April 9, 1968 G. R. SHADLEY 3,376,600

MECHANICAL DISCHARGE SHACKLE FOR FOWLS AND THE LIKE

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Fig. 1

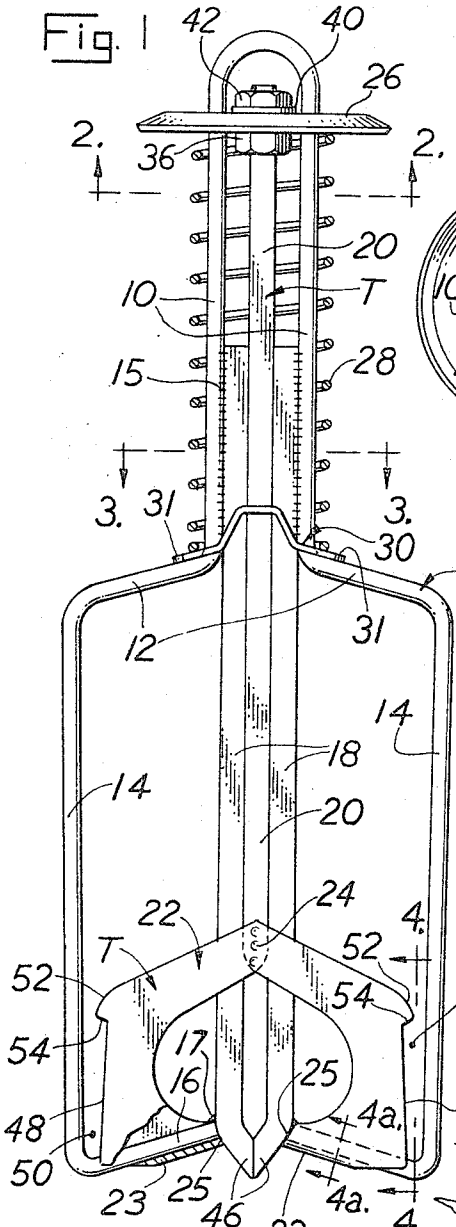


Fig. 2

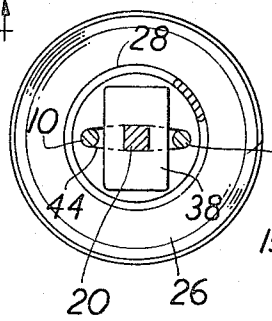


Fig. 4a

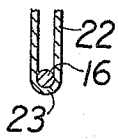


Fig. 4

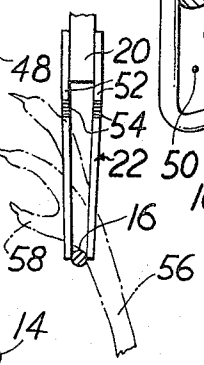


Fig. 5

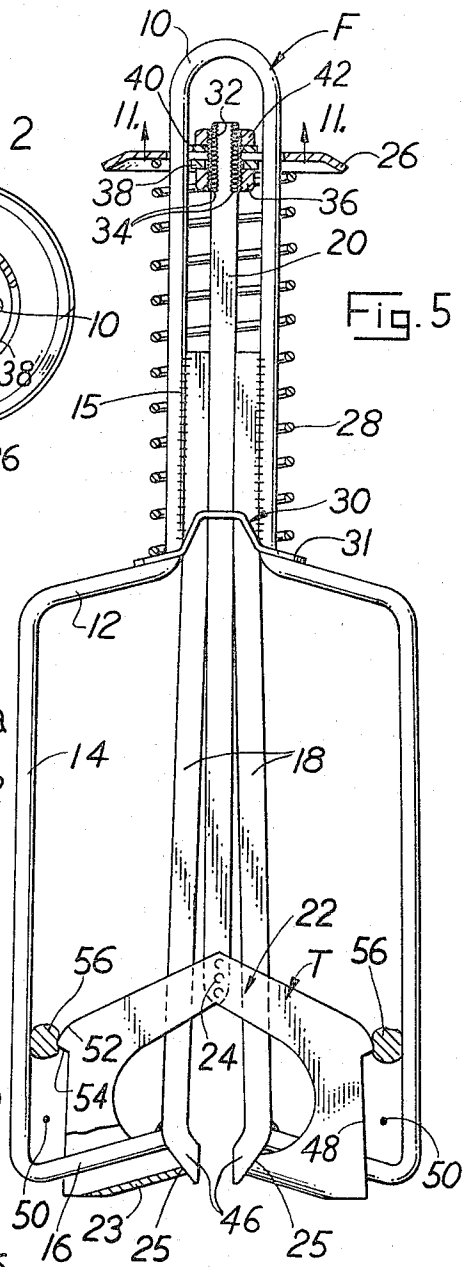
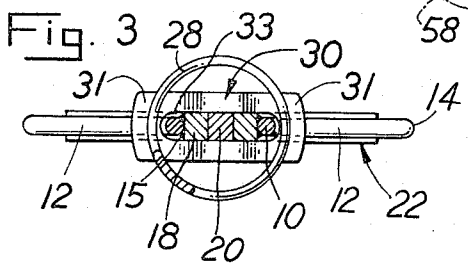


