

July 31, 1934.

K. LUKS

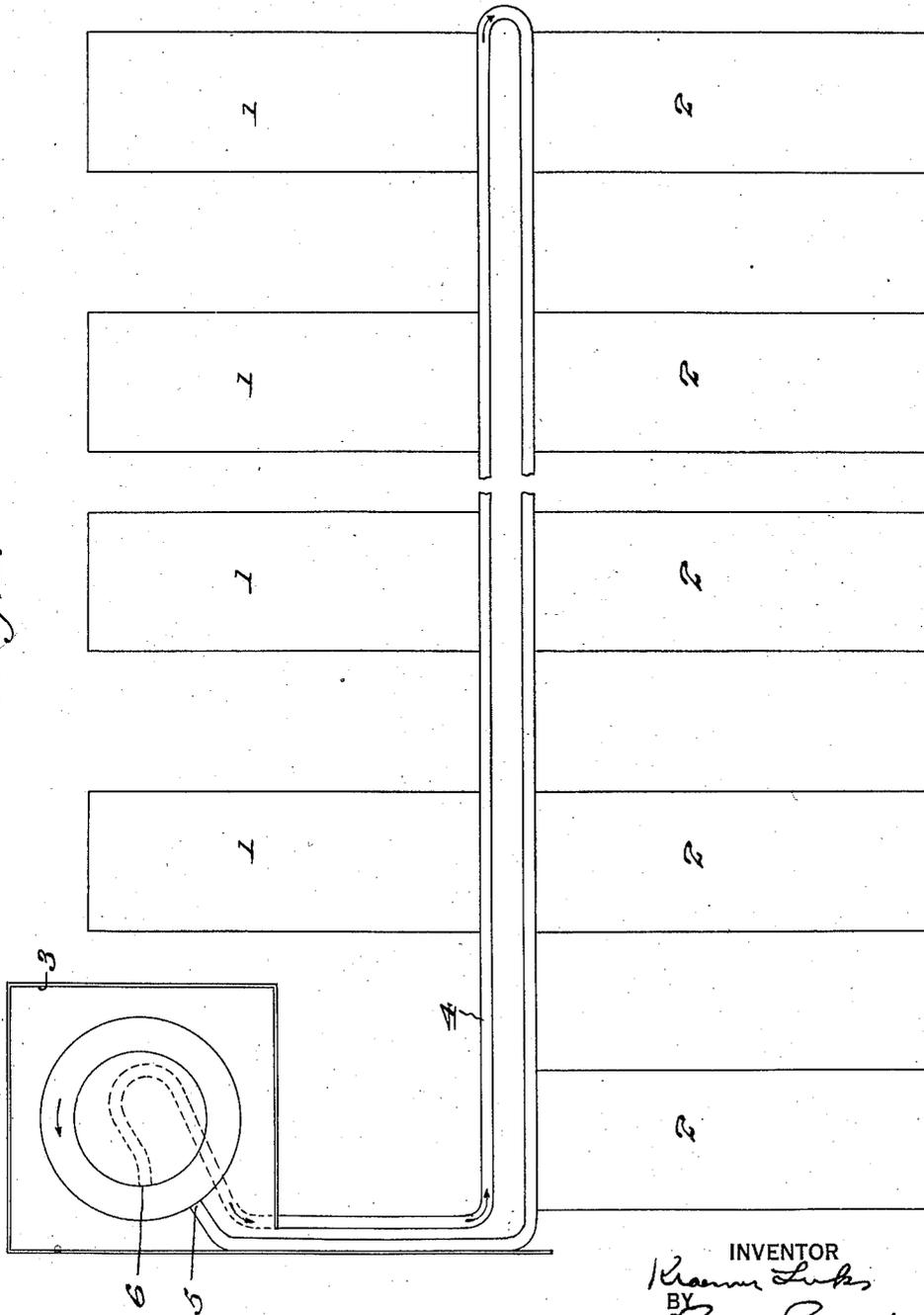
1,968,564

MILKING APPARATUS

Filed March 17, 1928

4 Sheets-Sheet 1

Fig. 1.



