July 14, 1953 W. J. WRIGHT 2,645,424

CHICK COUNTING DEVICE

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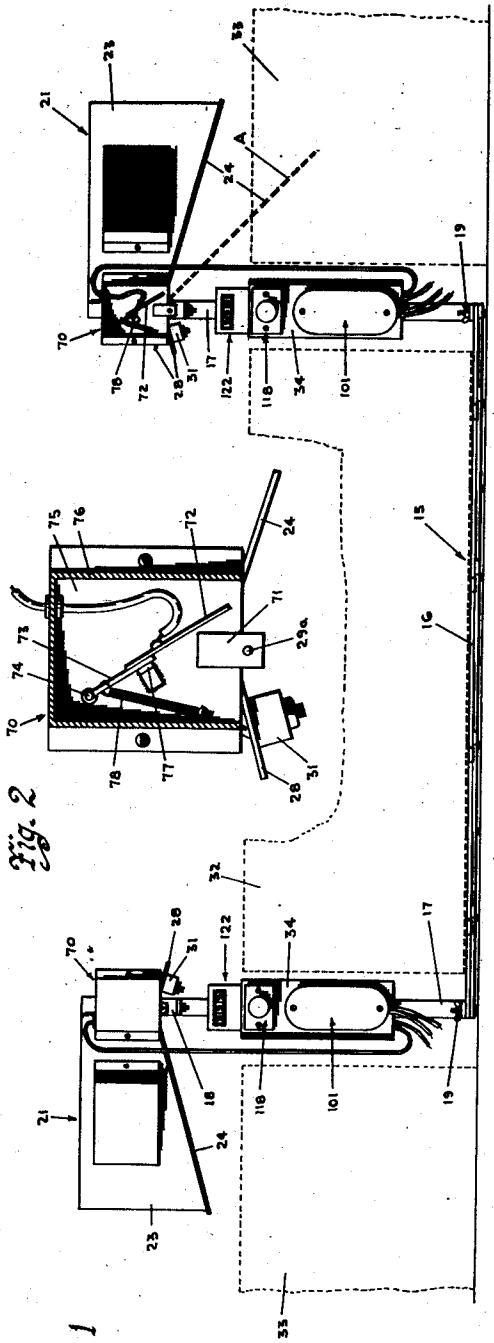