Fig. 3



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MECHANICAL DISCHARGE SHACKLE FOR FOWLS AND THE LIKE

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Fig. 6

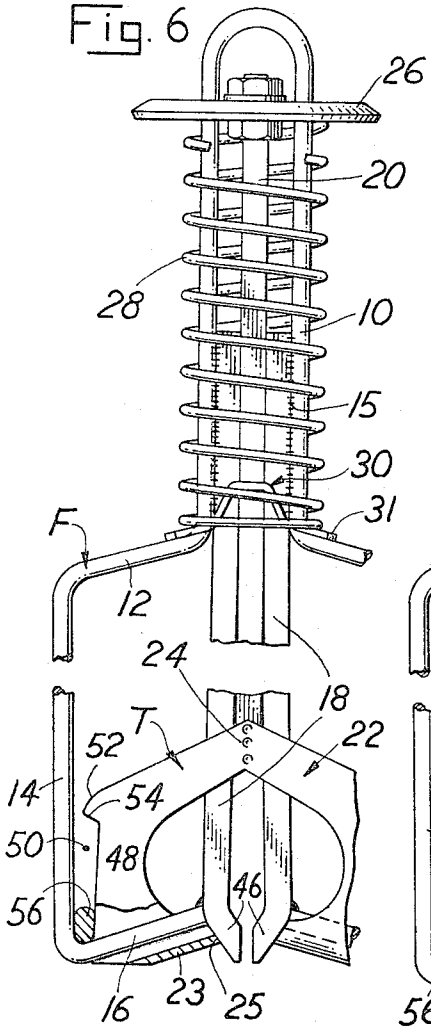


Fig. 7

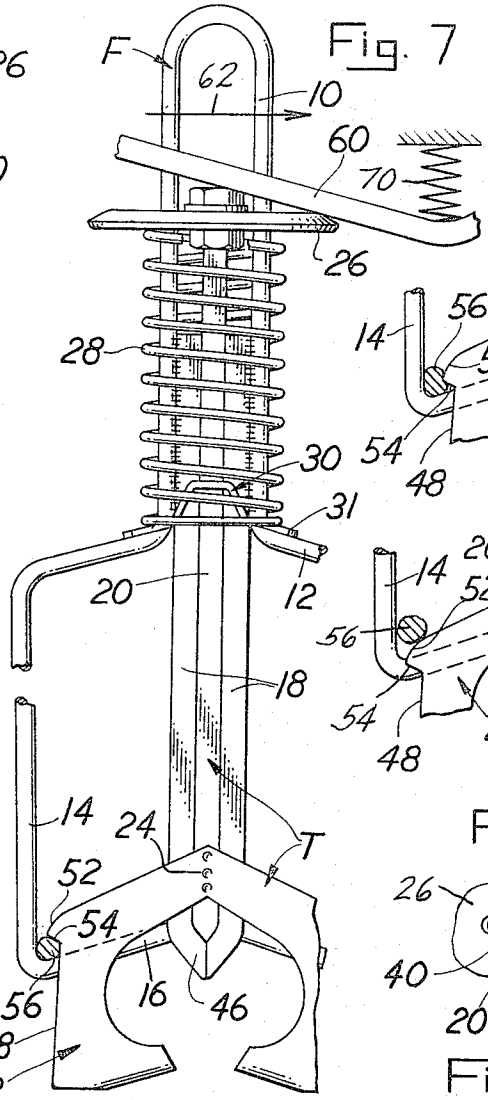


Fig. 8

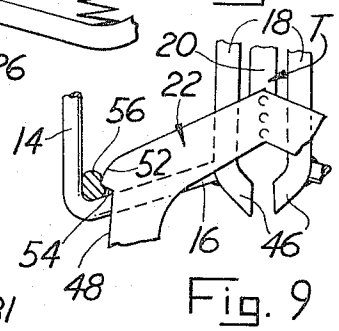


Fig. 9

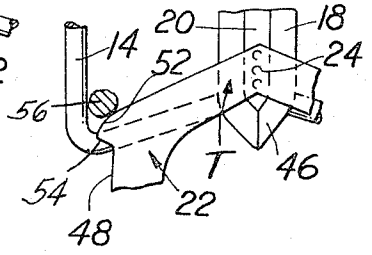


Fig 11

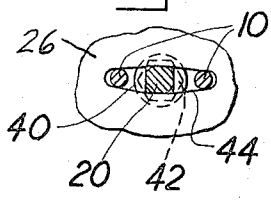


Fig. 10

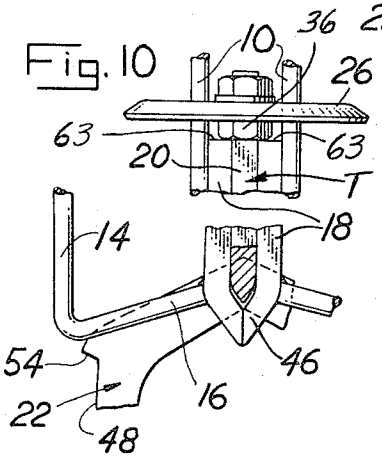


Fig 12

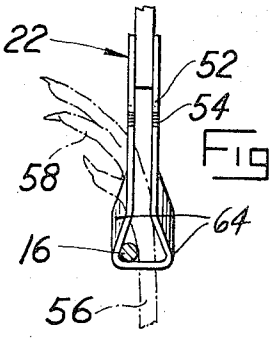
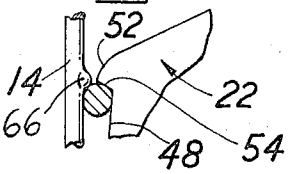


Fig. 13



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United States Patent Office 3,376,600 Patented Apr. 9, 1968

3,376,600

MECHANICAL DISCHARGE SHACKLE FOR FOWLS AND THE LIKE

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Filed Feb. 1, 1966, Ser. No. 524,326
21 Claims. (Cl. 17—44.1)

This invention relates to a mechanical discharge shackle for animals, such as fowls and the like, and is of the general type shown in my Patent No. 2,797,436.

One object of my present invention is to provide a rugged shackle of the mechanical discharge type which is long lasting and reliable in operation.

Another object is to provide a shackle comprising a frame and a traveler wherein the traveler has leg engaging elements, the leg engaging elements of the frame and those of the traveler defining leg receiving slots which are variable in width to accommodate the legs of animals, even though they vary in size, with substantially equal spring pressure applied to the legs within the range of the shackle.

Another object is to provide a shackle which is symmetrical in side elevation so that it can be loaded from either side, thus facilitating the loading operation and thereby increasing the animal processing rate.

Still another object is to provide a shackle which has cam means of coaction between its frame and its traveler, the cam action translating the expansion of a shackle spring on a shank of the frame into a frame closing component, whereby the spring exerts the required pressure for adjusting the sides of the leg receiving slots with substantially equal pressure regardless of the size of the legs entered into the slots and also exerts the pressure required to hold the legs in the slots.

A further object is to provide leg receiving slots which are restricted at the top for preventing accidental dislodgment of the legs from the slots, after they are fully received, the restrictions serving as cam means operable upon initial entry of the legs into the slots to produce the required spreading action of the two parts of the frame to permit their entry.

