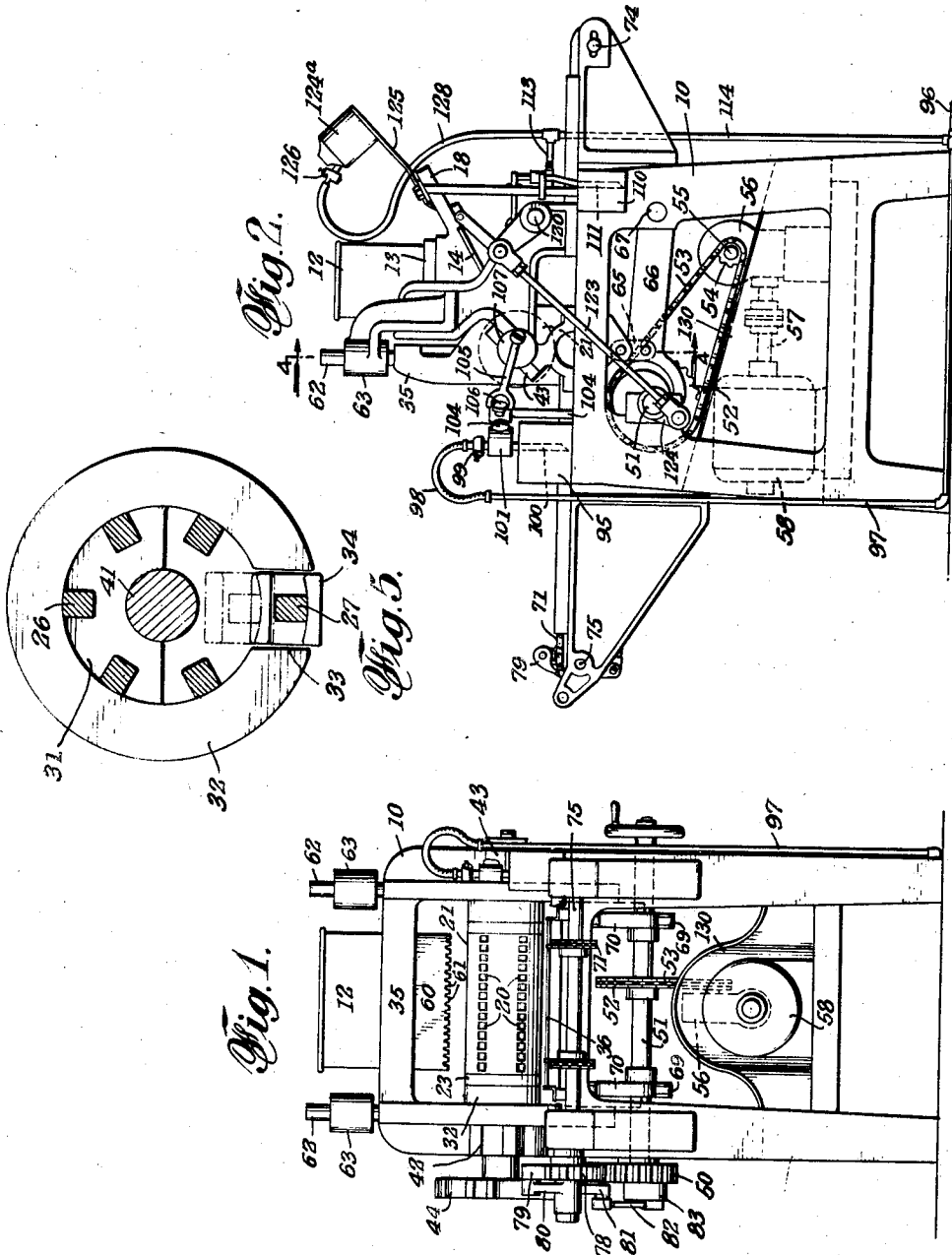
May 7, 1940.