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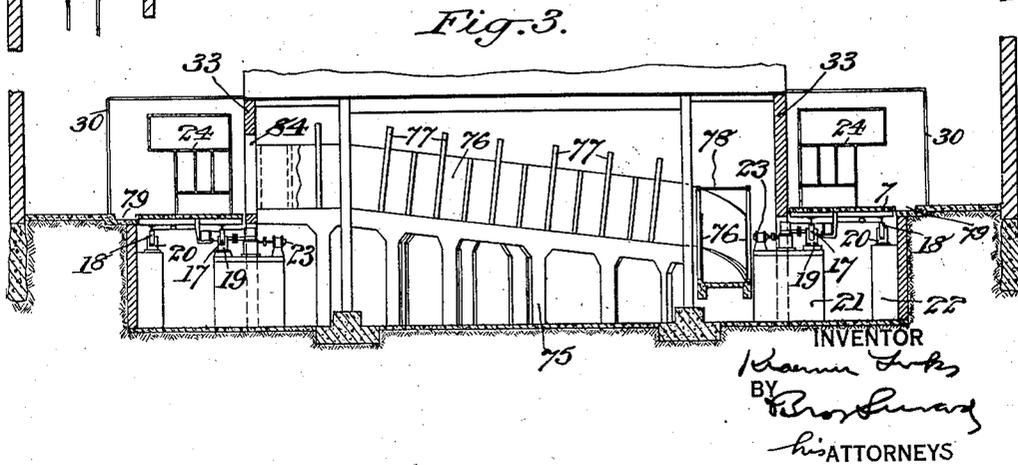