Still a further object is to provide the last mentioned cam means operable to also spread the sides of the frame upon mechanical discharge of the legs from the shackle, such discharge being effected by a movement downwardly of the traveler relative to the frame until the cam means engages the legs and causes them to spread the frame so that the legs can pass the cam means to a free position within the frame and the animal thereupon will fall out of the shackle.

An additional object is to provide means for actuating the traveler for the discharge operation by providing a stationary cam past which the shackle is carried by a shackle conveyor and which is operable to depress the traveler against the bias of the shackle spring.

Further objects and advantages of my present invention will become apparent as the following description proceeds, and the features of novelty which characterize the invention will be pointed out with particularity in the claims annexed to and forming a part of the specification.

A preferred embodiment of the invention is shown in the accompanying drawings in which:

FIG. 1 is a front elevation of a mechanical discharge shackle embodying my present invention, the parts thereof being in normal position.

FIGS. 2, 3, and 4 are detail sectional views on the lines 2—2, 3—3, and 4—4 respectively of FIG. 1.

FIG. 4*a* is a fragmentary detail on the line 4*a*—4*a* of FIG. 1.

FIG. 5 is a view similar to FIG. 1 showing the legs of

a fowl in cross section during the first phase of insertion of the legs into the shackle.

FIG. 6 is a similar view showing the legs fully inserted so that the fowl is suspended by the shackle.

FIGS. 7, 8, and 9 are views similar to certain portions of FIG. 1 showing progressively the action of the parts of the shackle during a mechanical discharge operation of the legs relative to the shackle.

FIG. 10 is a similar view showing the position of certain parts at a limit of extension of the shackle.

FIG. 11 is a fragmentary detailed sectional view on the line 11—11 of FIG. 2.

FIG. 12 is a fragmentary view showing a modification of FIG. 4, and

FIG. 13 is a fragmentary view similar to a portion of FIG. 1 showing a modification thereof.

On the accompanying drawings I have used the reference character F to indicate a frame and T a traveler on the frame F, the two parts F and T being in general the main parts of my shackle.

The frame F may be formed of rod stock comprising a vertically U-shaped shank 10, a pair of angular upper frame elements 12, a pair of vertical side frame elements 14 and a pair of angular lower frame elements 16 to which a pair of cam bars 18 are secured. The cam bars may be made of square bar stock and are manufactured as integral parts of the frame F by welding them as indicated at 15 adjacent their upper ends to the shank 10 and at 17 adjacent their lower ends to the inner ends of the lower frame elements 16.

The traveler T comprises a shank 20 of square bar stock slidable between the cam bars 18 and provided with a leg engaging element shown generally at 22 formed of sheet metal or the like into U-shape as shown in FIG. 4, the element 22 being secured to the lower end of the shank 20 as by spot welding or the like 24.

The complete assembly of my shackle further includes a cam disk 26 slidable on the shank 10 of the frame F and connected with the upper end of the traveler T, a shackle spring 28 being interposed between the lower surface of the cam disk and a spring seat element shown generally at 30. The element 30 rests on those portions of the upper frame elements 12 adjacent the U-shaped shank 10 and is provided with a slot 33 (see FIG. 3) slidably receiving the elements 10, 18, and 20.

The manner of securing the cam disk 26 to the upper end of the shank 20 is illustrated particularly in FIG. 5 and comprises a threaded portion 32 above a shoulder 34, a nut 36 threaded thereon, a spring centering element 38 below the cam disk 26, a washer 40 above the cam disk and a lock nut 42. The threaded portion 32 extends through a slot 44 of the cam disk 26 (also see FIG. 11), and its central portion fits flat sides of the threaded portion 32 to prevent relative turning. The legs of the U-shaped shank 10 extend slidably through the slot 44 and the spring centering element 38 as shown in FIG 2 centers the upper end of the spring while the spring seat element 30 centers the lower end thereof. The spring centering element 38 also reinforces the cam disk 26 at the center where it is somewhat weakened by the slot 44.