L. BROWNSTEIN
BOUILLON CUBE MACHINE

2,200,224

Filed Dec. 23, 1937

3 Sheets-Sheet 1



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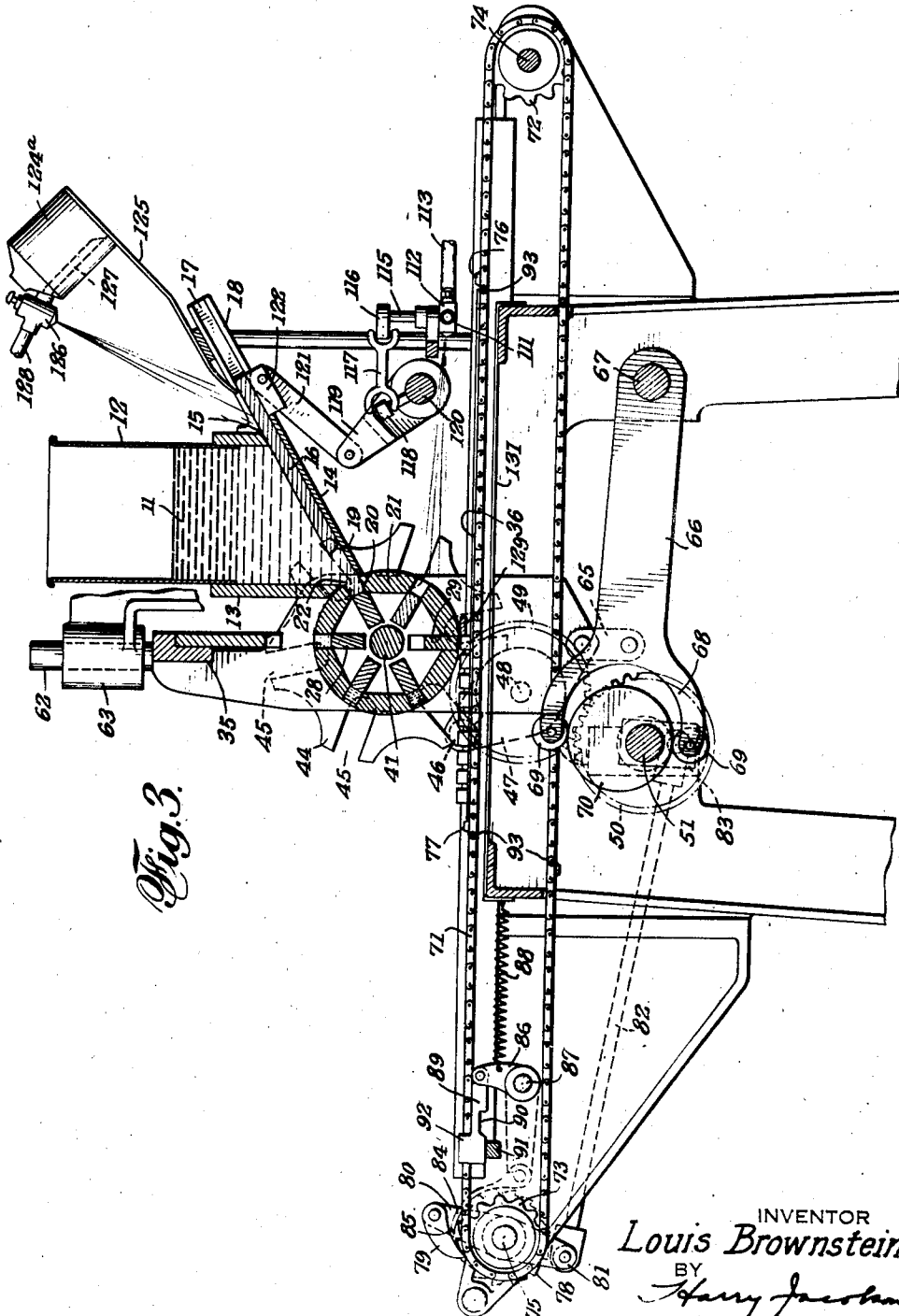


Fig. 3.