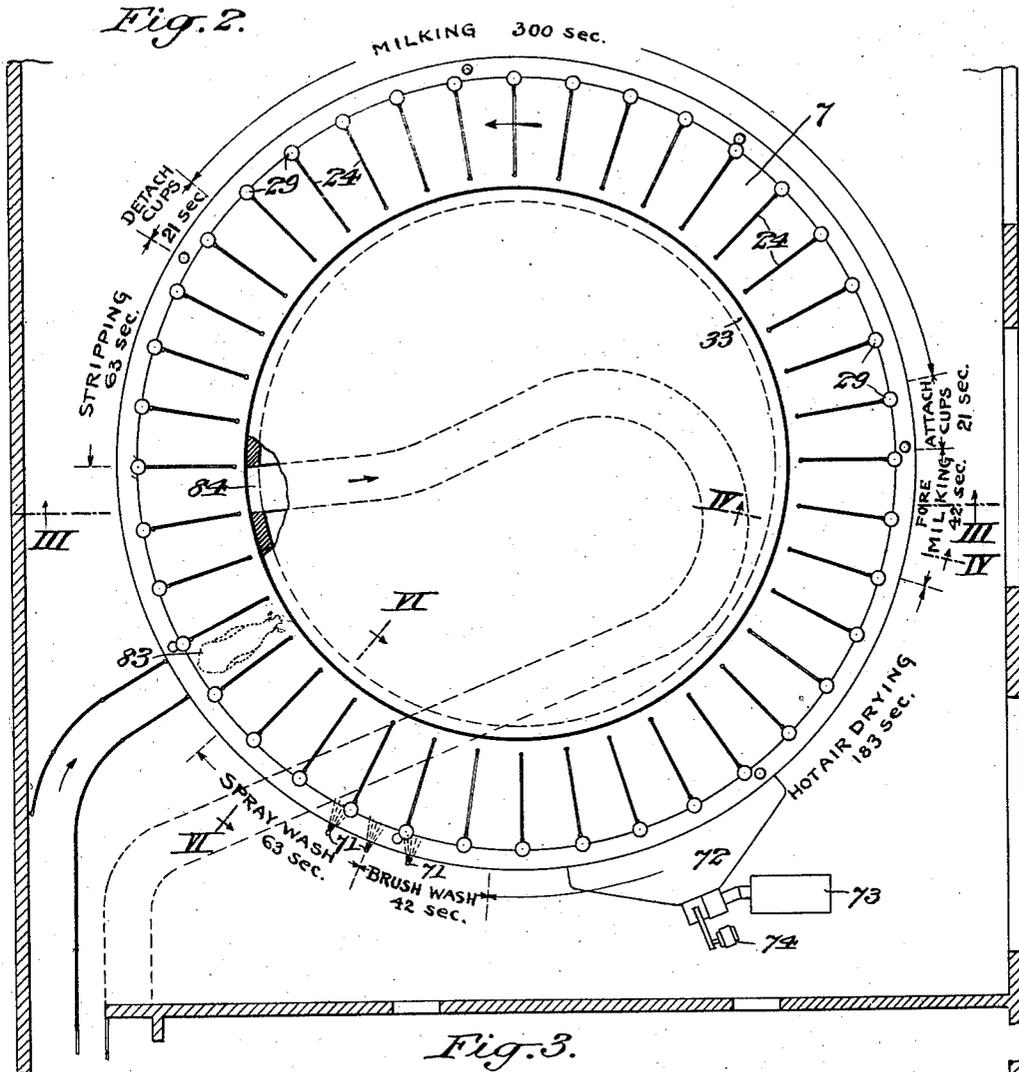
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Fig. 4.