The upper end of the U-shaped shank 10 is adapted to be hooked by a chain or the like to a shackle conveyor in the usual manner well known in the art whereby the entire shackle is suspended and conveyed thereby. The spring 28 biases the traveler T to the maximum elevated position shown in FIG. 1 with cross-members 23 at the lower end of the leg engaging element 22 stopped by engagement with the lower surfaces of the lower frame elements 16 as shown in FIG. 1.

Considering the frame F as having two sides (each side comprising one leg of the shank 10, one each of the

elements 12, 14 and 16 and one of the cam bars 18), these sides are biased toward each other to the closed position shown in FIG. 1 with cam portions 46 at the lower ends of the cam bars 18 in engagement with each other due to the inherent resiliency of the rod-like frame and particularly the U part of the shank 10. Such bias however, is insufficient for effective operation of the shackle. Accordingly, I provide the spring 28 to both bias the traveler T upwardly relative to the frame F and bias the two sides of the frame toward each other by having the upper frame elements 12 at an angle as shown and the spring seat element 30 provided with wings 31 at similar angles so that the downward component produced by the tendency for the spring to expand is translated into horizontal components tending to force the two sides of the frame towards each other because of the angles involved. Obviously if the angle is greater to the horizantal than illustrated the tendency for the frame to close would be greater and if the angle were less then the tendency would be less. Therefore the tendency for the frame to close may be nicely controlled by both varying the force of the spring and varying the angles for the frame elements 12 and the corresponding angles of the spring seat wings 31. The adjacent inner ends of the cross-members 23 of the leg engaging element 22 are identified 25 in FIG. 1 and constitute cam ends cooperable with the cam portions 46 of the cam bars 18 as will hereinafter appear.

The leg engaging element 22 is provided with cam-like leg engaging edges 48 which are at slight engles to the vertical as shown in FIG. 1 to produce wedge shaped or tapered leg receiving slots 50 between these edges and the adjacent substantially vertical side frame elements 14. These tapered slots 50 permit ready insertion of the legs of the fowl or other animal into the slots as will hereinafter appear. The upper ends of the leg engaging elements 48 are also provided with entrance cam edges 52 and exit car edges 54, the operation of which will hereinafter appear.

A stationary cam 60 is associated with FIG. 7 and is operable to strip the legs 56 of the fowl from the shackle. As before mentioned the shackle itself is supported by a shackle conveyor and conveyed thereby in a predetermined direction such as indicated by the arrow 62. The stationary cam 60 coacts with the cam disks 26 of the successive shackles as they are advanced by the shackle conveyor past the cam, the cam disks being depressed by the cam 60 from the normal position shown in FIG. 1, so as to depress the traveler T relative to the frame F as illustrated in FIGS. 7, 8, and 9.

PRACTICAL OPERATION

In the operation of my shackle, fowls or the like to be killed, scalded, picked, etc., are hung in the shackle by an operator placing the two legs of the fowl in the spaces within the frame F above the leg engaging element 22 as shown in FIG. 5 and pulling downwardly on them so that they cooperate with the cam edges 52 in such manner that the legs push against the inner surfaces of the side frame elements 14 and spread them apart in order to pass the cam edges 52, 54. The spreading action of the sides of the frame F results in the cam edges 25 of the cross-members 23 sliding downwardly along the cam portions 46 of the cam bars 18 as shown thereby pulling the traveler T downwardly against the bias of the spring 28 due to both the camming action just described and the engagement of the legs 56 against the upper cam surfaces 52 of the leg engaging element 22.

After the legs 56 pass the cam edges 52, 54 they enter wider portions of the slots 50 which permit the side frame elements 14 to spring back toward each other in response to both their inherent spring tendency and the expanding tendency of the spring 28 which pulls the cross-members 23 of the leg engaging element 22 upwardly with their cam ends 25 sliding along the cam portions 46 to the position shown in FIG. 6. Thereafter the legs are readily pulled downwardly along the sloping edges 48, acting cam-like against three edges, until they seat against the lower frame elements 16 as also illustrated in FIG. 6, wherein the side frame elements are still spread somewhat apart as compared to FIG. 1.

The entire operation described in the preceding two paragraphs is rapidly performed in a matter of one or two seconds on a production basis, the passage of the legs past the cam edges 52, 54 and down to the position shown in FIG. 6 being a continuous slam-like motion.