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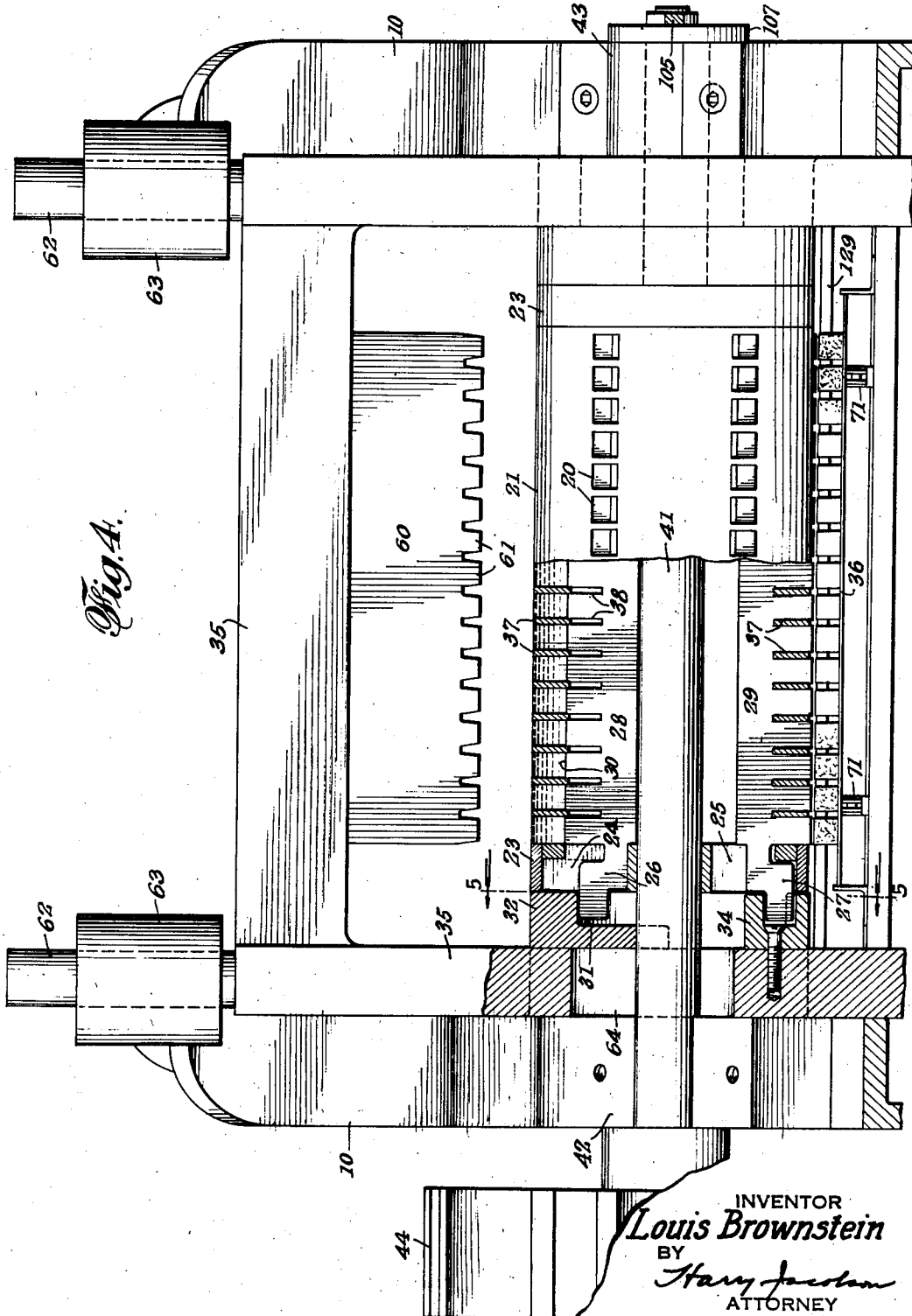
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UNITED STATES PATENT OFFICE

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BOUILLON CUBE MACHINE

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corporation of New York

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4 Claims. (Cl. 107--8)

This invention relates to machines for making bouillon cubes and particularly to that type of machine which is largely automatic in its operation.

5 The stock from which bouillon cubes are made is of a highly adhesive character, having a tendency to stick to metal and therefore being difficult for automatic machinery to handle. The invention contemplates the provision of a machine
10 in which the bouillon stock is supplied to a hopper, then automatically fed from the hopper and molded into cubes and the molded cubes ejected and carried to a convenient point for removal.

15 The invention further contemplates the provision of means which may be readily kept in a clean and sanitary condition for automatically forming bouillon cubes while preventing the cubes and the stock from which they are formed from adhering to the various parts of the machine with
20 which it comes into contact, so that perfect cubes are produced without danger of the machine being gummed up or halted by loose material.