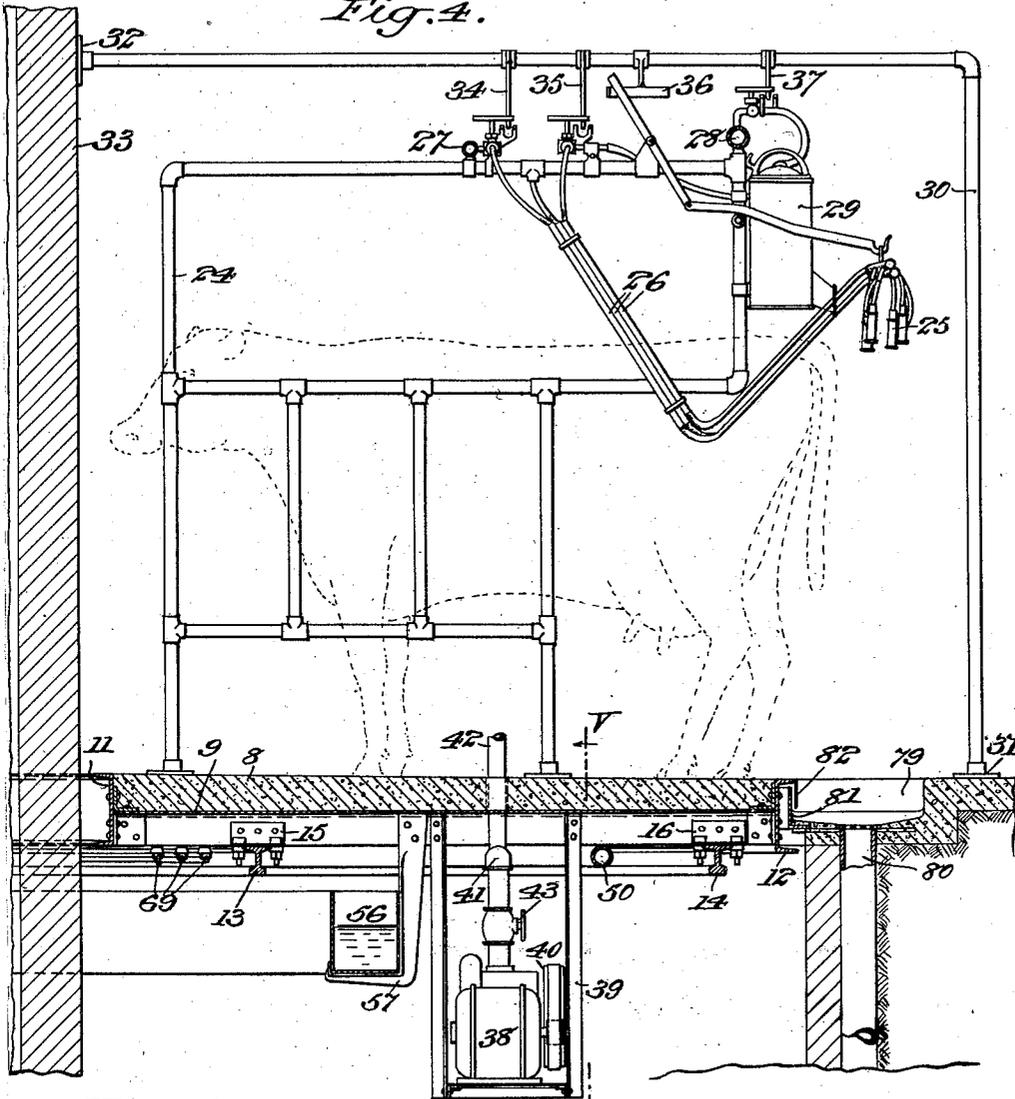
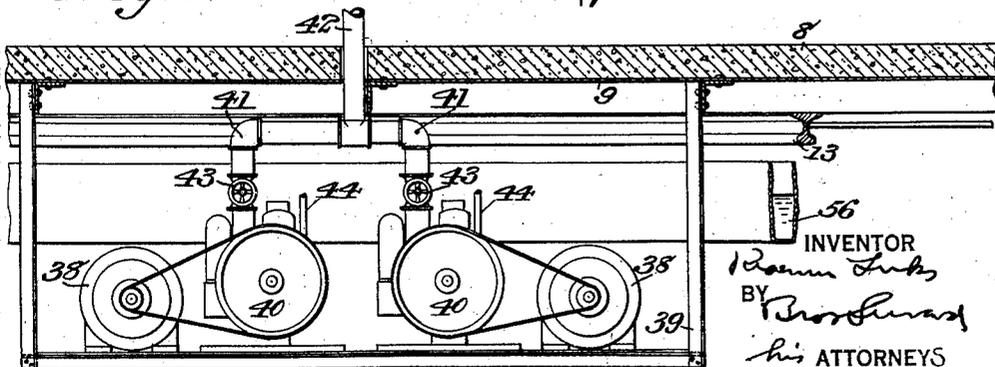


