Aug. 24, 1954 M. B. GAULT 2,687,113

CLEANING DEVICE FOR POULTRY BATTERIES

Filed Dec. 24, 1948 3 Sheets-Sheet 1

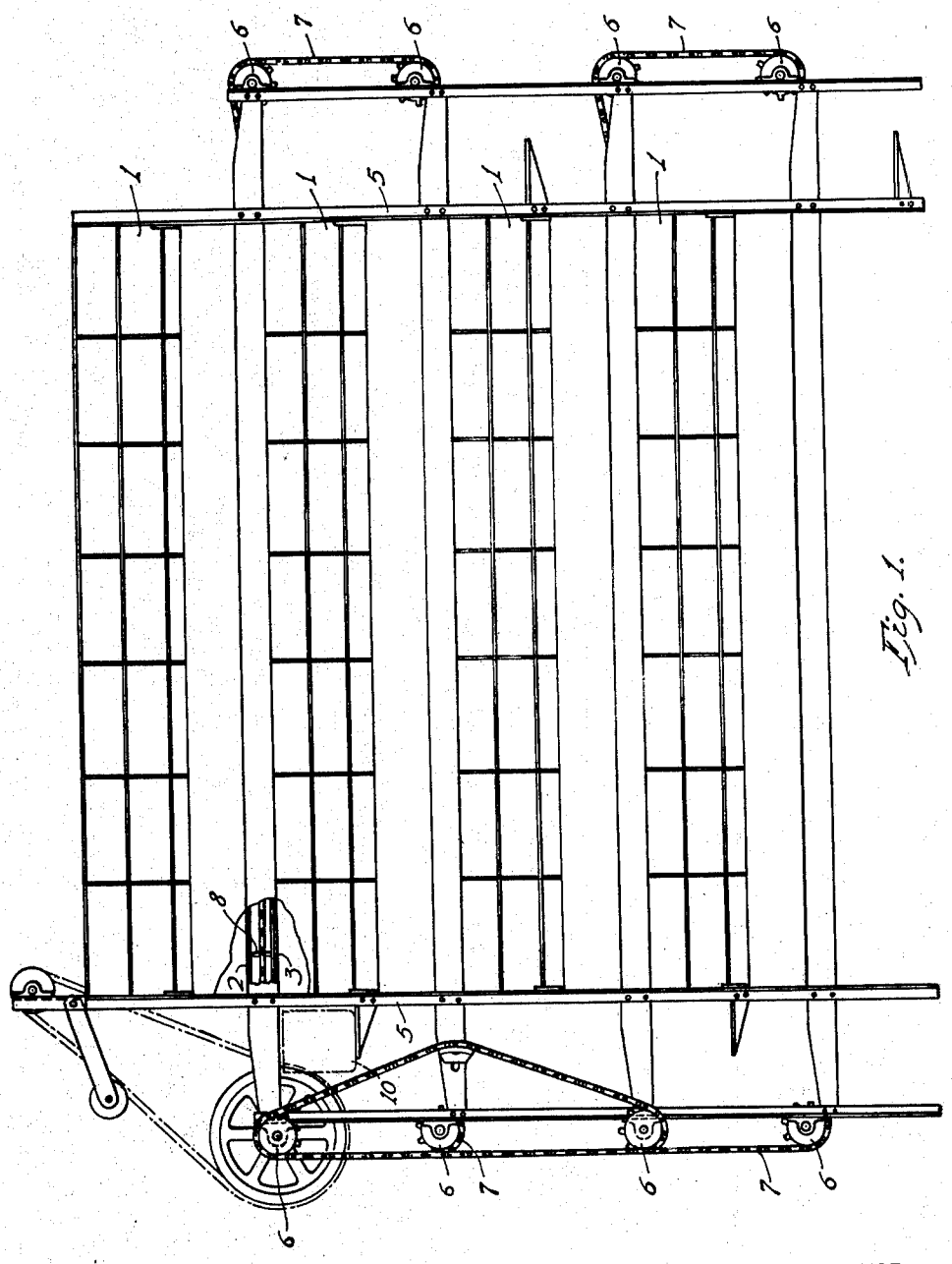

Fig. 1.