Fig. 1

Fig. 2

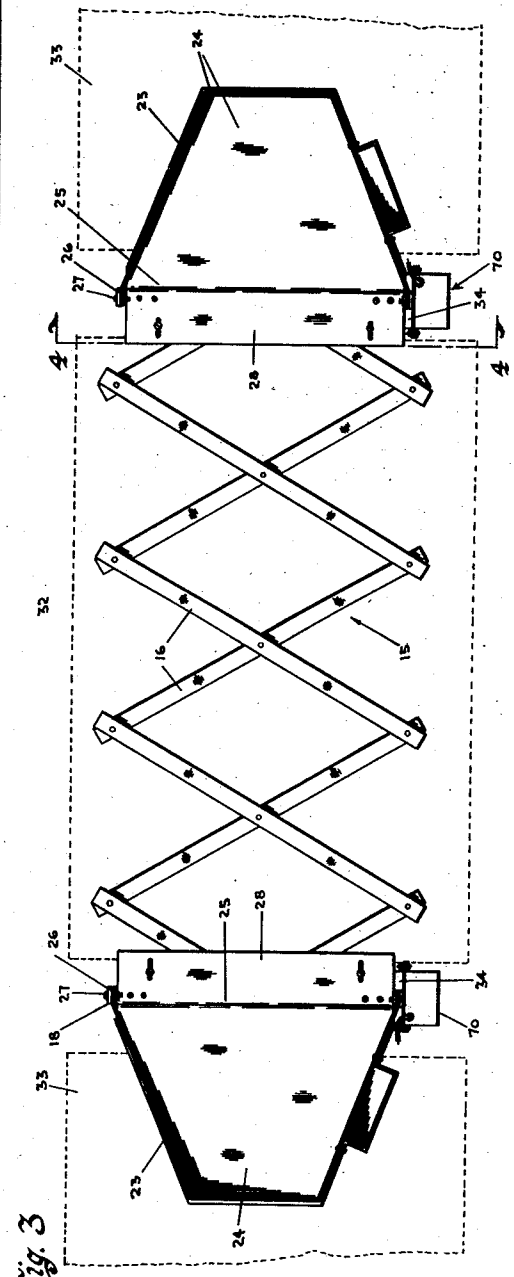


Fig. 3

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Fig. 4

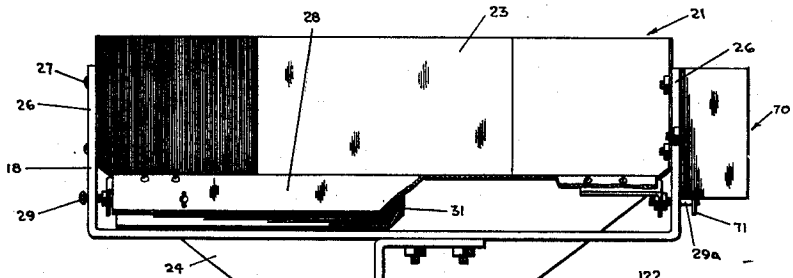


Fig. 7

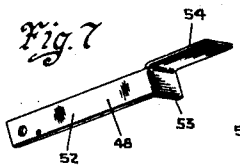
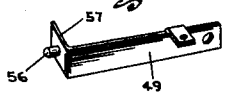


Fig. 9



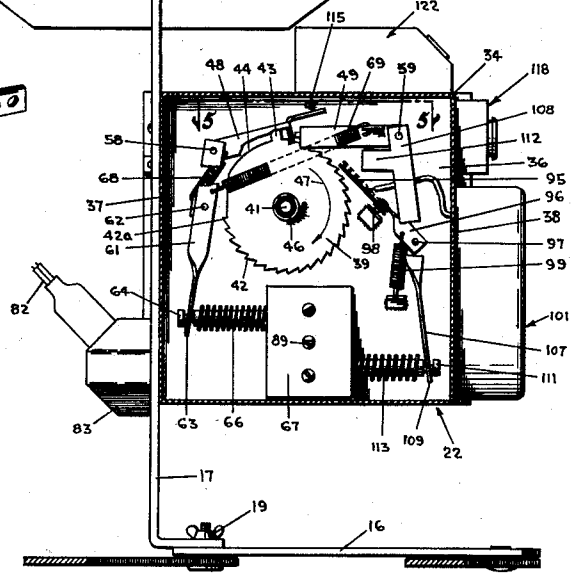


Fig. 10

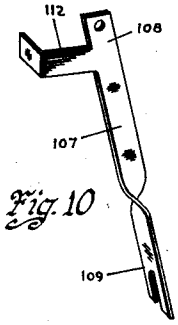


Fig. 8

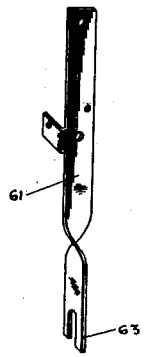
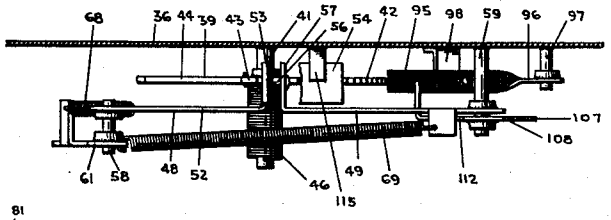