Fig. 5.



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# UNITED STATES PATENT OFFICE

1,968,564

## MILKING APPARATUS

Kraemer Luks, Towaco, N. J., assignor, by mesne assignments, to Walker-Gordon Laboratory Company, Inc., Plainsboro, N. J., a corporation of Delaware

Application March 17, 1928, Serial No. 262,389

21 Claims. (Cl. 31—58)

This invention relates to apparatus for milking cows and contemplates the provision of means whereby a system may be established for the movement of animals seriatim from their barns and for subjecting them in sequence to all the operations incidental to hygienic milking while the cows are traveling on a moving platform.

Another object is to provide means whereby the cows file from their barns, walk successively into position on a moving platform, remain in said position on the platform during all the operations, and then successively step off the platform upon arriving at a given position and file back to their barns.

Another object consists in providing such an apparatus in which the traveling platform moves in an endless path, supports devices for performing certain of the operations, and successively passes stations at which are located devices appropriate for the performance of others of the operations, the said devices being arranged in such sequence as to require the correct succession of the operations, and being located at such distances apart as to allow the correct amount of time for each operation before any given animal reaches the succeeding station.

Another object consists in providing such an apparatus in which the moving platform is annular in form and the stations for certain of the operating devices are located around its outside circumference, while its inner circumference is employed for the exit of the animals and for the location of any such complementary structure as may be desirable. This arrangement allows adequate room for the operating devices because the outside circumference is, of course, much greater than the inside, and it also facilitates the said operations because of the relatively slow linear speed of the outside circumference at any given R. P. M.

Another object is to provide such an apparatus which has the capacity for handling a large number of animals and yet is comparatively compact and simple in construction.

Another object consists in providing such an apparatus in which suitable relatively movable connections are established between the parts of the operating devices on the moving platform and the parts on immovable supports surrounding the platform so as to enable proper cooperative functioning of the said parts.

A further object consists in providing certain improvements in the form, construction and arrangement of the several parts of the apparatus

whereby the above named and other objects may effectively be attained.

A practical embodiment of the invention is shown in the accompanying drawings, in which

Fig. 1 represents a broken diagrammatic view of a plant, illustrating a location of the cow barns and the milking apparatus suitable for carrying out the desired system.

Fig. 2 represents a diagrammatic view of the moving platform and certain connected parts.

Fig. 3 represents a section taken in the plane of the line III—III of Fig. 2, looking in the direction of the arrows, and including certain parts not shown in Fig. 2.

Fig. 4 represents an enlarged detail section taken substantially in the plane of the line IV—IV of Fig. 2 looking in the direction of the arrows.

Fig. 5 represents a detail section taken in the plane of the line V—V of Fig. 4 looking in the direction of the arrows.

Fig. 6 represents an enlarged detail section, on the same scale as Fig. 4, taken substantially in the plane of the line VI—VI of Fig. 2 looking in the direction of the arrows.

Fig. 7 represents a section taken in the plane of the line VII—VII of Fig. 6, looking in the direction of the arrows, and showing certain parts more completely.

The general system followed in the individual application of my invention may be a matter of substantial importance and, in order better to visualize the same, reference may be had to Fig. 1 in which the general lay-out is diagrammatically represented. Two series of barns are marked 1, 2. The building in which my improved apparatus may be housed is indicated by 3, and an endless walkway for the cows is marked 4. This walkway is arranged so as to meet with the upper level of the apparatus at the ingress point denoted by 5, and to leave on the same level at the egress point marked 6, and then be depressed and pass under the apparatus, as indicated in dotted lines, until it rejoins the main walkway at the normal level thereof. The arrows on the walkway denote the path of travel of the animals, and it will, of course, be understood that they file in sequence from the barns 1 and 2 for the milking operation, and return to the same thereafter, in accordance with the predetermined system under which the plant is operated.

The moving platform is denoted generally by 7, and it preferably takes the form of an annulus fitted to be supported in a suitable depression formed in the foundations of the building for housing the apparatus. The said platform or

turntable may have a cementitious surface 8 supported on metallic or other suitable flooring 9 carried by angle iron or other appropriate beams 10. The said beams 10 are radially disposed at suitable intervals around the platform 7 and their inner and outer ends are riveted to and supported by channel girders 11, 12, that are suitably curved so as to conform to the shape of the platform.

10 A pair of concentric rails or tracks 13, 14, are secured to the under sides of the beams 10 by suitable clamping devices 15, 16, and the said rails are designed to rest upon two concentric series of wheels 17, 18, (see Fig. 3) which are properly mounted in order to constitute means for supporting and permitting rotary travel of the platform 7. The said rails may be ordinary railroad rails and the wheels similar to railroad car wheels.

20 Series of journals 19, 20, carry the wheels 17, 18 and are themselves mounted on supports 21, 22, which may conveniently be composed of reinforced concrete.

25 Two of the wheels 17, preferably diametrically opposed, are positively driven from motors 23, through suitable connections of conventional form. The driving of the said wheels 17 serves to rotate the platform 7 at desired speed. I find a peripheral speed of the outside circumference of the platform amounting to twelve feet per minute to be satisfactory.