The various objects of the invention will be clear from the description which follows, and
25 from the drawings, in which:

Fig. 1 is a front view of a machine embodying the invention.

Fig. 2 is a side view of the same.

Fig. 3 is a longitudinal vertical section and partial side view of the same.

Fig. 4 is a partial transverse vertical section taken on the line 4--4 of Fig. 2.

Fig. 5 is a fragmentary vertical section taken on the line 5--5 of Fig. 4 showing the ejector bar operating mechanism.

35 In the form illustrated, a conveyor chain is provided on which cube-receiving plates are removably mounted and intermittently forwarded. The upper surfaces of the plates are somewhat moistened by the spray directed to other parts of the machine, or said surfaces may be sprayed if desired. The moisture on the plates prevents the finished bouillon cubes from adhering thereto. Bouillon stock in bulk is inserted by the operator
40 into a hopper from which the stock is fed to an intermittently rotating mold cylinder, the molded cubes being ejected row after row from the mold cylinder on to the plates. The plates when fully loaded with cubes are conveyed to the front of
45 the machine where they are readily removed successively from the conveyor. Those moving parts of the machine which contact with the bouillon stock are sprayed with a very fine spray of water which forms a film preventing the stock from ad-
50 hering and gumming up the machine.

As illustrated, the frame 10 or suitable extensions thereof or brackets thereon support the various instrumentalities of the machine. The bouillon stock 11 is inserted into the removable upstanding extension 12 of the hopper 13, and
5 when permitted to do so, rests on the bottom 14 of said hopper. The hopper 13 is suitably supported by the frame 10. In its front wall is the discharge opening 22 for bouillon stock, and in its rear wall is the opening 15 through which
10 passes the feed plate 16 operating in and guided by the walls of the grooves 17 of the guide 18 extending from the side walls of the hopper. The feed plate 16 preferably is provided at its front end with a convex edge 19 and is also preferably reciprocated in a direction inclined to
15 the horizontal so that the stock caught by the front edge 19 is directed thereby downwardly and toward the bottom 14 of the hopper at the same time as it is advanced toward the discharge opening 22. It will be understood as the plate 16 is
20 reciprocated, a certain amount of the material 11 is removed from the bottom of the hopper and advanced forwardly out of the hopper through the opening 22 and to the row of mold openings
25 20 in the hollow mold cylinder 21. Said cylinder 21 is intermittently rotated by suitable mechanism later to be described in such a manner that the continuous or imperforate part of its cylindrical surface normally closes the front or discharge
30 opening 22 of the hopper. The cylinder is provided with a series of circumferentially spaced rows of suitable mold openings 20 slightly spaced apart longitudinally for the reception at the proper time of the bouillon stock advanced by
35 the feed plate. The cylinder is further so rotated that a longitudinal row of said openings is arranged at and in registration with the hopper discharge opening 22 when the mold cylinder is at rest and at the end of the forward stroke of the
40 feed plate, whereby said plate forwards a sufficient amount of bouillon stock into said openings to fill them to the proper depth for later compression of the stock to the desired extent to form cubes of the proper size and density or
45 firmness.

Beyond each of the ends of the cylinder 21, is an end plate 23 (Fig. 4), which is secured to and rotates with the cylinder, and which is provided with a multiplicity of radial slots 24, 25,
50 etc., for the passage of the respective extensions 26, 27, etc. projecting from the ends of the ejector bars 28, 29, etc. One of said ejector bars is provided for each row of mold openings in the cylinder. As illustrated, there being six of such
55