WITNESS

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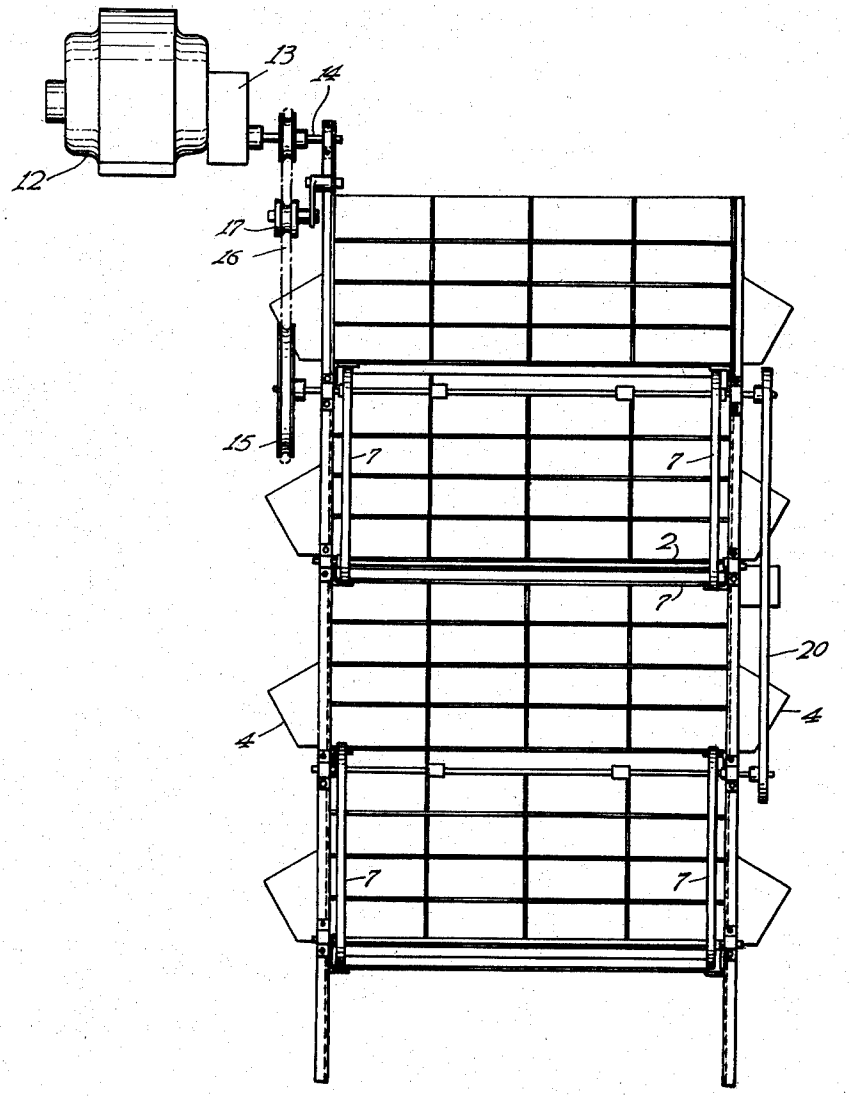

Fig. 2.