Fig. 5



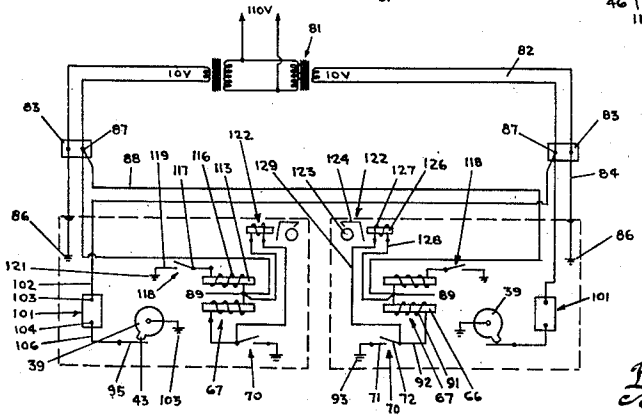


Fig. 6

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CHICK COUNTING DEVICE

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2 Claims. (Cl. 235—98)

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This invention relates generally to chick counting devices and in particular to a device for counting chicks that have been sexed.

In the sexing of chicks, the chicks to be sexed are generally carried in a first container, and on being sexed the rooster chicks are placed in a second container and the pullet chicks in a third container. Insofar as keeping count of the sexed chicks is concerned this is generally manually or mentally performed by the sexer, and in connection with his main duties, considerable inconvenience and loss of time are encountered in maintaining an accurate count. Further, should the count be lost, a complete recount is necessary.

It is an object of this invention, therefore, to provide an improved device for counting chicks.

A further object of this invention is to provide a device for counting sexed chicks in which the counting is made concurrently with the separation of the chicks into separate containers.

Still another object of this invention is to provide a chick counting device in which a warning signal is given after a predetermined count has been reached.

Still another object of this invention is to provide a chick counting device in which a chick-receiving structure has a pivoted trap door which is tripped, each time a chick is placed thereon, to operate an electrical counting mechanism. When a predetermined count has been reached, the counting mechanism operates a warning signal, whereupon the counting mechanism is manually reset.

Yet another object of this invention is to provide a portable chick counting device, which is foldable into a compact package for carrying purposes, efficient in operation to accurately count chicks concurrently with the placement of the chicks into containers according to their sex, and with a warning signal being given when a predetermined count for a container has been reached.

Further objects, features and advantages of this invention will become apparent from the following description when taken in connection with the accompanying drawings in which:

Fig. 1 is a side elevational view of the chick counting device of this invention with parts broken away and shown in section to more clearly show its construction;

Fig. 2 is an enlarged showing of the switch mechanism illustrated in section in Fig. 1;

Fig. 3 is a top plan view of the chick counting device;

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Fig. 4 is an enlarged sectional view taken on the line 4—4 in Fig. 3;

Fig. 5 is an enlarged sectional detail view taken along the lines 5—5 in Fig. 4;

Fig. 6 is a diagrammatic showing of the electrical circuit for the chick counting device of this invention; and

Figs. 7, 8, 9 and 10 are enlarged detail perspective views of parts which are embodied in the counting mechanism shown in Fig. 4.

With reference to the drawings the chick counting device of this invention is illustrated in Figs. 1, 3 and 4 as including a frame structure 15 of a substantially U-shape having a base member 16 of what might be termed a lazy tong construction so as to provide for the base being longitudinally retractable and extendable. Carried at each end of the base member 15 is an upright leg member or support 17 the upper end of which terminates in a U-shape bracket 18 positioned transversely of the base member 16.

The lower end of an upright 17 is detachably secured to the base member 16 as by a wing nut and bolt assembly 19 so as to facilitate dismantling of the device for transport purposes from job to job. Each upright support 17 carries a chick-receiving structure 21 and a counting mechanism 22, and since the relative assembly of these parts with a corresponding upright support 17, and their operation, are the same only one of such chick-receiving structures 21 and counting mechanisms 22 will be described in detail.

A chick-receiving structure (Figs. 3 and 4) includes a side wall 23 of a substantially U-shape, and a pivoted bottom member or trap door 24. The side or confining wall 23 is arranged longitudinally of the base member 16 at a position between the legs 26 of the U-bracket 18, and with the open end 25 of the side wall 23 secured to the legs 26 as by bolts 27 so that the structure 21 projects longitudinally outwardly from the base 16 at a position spaced upwardly from the base 16.