longitudinal rows of mold openings, there are six ejector bars mounted for radial movement within the hollow cylinder. The outermost surface 30 of each of the bars forms the bottom of the corresponding row of mold openings, said surface being in its innermost position (Fig. 3) when it reaches the filling position in which the stock is fed into the openings, and being in its outermost position for ejecting the molded cubes when it reaches the lowermost or ejecting station during the intermittent rotation of the cylinder. For reciprocating the bars at the proper time, the extension 26 of the ejector bar is normally inserted into the central circular opening 31 of the fixed ring 32 which is fixed to and forms a transverse extension of the frame 10, and is provided with a suitable radial opening 33 at its lower end for the loose reception of the radially slidable member 34. Said member 34 is fixed to and reciprocates with the vertically reciprocating yoke 35 and is provided with a recess having a curved bottom edge of the same curvature as the inner face of the ring 32 for the reception of the extension 27 of the ejector bar when said bar approaches its lowermost or ejecting station during the rotation of the mold cylinder. Movement of the ejector bar 28 or of the other bars is effected only when the bar approaches its lowermost position or ejecting station on the rotation of the cylinder at which station, the projection 27 of said bar enters the recess of the member 34, and the yoke 35 is moved downwardly by means later to be described. Such movement of the yoke carries with it the member 34, which slides in the slot of the ring 32 and carries with it the ejector bar whose projection 27 has entered the recess of said member 34. The downward movement of the bar 25 carries said bar to eject the corresponding row of molded cubes from the mold cylinder and on to the plate 36.

It being understood that the openings 20 of each row of mold openings are quite close together and are separated by comparatively thin partitions 37, each of the bars as 28 is provided with a series of slots 38 adapted to receive the partitions 37 when the bar is at the lowermost or ejecting station (Fig. 4).

The means for intermittently rotating the cylinder will now be described. The mold cylinder 21 is provided with suitable slotted end plates 32 secured to the adjacent end of the cylinder and fixed to the shaft 41 which is mounted for rotation in the frame bearings 42 and 43 and which projects beyond said bearings and the frame 10 a sufficient distance to permit the Geneva wheel 44 to be secured thereto. Said wheel 44 is provided with six Geneva slots 45, the slots corresponding in number to the number of rows of mold openings in the mold cylinder. Mounted on the Geneva crank 47 is the Geneva pin 46, which pin is adapted to enter one of the slots 45 and on the rotation of the crank to cause the desired intermittent rotation of the Geneva wheel and of the mold cylinder connected thereto. The crank 47 is in turn mounted on the shaft 48, which also carries the gear wheel 49 meshing with the gear wheel 50 on the shaft 51. Said shaft 51 also supports the sprocket wheel 52 driven by the chain 53 passing about the sprocket pinion 54 on the shaft 55 (Fig. 1). For continuously rotating the shaft 55 at the desired speed, a suitable reduction gear mechanism 56, (Fig. 2) of the usual type not necessary to be described in detail, is interposed between said shaft and the motor shaft 57 which

is driven by a suitable motor or other source of power 58.

It will be understood from the above description that the mold cylinder 21 is intermittently rotated to each of its various stations and there held at rest for a sufficient time to permit the desired operation to be performed at the station. Three operative stations are provided in addition to the stations at which the spraying of the parts is done. As has been indicated, the station to the right of the uppermost station is the stock supply or feeding station. The next or uppermost station, as the drum revolves in a counter-clockwise direction as viewed in Fig. 3, is the cube-compressing station; the next two stations are idle stations at which the tops of the cubes and the surface of the mold cylinder are sprayed; the lowermost station is the ejecting station and that station between the ejecting station and the feeding station is another idle station in which the spraying of the mold cavities is accomplished. The number of stations may be varied at will.

The feed mechanism at the feeding station having been described and the ejector mechanism having also been described, there now remains for description the mechanism for compressing the loose bouillon stock in the mold openings to form the cubes of the desired size, shape and density. Said mechanism comprises the compressor plate 60 carried by the yoke 35 and at its lowermost edge being formed into a series of plungers 61 substantially in the form of cubes and each designed to enter one of the mold openings 20 in the uppermost position of said row of openings and while the cylinder is at rest. The plate 60 is reciprocated at the compressing station by the reciprocation of the yoke 35 which is provided with extensions 62 sliding in the fixed guides 63 of the frame. The upright parts of the yoke are each provided with a suitable slot 64 for the passage of the cylinder shaft 41 and to prevent interference with said shaft when the yoke is reciprocated.