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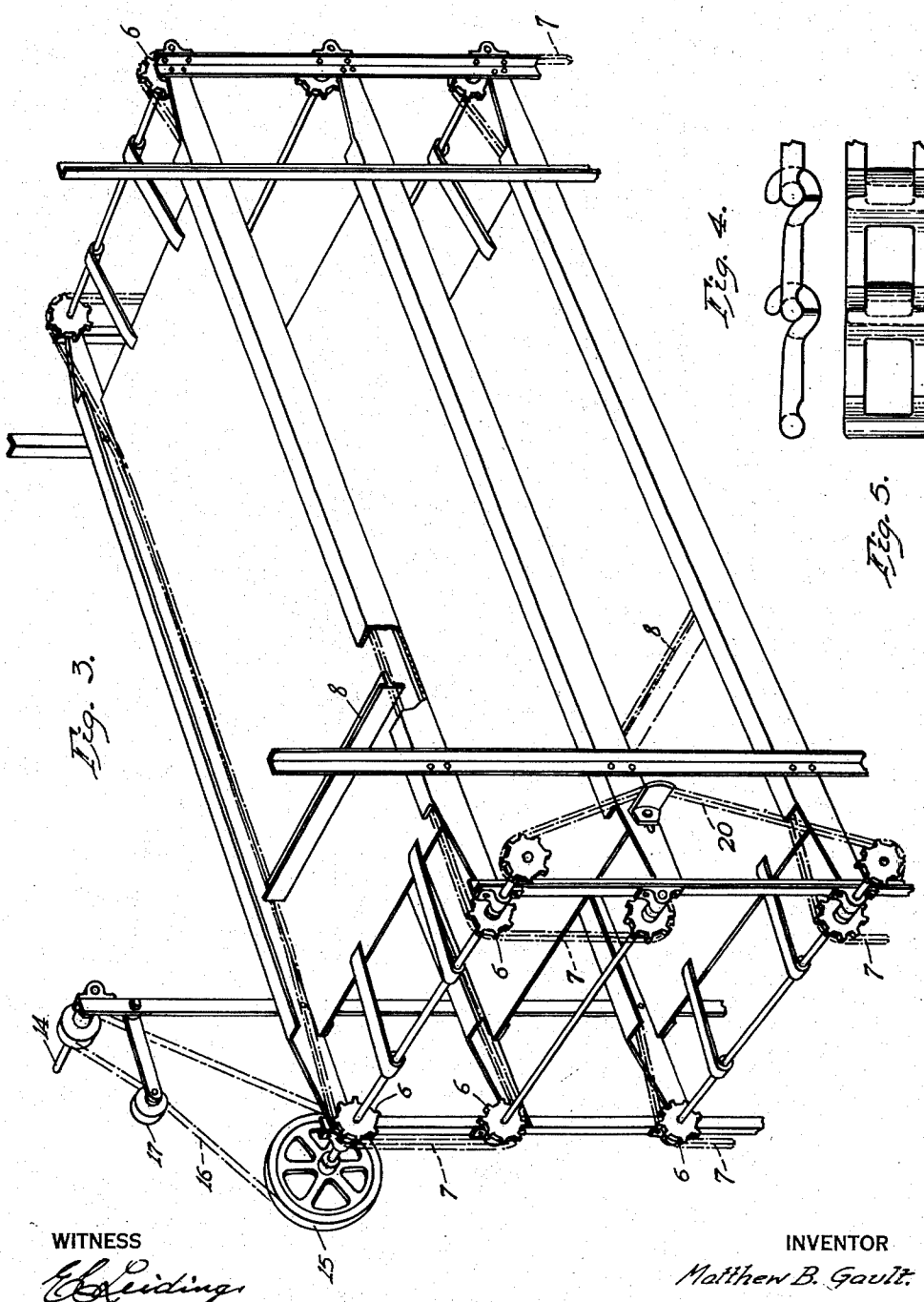

Fig. 3.

Fig. 4.

Fig. 5.

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CLEANING DEVICE FOR POULTRY BATTERIES

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5 Claims. (Cl. 119—22)

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My invention relates to a cleaning device and particularly to a cleaning system for removing droppings from the dropping pans of cages.

It is customary to raise many small animals and much poultry in relatively small cages arranged in groups usually called batteries. It has been conclusively demonstrated that more meat or eggs per unit of feed can be produced in these so-called battery constructions. However, the cleaning of the cages has proved such an arduous and distasteful occupation that very few poultrymen will utilize batteries.

Because of this situation many attempts have been made to provide mechanical systems for removing the droppings from the dropping boards of the cages. The various systems have not been commercially satisfactory either in that they did not clean the pans, or wrecked the cages. The cages themselves are built of relatively light parts and screwed or spot-welded together and if the cleaning system produces any excessive strain or vibration, the screws drop out or the welding breaks loose to the extent of effectively destroying the cages.

I have provided a system which eliminates the disadvantages of the heretofore known cleaning systems.

In a system according to my invention, a plurality of cages is arranged in parallel vertical arrangements, the dropping board of the top cage usually providing the ceiling for the lower cage. An endless drive system is then provided having a minimum of relatively narrow cleaning elements or scrapers passing across the dropping boards. The endless drive elements then carry the scrapers through first one and then the other of the dropping boards in a continuous direction so that one of the boards is cleaned in one direction and the other one in the alternate direction, the cleaning elements are so constructed and held by their own weight only so that after receiving a predetermined load any other droppings will pass under the scraper without increasing the load on the drive system.

It is an object of my invention to provide an improved cleaning system for cages.

It is a further object of my invention to provide a cleaning system in which a single cleaning element operates on successive superimposed cages.

It is a further object of my invention to provide a cleaning system which operates continuously in a single direction.

It is a further object of my invention to provide a cleaning element operating at a predetermined maximum load.

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It is a further object of my invention to provide a cleaning system that will not damage the cage construction.

It is a further object of my invention to provide automatic safety means to prevent undue strain on the system.