The camming action produced by coaction of the cam ends 25 of the cross-members 23 with the cam portions 46 operate to squeeze the legs 56 in the slots 50 between the leg engaging edges 48 and the side frame elements 14 which may also be considered leg engaging elements with a predetermined spring force which is substantially the same whether the legs 56 are small or large. Thus my shackle automatically adjusts itself for legs 56 regardless of their size within a certain range of limits which is a very desirable feature in the operation of a shackle. Such range of limits may include all sizes of chickens and rabbits for instance, whereas a larger shackle would be used for all sizes of turkeys or the like.

As far as the mechanical discharge feature of my shackle is concerned, this is accomplished by the shackle conveyor moving the shackle F, T in the direction of the arrow 62 in FIG. 7 past the stationary cam 60 against the lower surface of which the cam disk 26 engages. Due to the motion of the shackle conveyor and the downward incline of the cam 60 in the direction of the arrow 62, the cam disk 26 is depressed against the bias of the spring 28 as illustrated which moves the entire traveler T downwardly relative to the frame F. The lower frame elements 16 thereby hold the legs 56 at the same elevation as the edges 48 of the leg engaging element 22 slide downwardly relative to the legs until the exit cam edges 54 engage the legs as illustrated.

Thereafter, slight further downward movement of the cam disk 26 due to continued engagement with the cam 60 will cause the legs 56 to be spread apart by the cam edges 54 as shown in FIG. 8, thus opening the frame F (see cam portions 46 spaced apart) as also illustrated in this figure against the bias of the spring 28 tending to keep the frame closed. A little further downward movement of the leg engaging element 22 will snap the legs 56 past the projections formed by the cam edges 52 and 54 as shown in FIG. 9 and the frame F will reclose with the cams 46 in engagement as also illustrated in this figure. Since the legs 56 are now free within the large openings defined by the elements 12, 14, 18 and 22, the fowl will be entirely free of the shackle and can fall onto a conveyor or on a table to be removed therefrom as desired. Thus, the fowl is automatically released from the shackle without any attention by the operator.

FIG. 10 illustrates a stopped position for the traveler T designed to prevent over-compression of the spring 28. It will be noted that the upper ends of the cam bars 18 shown at 63 are engaging the nut 36. The stationary cam 60 may be made adjustable as to height so that the maximum depressed position of the cam disk 26 is such that these ends 63 are slightly below the nut 36 but in case the cam depresses any of the disks in the conveyor line too much, the engagement of the ends 63 with the nut 36 will avoid the possibility of compressing the spring 28 beyond its elastic limit. The cam 60 may be biased downwardly to a lowermost position by a spring 70 shown diagrammatically in FIG. 7, which spring would be stronger than the spring 28, to avoid excessive pressure upon the ends 63 engaging the nut 36.

In several prior art shackles, the lower ends of the shackles are bent at an angle in one direction out of the general plane of the shackle so that the fowl hangs substantially vertically below the shackle so as not to cant the shackle very far from a vertical attitude. Such

shackles, however, have to be loaded from one side only and this is a time-consuming requirement when compared with a symmetrical schackle which can be loaded from either side. FIG. 4 illustrates the symmetricalness of my shackle. The fowl's leg 56, it will be noted, is bearing against the lower frame element 16 while the foot 58 is bearing against the cam edge 54 of the leg engaging element 22. The leg 56 therefore hangs close to a vertical position. If a closer approach to the vertical position is desirable, the lower end of the U-shaped element 22 may be modified by widening as shown at 64 in FIG. 12 so that the frame element 16 can float from side to side of the widened portion. Thus, whether loaded from either side, the pressure of the leg 56 against the element 16 will cause it to automatically move over to the side which permits closer approach of the leg to the vertical as illustrated in FIG. 12 compared with the illustration in FIG. 4.