As is shown in Figs. 2 and 3, the yoke is connected at its lower end by the link 65 to the rocker lever 66, which lever is pivoted at one end as at 67 to the frame of the machine. The fork 68 at the free end of said lever is provided with a suitable pair of rollers 69 engaging the cam 70 which is mounted on the shaft 51. As said shaft is continuously rotated, the cam 70 oscillates the lever 66 and through the link 65 causes reciprocation of the yoke 35 and the compressor plate 60 to cause said compressor plate to enter the mold openings 20 when they reach their uppermost positions at the compressing station and to compress the bouillon stock therein while the mold cylinder is at rest. It will be noted that since both the compressor plate and the ejector bar are operated by the yoke, one row of cubes are compressed at the compressing station while another row is ejected simultaneously at the ejecting station.

As has been indicated, the compressed cubes are carried to the ejecting station and by means of the bars 28, 29, are ejected on to the plates 36. Said plates are removably carried by the pair of transversely spaced endless conveyor chains 71, each passing around a set of sprocket wheels 72 and 73 on the shafts 74 and 75 respectively (Fig. 3). Secured at longitudinally spaced intervals to each of said chains are the chain lugs 76, 77 and the like, said lugs being spaced apart a distance equal to the length of the cube-receiving plate 36. The chains 71 are preferably spaced part trans-

versely of the machine a distance substantially equal to or slightly less than the length of the mold cylinder 21, the plate 36 fitting between said chains and resting in suitable recesses in the lugs 76, 77; that is, the front edge of the plate rests in the rear recesses of the front lugs 77 as viewed in Fig. 3 and its rear portion rests in the front recesses of the lugs 76, whereby its rear edge is acted on by said lugs 76 to advance the plate on the operation of the chain. It will be understood that the chains 71 are intermittently advanced the proper distance to space the cubes deposited on the plates 36 the desired distance apart, and that means are provided for increasing the distance through which the chains are moved when the plate-holding lugs as 76 reach the ejecting station. By reason of the additional movement of the chain, the rear end of the loaded plate is advanced past the ejecting station, and the forward end of the next succeeding empty plate 36 brought into the proper position to receive the next row of ejected cubes, so that no cubes are deposited in the space between the rear end of one plate and the front end of the next plate.

For intermittently advancing the chains 71, a ratchet wheel 78 is secured to the front chain shaft 75 (Fig. 3), said wheel being operated by the ratchet pawl 79 pivoted at one end of the bell crank lever 80, which is loosely mounted on the shaft 75. To the other end 81 of said lever, is connected one end of the connecting rod 82, the other end of which is pivoted to the crank 83 secured to the shaft 51. Normally, only part of the stroke of the pawl 79 is effective to rotate the ratchet wheel 78, the remaining part of the stroke being rendered ineffective for that purpose by the interposition between the pawl and the wheel of the pivoted ratchet tooth guard 84. The front end 85 of the guard is bevelled to permit the pawl to ride up thereon on the last part of the rear stroke of the pawl, and out of contact with the ratchet teeth.

When, however, the chains are to be advanced their full distances, that is, when one plate 36 has been fully loaded and the next plate brought into position to receive cubes, the guard 84 is removed from the ratchet wheel and the full stroke of the pawl 78 permitted to become effective to rotate said wheel. The mechanism illustrated for this purpose comprises the ball crank lever 86 connected to the guard 84 and pivotally mounted as at 87, and pulled by the spring 88 into its normal position shown in Fig. 3. Pivoted to project forwardly from the upper end of the lever 86 is the notched member 89 having the notch 90 therein and normally resting on the fixed cross-bar 91. Said bar is provided with an upstanding projection 92 adapted to be engaged at the proper time by the pin 93 projecting transversely from each of the lugs 77 and 76. When so engaged, the member 89 is pulled forwardly by the pin 93 on the last part of the movement of the chain just before the last row of cubes is deposited on the loaded plate 36. The forward movement of the member 89 is continued until the notch 90 reaches the bar 91, when the member 89 will drop under the pressure of the pin 93, the fixed bar 91 entering the notch 90, whereby the member 89 is removed from the path of the pin 93. Such forward movement of the member 89 rotates the bell crank lever 86 in a counter-clockwise direction as viewed in Fig. 3, thereby withdrawing the guard 84 from the upper teeth of the ratchet wheel and permitting the pawl 79 to become fully

operative on its next stroke. On said next stroke the necessary additional movement is given to the chains 71 to carry the lugs 76 past the ejecting station and to bring the forward end of the next plate 36 into its proper position. At the same time the pin 93 passes over the projection 92 of the member 90 and permits the spring 88 during the last part of the advancing stroke of the pawl 79 to rotate the bell crank lever 86 and thereby to raise the member 89 off the bar 91 and to retract said member 89 into its normal position.