Other objects of my invention will be apparent from the following detailed description taken in conjunction with the accompanying drawing, in which:

Figure 1 is a side elevation of a battery embodying my invention with parts broken away,

Fig. 2 is an end elevation of the battery of Fig. 1,

Fig. 3 is a fragmentary isometric view of the system with the cages removed to better disclose the working contents of the system, and

Fig. 4 is an enlarged side elevation of a section of a satisfactory drive chain for use in my system; and

Figure 5 is a plan view of the chain of Figure 4.

In the exemplary embodiment of my invention, the battery is composed of a plurality of superimposed cages 1, each of which is constituted of a floor 2 on which the animals or poultry normally stand and which is composed usually of wire fabric or small bars welded together. Immediately below the floor 2 of the cage 1 is a dropping board 3 for receiving excrement from the animals or poultry. The board 3 is usually composed of sheet metal although in some types of cages plastic dropping boards 3 have been utilized. In the practical installation of batteries a plurality of cages 1 is superimposed in vertical arrangement to properly utilize the floor space.

While any desirable shape of cage 1 may be used, it is usually found desirable to provide cages of about 30 to 40 inches in width with the length several multiples of the width with the interior divided into a plurality of compartments. The feed and watering arrangements 4 are usually provided along the long sides of the cages 1 and may or may not be a portion of the side walls of the cages 1 which may be constructed in part of wire cloth or other lightweight barrier elements. At least a portion of the side walls should be easily removable to permit access to the interior of the cage.

In the system according to my invention, superimposed cage elements are preferably arranged in pairs, two or more pairs of cages being arranged in a common stack. Rigidly connected to supporting members 5 of the stack of cages 1 are two series of sprocket members 6 spaced from the ends of the cages 1 and so arranged that a pintle

chain 7 passing over and around the sprocket elements 6 will provide a continuous chain element extending across the two superimposed dropping boards 3. While it has been known to pull a cleaning element 8 across a dropping board by a single driving chain 7, I prefer to provide a pair of driving chains 7, one at each side of the dropping board 3 and to place the scraper element 8 between the driving chains 7.

In order to prevent the scraper 8 from picking up an excessive load, I construct the scraper 8 as a light relatively narrow element so that after a predetermined quantity of droppings have been accumulated, any further droppings encountered will pass under the scraper blade 8 and will remain on the dropping board 3 until the next passage of the scraper 8.

Various arrangements of dumping may be utilized. In some instances, it is desirable to provide baskets or collectors 10 at the end of each dropping board 3 to receive the accumulated load dropped by the scraper 8.

I have found that materially better and much more satisfactory operation can be secured by operating the scraper blades 8 at a very low rate of speed. This low speed of operation has several important advantages. First, the slow moving scraper arrangement produces very little vibration so that there is practically no tendency to jack apart the cage construction and particularly the slow moving light load blade produces a minimum torsional effect on the cage structure so that the light spot-welding is not torn apart.

Another important advantage is that in the event any animal in the cages should get its foot or other portion of its body through the bottom deck 2, the slow moving scraper blade 8 will give warning in ample time for the part to be removed without disarranging the blade and without injury to the animal.

Further, the slow moving blade 8 produces relatively little noise and practically no vibration so the animals or poultry are not annoyed or frightened by the cleaning system.

While any relatively low speed may be used, I have found it advantageous to use a 1700 R. P. M. motor 12 with a 600–1 reduction gear 13, which may or may not be supplemented by further reduction between the drive shaft and the individual drive chains 7 of the separate batteries.

In battery construction, it is frequently desirable to use a lightweight sprocket chain of the wire link type, such as shown in Fig. 4, and in the event some foreign object, such as stones, bolts, nuts or other metallic pieces which are commonly found in chicken feed, should be dropped on the dropping board 3, the sprocket chain 7 may readily spring apart under the load and be disengaged from one of the drive sprockets 6 in order to prevent damage to the drive mechanism or any other part of the cleaning system.

I provide a friction drive 16 between the motor 12 and the drive sprocket 15 of the cleaning system so that if for any reason the load on the cleaning system becomes excessive, the friction drive 16 will allow the cleaning system to stop without injury to any portion of the equipment. While any suitable friction drive may be utilized, I prefer to use a V-belt drive 16 with a tightening idler pulley 17 so that the tension is just sufficient to drive a normally loaded cleaning system.

In the event a foreign object blocks the scraper 8 or one of the sprocket chains 7 should be broken or disengaged, the load produced will be in excess of the normal load on the cleaning system and the friction drive 16 acts to prevent damage until such time as the operator may remove the obstacle or repair the damage.

While it may be convenient to provide a separate driving motor 12 and gear reduction arrangement 13 for each battery, I prefer to provide a single motor 13 and a low speed drive shaft 14 for a plurality of batteries and provide the V-belt friction drive 16 between the drive shaft 14 and the drive wheel 15 of each of the batteries.