When the legs 56 of the fowl are held in the slots 50 as shown in FIGS. 4 and 6, the cam edges 54 act as stops against accidental movement of the legs upwardly and out of the slots. The fowls are still alive when their legs are inserted in the shackles and they flap their wings which, especially in the case of large turkeys, produces a considerable force tending to jerk the legs upwardly past the cam edges 54 and out of the shackle. This, of course, is undesirable. While the projections offered by the cam edges 52, 54 produce relatively narrow slots with respect to the adjacent surfaces of the frame elements 14, these slots may be reduced by providing additional projections 66 on the frame elements 14 as shown in FIG. 13. This is particularly desirable in connection with shackles of a size suitable to accommodate turkeys and the like. While the gap between 52, 54 and 66 has been reduced considerably (comparing FIG. 13 with FIG. 1), it is not reduced during the mechanical discharge operation because at that time the projections 66 would be well above the cam edges 52, 54 and the same relative position of parts 52, 54 to the parts 14 would be as shown in FIG. 7.

The cam edges 52, 54 of the traveler T may be omitted from shackles designed for eviscerating operations and the like whereupon the shackle will still function as in FIG. 6 to clamp the leg 56 between the rod 14 and the edge 48, and as in FIG. 9 to provide a wide space between the rod 14 and the top of the element 22 for release and fall-out of the leg from the shackle.

In some prior art shackles tapered leg receiving slots are provided, the sides of which are rigid relative to each other, the purpose being to have large legs wedge higher up in the slots than small legs. Such leg receiving slots have disadvantages, however, in that the fowls are held at different heights during conveyance instead of uniformly at the same height as in my shackle where all sizes of legs are held at the same height (down against the frame elements 16) as shown in FIG. 6. Also, the wedging of legs in solid slots makes it difficult to mechanically remove the legs, especially after the fowl has struggled to release itself and its legs have been thereby pulled even deeper into the slots. Mechanical release from such prior shackles may require considerable force even sufficient to bend the wires of which most shackles are made as distinguished from the slots 50 which I disclose as being variable in width against the bias of the spring 28. My shackle accordingly is less of a maintenance problem.

I have hereinbefore referred to the angles of the frame elements 12 and the wings 31 of the spring seat element 30 as being capable of variability for increasing or decreasing the spring action of the frame sides 14 toward the leg engaging edges 48 of the element 22. Additionally, the cam portions 46 engaging the cam edges 25 may be varied as to angle for securing the desired frame-closing pressure in proportion to the expanding bias of the spring 28.

While a particular embodiment of my invention has been shown in the drawings, it will be appreciated that various changes and modifications may be made in the form of the members shown and described without departing from the real spirit and scope of my invention. Accordingly, it is intended in the appended claims to cover all possible changes and modifiecations which fall within the true spirit and scope of the invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. An animal shackle comprising a frame adapted to be supported and conveyed by a shackle conveyor, a traveler carried by said frame and movable vertically relative thereto, said frame and traveler having cooperating leg engaging elements defining receiving slots for the legs of an animal, the leg engaging elements of said frame being movable horizontally away from the leg engaging elements of said traveler, and means biasing said leg engaging elements of said frame toward said leg engaging elements of said traveler including a spring element interposed between said frame and a portion of said traveler to hold the legs of the animal in said slots and to automatically adjust the effective width of the slots to the size of the legs.

2. A shackle in accordance with claim 1 wherein said biasing means comprises a vertical coiled compression spring and said shackle has coacting cam means between said frame and said traveler to translate vertical thrust of said spring into force applied horizontally on said leg engaging elements of said frame toward leg engaging sides of said traveler.

3. A shackle in accordance with claim 2 wherein said traveler is provided with second cam means cooperable with the animal's legs as they are entered into said leg receiving slots to effect spreading of said leg engaging elements of said frame against the bias of said spring.

4. A shackle in accordance with claim 3 wherein said second cam means thereafter coacts with said leg engaging elements of said frame to retain the animal's legs in said leg receiving slots.

5. A shackle in accordance with claim 3 wherein said traveler is movable downwardly against the bias of said biasing means and relative to said frame while the animal's legs are supported by the frame whereupon the legs coact with said second cam means to spread the leg engaging elements of the frame to permit discharge of the legs from said leg receiving slots.

6. A shackle in accordance with claim 5 wherein said traveler is adapted to be moved downwardly by a stationary cam adjacent the shackle conveyor as the shackle is moved by the conveyor past the stationary cam.