As has been hereinbefore indicated, means are provided for spraying with a fine spray of water certain moving surfaces which contact with the bouillon stock to prevent adhesion thereto. Said means comprises suitable water tanks, atomizers and movable nozzles. As shown in Figs. 1 and 2, the water tank 95 is arranged at one side of the machine in front of the mold cylinder 21. Compressed air is delivered into the compressed air line 96 from any suitable source and enters the branch pipe 97, then passing into the flexible pipe 98 into a suitable atomizer 99. The interior of the atomizer may be of the customary and usual construction, being provided with suitable openings whereby the compressed air entering the atomizer draws water from the tank 95 through the pipe 100 on which the atomizer is mounted and atomizes the water into the form of a fine conical spray. The atomizer is oscillated to a slight extent to direct the spray against the front part of the cylindrical surface of the cylinder thereby to wash off any of the bouillon stock which might have adhered to said surface as said surface passes the hopper opening 22, and to maintain said surface moist, to prevent any additional stock from adhering thereto on the next revolution of the cylinder, and also moistens the upper ends of the compressed cubes so that they will not stick to the plates 36. By oscillating the nozzle, the entire length of the mold cylinder is suitably moistened.

The means for oscillating the nozzle comprises the crank 101 carrying the nozzle pipe 100 and pivoted on the stud shaft 104. Said crank 101 is operated by the rod 105 forked at one end and pivoted to the member 106 projecting from the crank and at its other end is secured to the crank 107 on the cylinder shaft 41. On the rotation of said cylinder shaft, the crank 107 is given a partial rotation operating the rod 105 and oscillating the crank 101 and the nozzle 99.

Similarly, the tank 110 (Fig. 2) is provided with a water pipe 111 connected to the nozzle 112 (Fig. 2), there being an additional air pipe connection 113 to said nozzle from the branch 114 of the compressed air line 96. The nozzle 112 is secured to the shaft 115 for oscillatory movement, said shaft carrying the crank 116 to which is secured one end of the link 117, the other end of which is pivotally secured to the connection 118 on the crank 119. Said crank 119 is pivotally mounted on the stud shaft 120 for oscillation thereon.

When the crank 119 is oscillated by the mechanism later to be described, the member 118 is also oscillated, thereby reciprocating the link 117 which oscillates the crank 116 and the shaft 117 and thereby oscillates the nozzle 112. Said nozzle directs the spray into those mold cavities 20 which have passed the ejecting station and which contain no cubes, thereby moistening the interior walls of the mold cavities preparatory for the feeding of bouillon stock thereinto at the

next succeeding station. The spray also serves to moisten the rear surface of the cylinder 21 and the drippings therefrom also serve to moisten the plates 36.

5 A link as 121 connects the crank 119 to a suitable extension 122 of the feed plate 16 whereby the feed plate is oscillated to perform its proper feeding operation. To oscillate said crank 119 (Fig. 2), a connecting rod 123 connects the
10 end of said crank to a suitable crank 124 on the shaft 51. In order that the feed plate be properly moistened, a third water tank 124a is suitably mounted on the branch 125 extending from the fixed guide 18. Said tank is provided with
15 a nozzle 126 receiving water through the pipe 127 entering the tank and receiving compressed air through the flexible pipe 128 joined to the branch air pipe 114.

To protect the motor 58 and the mechanism
20 connected thereto from the drippings of water condensing from the various sprays, the motor is covered by a suitable sheet metal cover 130 (Fig. 1) which slopes in the proper direction and is suitably formed to convey the condensed water
25 to a suitable receptacle where the water drippings are collected. A second plate as 131 (Fig. 3) perforated at the proper points, is arranged underneath the chains 71 and above the shaft 51 and collects the condensed moisture and per-
30 mits said moisture to drip therethrough at the selected perforations on to the cover 130 without dripping on the machine parts and connections.