30 In order to prevent slippage between the wheels and rail in the drive, it is desirable to have the journals 19 yieldingly mounted in any well known or approved form. Such mounting may also be provided for the journals 20 that carry the wheels 18, if desired.

35 The upper surface of the platform 7 has a series of radially disposed divisions which are marked 24. In the present instance 40 of these are shown, and they may conveniently be composed of hollow iron piping suitably fixed on the cementitious surface 8. The said devices are spaced apart at such distance as to establish 45 between each contiguous pair a stall for a cow, so that forty cows can be accommodated at one time on the platform. It will, of course, be clear that this number may be increased or decreased by varying the size of the apparatus.

50 Each of the said devices 24 constitutes a means of support for a suitable milking machine intended to be operative during a portion of the time the animals are being transported on the platform. The said milking machine is illustrated in Fig. 4 of the drawings but, as it constitutes no part of my invention and is described in a co-pending application of Cyrus H. Hapgood, Serial Number 262,337 filed of even date herewith, the same will not be herein described other than to note that the teat cups are indicated by 25, the connecting tubes for operating them by 26, a pulsator pipe by 27, a vacuum pipe by 28, and the milk pail by 29.

65 The apparatus also includes a series of iron piping frames 30 which have their outer ends mounted on the foundation exterior to the platform, as indicated at 31, and their inner ends fastened, as at 32, to a wall 33, or other structure located within the inner circumference of the platform. The said frames 30 are suitably positioned and are calculated to carry actuating devices 34, 35, 36, 37, for the milking machines, all as shown and described in said co-pending application of Cyrus H. Hapgood. As these ar-

rangements constitute no part of my invention, they will not be further described herein.

80 In order to provide power for the actuation of the milking machine, a pair of motors 38, 38, are carried in an angle iron sling 39 fast to the under side of the platform 7. Each of said motors drives a combined exhaust pump and pulsator 40, 40, the said exhaust pumps being connected by branch piping 41 to a main pipe 42 which is connected in any practicable way with the vacuum pipe 28 of the milking machine. It is intended to use only one of the motors and connected devices at a time, the second being supplied in order to eliminate interruption in the operation in case of breakdown. Valves 43, 43, in the branch pipes 41, 41, enable either exhaust pump to be connected with the main pipe 42. Pipe extensions 44, 44, from the pulsators, may be united with a single pipe that is connected with the pulsator pipe 27 in a manner similar to the vacuum pipe just described, or in any other well known or approved way.

85 The apparatus further comprises means for washing each animal after it takes its position on the traveling platform and before milking operation begins. This means consists of a series of stand pipes 45 which are coincident with the devices 24 and located near the outer circumference of the platform. Each stand pipe has an overhanging spray head 46 with a pair of nozzles 47, and a lower spray head 48 with a pair of nozzles 49. The said pipes are connected at their lower ends with a water main 50 that is circularly formed and carried by straps 51 beneath the radially disposed beams 10. The said water main 50 is supplied with water under pressure through a pipe 52 connected with a pump 53 that is hung in a sling 54 fixed to the under side of the platform. The said pump communicates by a pipe 55 with a circular trough 56 that is carried in brackets 57 bolted or otherwise secured to the beams 10. A supply pipe 58 from a suitable source leads into the trough 56 and the flow of water therefrom into the trough is governed by a float valve 59 similar to the common float valve usually employed in flush tanks. This arrangement provides for maintaining a predetermined level of water in the trough 56 and allows for relative movement of the trough and supply pipe during the rotation of the platform 7. The pump 53 may be driven from a motor 60 mounted in the same sling 54.

90 The actuation of the spray nozzles 47, 49, is governed by a valve 61, which is provided with a lever 62 normally urged upwardly by a retractile spring 63. A shoe 64 is carried by a bracket 65 fast to the foundation surrounding the platform and provided with upwardly curved ends, as clearly shown in Fig. 7. The said shoe is designed to contact with rollers 66 on the lower ends of the levers 62 and to depress the said levers against the action of the springs 63 in order to open the valves 61 and permit the water to be sprayed from the nozzles 47, 49. The length of the shoe 64 determines the extent of the period of spray.