7. A shackle in accordance with claim 3 wherein said traveler is movable downwardly against the bias of said spring and relative to said frame while the animal's legs are supported by the frame whereupon the legs coact with said second cam means to spread the leg engaging elements of the frame to permit discharge of the legs from said leg receiving slots, said traveler being adapted to be moved downwardly by a stationary cam adjacent the shackle conveyor as the shackle is moved by the conveyor past the stationary cam.

8. A shackle in accordance with claim 3 wherein said second cam means comprises protuberances on said traveler at the upper ends of said leg receiving slots and extending toward said side frame elements.

9. A shackle in accordance with claim 8 wherein said frame comprises a U-shaped shank, downwardly and outwardly sloping upper frame elements, substantially vertical side frame elements constituting leg engaging elements, and upwardly and inwardly sloping lower frame elements, and said biasing means comprises an expansion spring on said shank interposed between a portion of said traveler at the upper end of the spring and said upper frame elements.

10. A shackle in accordance with claim 9 wherein said traveler comprises a second shank slidable between the legs of said U-shaped shank, leg engaging elements carried thereby and having stop members engageable with the lower surfaces of said lower frame elements in the normal position of the parts, said first mentioned cam means comprising cam elements carried by said frame and cooperating with said stop members to permit spreading of said side frame elements against the bias of said spring by the legs of the animal entering said leg receiving slots, said cam elements engaging said second cam means to effect spreading of said side frame elements and thereby movement of said traveler downwardly against the spring bias.

11. A shackle in accordance with claim 2 wherein said cooperating leg engaging elements of said frame and said traveler define receiving slots for the legs of an animal which are sloping in relation to each other with their narrower ends adjacent the lower end of the shackle.

12. A shackle in accordance with claim 11 wherein said traveler is adapted to be moved downwardly relative to said frame for effectively widening said leg receiving slots to permit release of the animal's legs therefrom.

13. A shackle in accordance with claim 12 wherein a stationary cam is provided adjacent the shackle conveyor to effect the downward movement of the traveler as the shackle is moved by the conveyor past the stationary cam.

14. A shackle in accordance with claim 1 wherein said frame comprises a U-shaped shank, downwardly and outwardly sloping upper frame elements, substantially vertical side frame elements constituting leg engaging elements, and upwardly and inwardly sloping lower frame elements, said biasing means comprising an expansion spring on said shank interposed between a portion of said traveler at the upper end of the spring and said upper frame elements.

15. A shackle in accordance with claim 14 wherein said traveler comprises a second shank slidable between the legs of said U-shaped shank, a leg engaging element carried thereby and having stop members engageable with the lower surfaces of said lower frame elements in the normal position of the parts, and having cam portions, said cam means comprising cam elements carried by said frame and cooperating with said cam portions to permit

spreading of said side frame elements by the legs of the animal entering said leg receiving slots only against the bias of said spring.

16. A shackle in accordance with claim 14 wherein said first cam means comprises a cam element carried by each half of said frame and having cam surfaces inclined downwardly and toward each other, and cam elements carried by said traveler in fixed spaced apart relation and engaging with said cam surfaces.

17. A shackle in accordance with claim 1 wherein said traveler is provided with cam means cooperable with the animal's legs as they are entered into said leg receiving slots to effect spreading of said leg engaging elements of said frame against the bias of said biasing means.

18. A shackle in accordance with claim 17 wherein said cam means thereafter coacts with said leg engaging elements of said frame to retain the animal's legs in said leg receiving slots.

19. A shackle in accordance with claim 18 wherein said side frame elements are provided with protuberances opposite said cam means to restrict the upper ends of said leg receiving slots when said traveler is in normal position relative to said frame.

20. A shackle in accordance with claim 17 wherein said leg engaging elements of said traveler have U-shaped portions to receive said lower frame elements of said frame and are normally held in engagement therewith by said biasing means.

21. A shackle in accordance with claim 20 wherein said U-shaped portions are widened adjacent said lower frame elements to permit them to move to either side of the widened portions for a more nearly vertical hang of the animal's legs in said shackle.

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