Where the individual batteries comprise more than a single pair of superimposed cages 1, a plurality of chains 7 may be actuated by a drive chain 20 engaged with the driving sprocket shaft associated with each pair of cages or with each of the individual cleaning systems.

While for purpose of illustration I have shown and described a specific embodiment of my invention and described my invention to the best of my present understanding, I wish it to be understood that I am not limited to the examples or explanations herein given, and it is apparent that many changes and modifications can be made without departing from the true spirit of my invention or the scope of the appended claims.

I claim as my invention:

1. In a battery system having two superimposed vertically spaced dropping boards, a cleaning system comprising a pair of sprocket wheels mounted adjacent each end of each of said dropping boards, a pair of continuous pintle chains passing in proximity to the upper surface of each of said dropping boards, a narrow lightweight scraper blade mounted on and extending transversely between said pintle chains, said blade having oppositely disposed scraper edges, a unidirectional driving mechanism connected in driving relation to said pintle chains, said mechanism operating said chains at a low rate of speed for traversing said blade successively over the dropping boards, one edge of said scraper blade making contact with one of said dropping boards and the opposite edge of said scraper blade making contact with the other of said dropping boards.

2. A manure handling system for removing manure from a pair of superimposed vertically spaced manure receiving dropping boards comprising a pair of sprocket wheels mounted adjacent each end of each of said dropping boards, a pair of endless driving chains mounted on said wheels and extending adjacent the sides of said dropping boards, a narrow lightweight scraper secured between said chains and passing in contact with the surface of said dropping boards, unidirectional power means operatively connected in driving relation to said chains for moving said chains in a single direction whereby the scraper passes over said dropping boards in succession, said scraper blade having two oppositely disposed scraping edges, one of said scraping edges engaging one of said dropping boards while moving from left to right and the opposite scraping edge engaging the other dropping board while moving from right to left.

3. A manure handling system for removing manure from a pair of superimposed vertically spaced manure receiving elements comprising a pair of sprocket wheels mounted adjacent each end of each of said elements, a pair of endless driving chains mounted on said wheels and ex-

tending adjacent the sides of said elements, a narrow lightweight scraper secured between said chains and passing in contact with the surface of said elements, unidirectional power means operatively connected in driving relation to said chains for moving said chains in a single direction whereby the scraper passes over said elements in succession, a friction clutch device between said power means and said chains, said scraper having two opposed scraping edges, one of said scraping edges operatively engaging the top of one of said elements, the opposite scraping edge operatively engaging the top of the other element, both edges of said scraper being disengaged while moving from one element to the other.

4. A manure handling system for a pair of superimposed cages, each of said cages having a floor of perforate construction comprising a dropping board in spaced relation under said floor, supporting means for said cages including a pair of columns spaced from each end of said cages, two series of sprocket members mounted on said frame and spaced from the ends of said dropping boards, a pair of endless drive chains mounted on said sprocket members, said sprocket members being so arranged that said chains make parallel endless chain elements passing along the upper edges of the two superposed dropping boards, a single scraper blade mounted transversely between said parallel chains, said blade being of narrow construction, said scraper blade having two opposite scraping edges, power means connected in driving relation to said sprocket means for irreversibly driving the chains in a single direction whereby the said blade is passed over the dropping boards successively, one edge of said scraper blade being operative in relation to the top of one of said dropping boards, the opposite edge being operative in relation to the top of the other dropping board.

5. A cleaning system for a pair of superimposed cages, each of said cages having a floor of wire mesh construction comprising a dropping board below each of said floors, supporting means for said cages including a pair of upright posts at each end of said cages and spaced therefrom, a pair of axle members mounted on each of said pairs of posts, a pair of sprocket members on each of said axles, a pair of endless drive chains mounted on said sprocket members, said sprocket members being so mounted on said posts that said chains make parallel endless chain elements passing along the upper edges of the two superimposed dropping boards, a single narrow scraper blade mounted transversely between said parallel chains, said scraper blade having two opposite scraping edges, a motor, a high ratio reduction drive connecting said motor to one of said axles for irreversibly driving said chains in a single direction whereby said scraper blade successively engages said dropping boards, said drive including a small driving pulley, a larger driven pulley, a belt entrained over said pulleys, one of said scraper edges engaging one of said dropping boards while traveling in one direction, the opposite scraper edge then engaging the other dropping board while traveling in the opposite direction.

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