95 All the previously mentioned motors are provided with power through three poles 67 that have shoes 68 at their upper ends which run on wire rings 69 carried on the under side of the platform 7, and communicating by suitable connections, generally indicated by 70, with the motors.

100 It may be desirable to have additional sprays playing upon the rear of the animal, and, to this

end, I have provided three spray heads 71 located on the foundation at a desired point contiguous to the outer periphery of the platform 7. These may be operated manually by any suitable form of valve construction, and serve to contact with portions of the animal not effectively reached by the sprays 47 and 49.

For the purpose of drying the animals following the spraying, a hot air hood 72 supplied from a suitable source of hot air 73 by a blower 74 is located on the foundation at a predetermined point adjacent the outer circumference of the platform 7. The said drying means is represented diagrammatically in Fig. 2 and may be of any well known or approved construction.

The exit walkway for the animals, shown in dotted lines in Fig. 2, is more fully represented, as to its construction, in Fig. 3, and may consist of reinforced concrete supports 75 flanked by walls or rails 76 with occasional uprights 77 having cross heads 78. The walls, of course, guide the animals, and the uprights and cross heads prevent disorder.

The surface immediately exterior to the outer circumference of the platform 7 has a gutter 79 formed therein with drain pipes 80 at intervals for the escape of the wash water and refuse. The said gutter is furnished at its inner edge with an upstanding guard 81 that cooperates with a depending flap 82 on channel beam 12 to prevent any splashing or seepage of the drain water from the gutter into the space beneath the platform.

The diagrammatic view represented in Fig. 2 is marked to indicate the successive operations and the proportional period of time allowed for each. When the apparatus is in use, an animal steps from the walkway 4 onto the traveling platform in the position indicated by the dotted figure of a cow shown at 83 in Fig. 2. The platform is, at that time, moving in the direction of the arrow indicated thereupon. Promptly after the animal reaches this position on the platform, the sprays come into operation and cleanse the animal during the period of time marked "Spray wash" on Fig. 2, which is indicated as being 63 seconds. Following this the animal may be washed with a brush manually for a period of 42 seconds. Thereafter the hot air drying takes place for a period of 183 seconds. When the drying has been completed there is a manual foremilk which is indicated to be completed within 42 seconds. Thereafter the operator attaches the teat cups 25 of the milking machine and is allowed 21 seconds for doing so. The milking machine is intended to be in operation for a period of 300 seconds, and then an operator is allowed 21 seconds for detaching the teat cups. Following this there is a manual stripping in order to complete the milking operation, and this is intended to be accomplished in 63 seconds. At the end of the stripping operation the cow has reached the point of egress into the walkway indicated by dotted lines in Fig. 2, and as this point is reached, the stall in which the animal is standing comes in coincidence with an opening 84 in the wall structure 33 and the cow, as is its wont, immediately steps through the said opening into the walkway.

The description which has just been given with respect to a single animal takes place with each animal in succession, and it will be understood that there is a continuous procession of the cows filing onto the moving platform, into the successive stalls, and off the platform into the walkway. Thus, from the time each cow leaves

its barn until it returns thereto, there is a constant movement in a given direction so that the whole purpose is accomplished by systematic progression from the barn through the milking operations and others incidental thereto and back to the barn, without any reversal or confusion of movement. The periods allowed for the various operations are practicable and suitable but they are, of course, variable in accordance with individual judgment and the exigencies of any particular plant. Following the milking step, in any case, the milk pails may be emptied into suitable receptacles and the output from each animal weighed and recorded as described, for instance, in the said co-pending application of Cyrus H. Hapgood.

The disclosure of my invention herein set forth involves, also, a disclosure of other novel subject matter not my invention and which forms subject matter of the said co-pending application of Cyrus H. Hapgood.