To insure against the possibility of the ejected cubes adhering to the ejecting surface 30 of the
35 ejector bars 28, 29 in the ejecting station and being carried past said station by the cylinder 21, and to further insure that the cubes will be deposited on the conveyor plates 36, a scraper, cut-off or stop plate 129 (Fig. 3) is provided. Said
40 plate extends longitudinally of the cylinder 21 and is arranged just below the cylinder in position to engage the upper parts of the rear surface of the row of cubes ejected from the mold cylinder at the ejecting station. The row of cubes is re-
45 tained at the ejecting station and on the plate 36 by the cut-off plate 129, which, on the movement of the cylinder past said station, forcibly removes the row from the surface 30 should said row ad-
here to the surface.

50 It will be seen that I have provided a simple and efficient machine for automatically forming and ejecting cubes of bouillon stock without danger of the stock adhering to the various parts of the machine so that the machine may be kept
55 in a strictly sanitary condition, a matter which has heretofore been difficult, even with manually operated devices.

While I have shown and described certain specific embodiments of my invention, I do not wish
60 to be understood as limiting myself thereto, but intend to claim the invention as broadly as may be permitted by the state of the prior art and the scope of the appended claims.

I claim:

65 1. In a machine for making bouillon cubes, a hollow mold provided with a series of rows of cubic mold cavities, a pair of ejector members within the mold forming the bottoms of a pair of opposed rows of said cavities, means for filling
70 one row of cavities with bouillon stock, reciprocating means for compressing the stock within said one row and against one of said members to form bouillon cubes, and means including a mem-

ber secured to and operated by the reciprocating means and engaging an end of the other ejector member for moving the other member to eject the molded and compressed cubes from an op-
posed row of cavities.

2. In a machine for making bouillon cubes, a hollow cylindrical mold provided with a series of longitudinal rows of bottomless mold cavities, a single flat slotted bar within the mold for each of
10 said rows, each of said bars having a surface forming the bottom inner ends of a corresponding row of said cavities, a reciprocating flat slotted plunger adapted to enter a row of cavities to compress material in said cavities against the
15 bar, and means secured to the plunger for operating the bar opposite the plunger on the movement of the plunger to eject the compressed material from the row.

3. In a machine for making bouillon cubes, an intermittently rotatable hollow mold cylinder 20 provided with a series of rows of mold cavities, said cavities being separated by partitions each having a pair of parallel side walls, means for feeding bouillon stock into a row of said cavities including a hopper having an inclined bottom, a
25 slide reciprocating on said bottom in an inclined direction into and out of said hopper, a slotted reciprocating yoke having a series of pairs of parallel side walls adapted to enter between the side walls of the partitions, and having parallel front
30 and rear walls, said yoke compressing into cubes the stock inserted into the cavities by said slide, a series of ejector bars carried by and in the interior of the cylinder, said bars being of substan-
35 tially uniform thickness and being provided with a series of parallel slots at the outer edge portion thereof, said slots receiving the partitions therein, the outermost edge of each of said bars forming the movable bottom of a row of cavities, a
40 movable member secured to and reciprocated by the yoke, and having an opening therein for the reception of an end of one of the bars, said member moving said bar outwardly on the inward
45 movement of the yoke to eject the cubes from one of the rows of cavities.

4. In a machine for making bouillon cubes, a hollow cylindrical mold provided with a series of longitudinal rows of bottomless mold cavities, the surface of said mold being imperforate between
50 the cavities, a bar within the mold for each of said rows, each of said bars being of substantially uniform thickness and being of generally rectangular shape and slotted at its outer edge portion and having a longitudinally projecting end,
55 the slotted outer edge of the bar forming the bottom inner ends of a corresponding row of cavities, a yoke having a slotted lower edge adapted to enter a row of said cavities to compress the material therein, means for reciprocating the
60 yoke, and means for moving each of said bars successively toward the outer end of its row of cavities when it reaches a position opposite the yoke to eject material from a row comprising a fixed
65 incomplete ring having spaced apart ends, said ring engaging and guiding the projecting ends of the bars, and a member slidable radially between the spaced ends of said ring and receiving the projecting end of the bar opposed to the yoke, said
70 slidable member being secured to and thereby reciprocating with the yoke.

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