It will be understood that various changes may be resorted to in the form, construction and arrangement of the several parts and in the periods of operation without departing from the spirit and scope of my invention; hence, I do not intend to be limited to the details herein shown and described except as they may be included in the claims.

What I claim is:

1. Apparatus designed for milking the animals of a group in succession, said apparatus comprising, a movable platform, means for actuating the same, means enabling the ingress of the animals to the platform and their egress therefrom, and means for milking the animals while on the platform and moving from the point of ingress to the point of egress.

2. Apparatus designed for milking and treating the animals of a group in succession, said apparatus comprising, a movable platform, means for actuating the same, means enabling the ingress of the animals to the platform and their egress therefrom, and means for milking and means for treating the animals while on the platform and moving from the point of ingress to the point of egress.

3. Apparatus designed for milking and treating the animals of a group in succession, said apparatus comprising, a movable platform, means for actuating the same, means enabling the ingress of the animals to the platform and their egress therefrom, and means for milking and means for treating the animals while on the platform and moving from the point of ingress to the point of egress, part of said last named means being carried by the platform and part being mounted adjacent the platform.

4. Apparatus designed for milking the animals of a group in succession, said apparatus comprising, an endless movable platform, means for actuating the same, means enabling the ingress of the animals to the platform and their egress therefrom, and means for milking the animals while on the platform and moving from the point of ingress to the point of egress.

5. Apparatus designed for milking and treating the animals of a group in succession, said apparatus comprising, an endless movable platform, means for actuating the same, means enabling the ingress of the animals to the platform and their egress therefrom, and means for milking and means for treating the animals while on the platform and moving from the point of ingress to the point of egress.



gress of the animals to the platform and their egress therefrom, and means for milking the animals while on the platform and moving from the point of ingress to the point of egress, said point of ingress being at one side of the platform and said point of egress being at the other side of the platform, a walkway leading to the point of ingress and away from the point of egress and passing both over and under the platform, and shelters for the animals spaced from the platform and connected in circuit with said walkway. 80

17. Apparatus designed for milking and treating the animals of a group in succession, said apparatus comprising, an endless movable platform, means for actuating the same, means enabling the ingress of the animals to the platform and their egress therefrom, and means for milking and means for treating the animals while on the platform and moving from the point of ingress to the point of egress, said point of ingress being at one side of the platform and said point of egress being at the other side of the platform, a walkway leading to the point of ingress and away from the point of egress and passing both over and under the platform, and shelters for the animals spaced from the platform and connected in circuit with said walkway. 85

19. Apparatus designed for milking and treating the animals of a group in succession, said apparatus comprising, a movable platform, means for actuating the same, means enabling the ingress of the animals to the platform and their egress therefrom, and means for milking and means for treating the animals while on the platform and moving from the point of ingress to the point of egress, said treating means including spraying devices carried on the platform, and means also carried on the platform for supplying liquid under pressure to the said devices. 90

20. In apparatus of the character described, a movable platform, spraying devices carried on the platform, and means also carried on the platform for supplying liquid under pressure to the said devices, said last named means including a liquid reservoir arranged to cooperate with a source of liquid supply off the platform, and mechanism for drawing liquid from the reservoir and forcing it to the said devices. 95

21. In apparatus of the character described, a movable platform, spraying devices carried on the platform, and means also carried on the platform for supplying liquid under pressure to the said devices, said last named means including a liquid reservoir arranged to cooperate with a source of liquid supply off the platform, mechanism for drawing liquid from the reservoir and forcing it to the said devices, and means for controlling the level of the liquid in the reservoir. 100

18. Apparatus designed for milking and treating the animals of a group in succession, said apparatus comprising, an endless movable platform, means for actuating the same, means enabling the ingress of the animals to the platform and their egress therefrom, and means for milking and means for treating the animals while on the platform and moving from the point of ingress to the point of egress, part of said last named means being carried by the platform and part being mounted adjacent the platform, 105

KRAEMER LUKS. 115

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