The trap door 24 (Figs. 1 and 4) is provided at its inner end 28, namely, the end thereof located at the open side 25 of the U-shape confining wall 23, with a pair of transversely spaced oppositely arranged pivot pins 29 and 29a which are rotatably supported in the legs 26 of the U-bracket 18 so that the door 24 is pivotally movable from a bottom closing position for the structure 21 to an open position inclined downwardly and outwardly from the support 17, as indicated in dotted lines at A in Fig. 1. The door 24 is yield-

ably held in a closed position by the provision of a counter weight 31 mounted to the underside of its inner end 23 and is swung downwardly to its open position by the action of gravity against the counter weight 31, when a chick is placed on the door 24 through the open end 25 of the structure 21.

Thus, during a sexing operation, and with the base 16 in an extended position, a container, indicated at 32 in Fig. 1, for the chicks to be sexed is positioned on the base 16 between the uprights 17. Containers indicated at 33 are then located below the chick-receiving structures 21. When a chick from the container 32 is sexed, it is placed in one or the other of the chick-receiving structures 21 depending upon the sex thereof. Concurrently with the placement of a chick within the structure 21, a trap door 24 is tripped or pivotally swung downwardly to an open position by the weight of the chick thereon, whereby the chick is dropped into a container 33.

To accomplish a counting of the chicks, concurrently with their separation into the containers 33 according to their sex, an electrical counting mechanism 22 is provided with each chick-receiving structure 21. With reference to Fig. 4 a counting structure 22 includes a housing 34 of a substantially box shape having a side wall 36 and an end wall 37 which is secured to the upright support 17 at a position below the U-bracket 18. For the purpose of convenience, the end wall 37 will be referred to as the rear wall of the housing 34, since in the use of the device the end wall 38 of the housing 34 will face, or be opposite, the chick sexer.

A counting or ratchet wheel 39 (Figs. 4 and 5) is rotatably supported on a shaft 41 mounted on and extended inwardly from the side wall 36. The ratchet 39 is illustrated as being formed with twenty-five teeth 42 and a radially extended projection 43 adjacent one end of the series of teeth 42, with the series of teeth being separated by a blank portion 44. A torsion spring 46 functions to yieldably bias the ratchet wheel 39 in a direction indicated by the arrow 47.

The ratchet 39 is operated by a pawl assembly including a working pawl 48 and a holding pawl 49. The working pawl 48 (Figs. 4 and 7) is of a substantially L-shape having a long leg 52 and a short leg 53. Projected laterally of the short leg 53, in a direction longitudinally of the long leg 52 and a plane normal to the plane of the long leg 52 is a guide member 54 for a purpose to appear later.

The holding pawl 49 (Figs. 4 and 9) is of a substantially L-shape and has a stop pin 56 projected laterally outwardly from its short leg 57. The pawl 49 is carried on a pivot 59, carried on and projected inwardly from the side wall 36, and the pawls 48 and 49 are relatively arranged in substantially horizontal positions so that the short legs 53 and 57 thereof, respectively, are positioned opposite each other at one side of the ratchet wheel 39, and in the path of movement of the ratchet teeth 42.

An operating member 61 (Figs. 4 and 8) for the working pawl 48 is arranged in a substantially upright position and pivotally supported intermediate its ends on a pivot 62 carried on the side wall 36. The upper end of the operating lever 61 is pivotally connected at 58 with the free end of the long leg 52 of the working pawl 48. The lower end 63 of the operating lever 61 is of a bifurcated construction for straddling a screw member 64 carried at one end of a plunger 66 forming part of a solenoid unit 67. A coil spring 68 connected between the holding pawl 49 and the operating lever 61, maintains the working or short leg 53 of the pawl 48 in yieldable engagement with the ratchet teeth 42, and a coil spring 69 connected to the holding pawl 49 and the operating lever 61 acts to hold the short leg 57 of the holding pawl in yieldable engagement with the ratchet teeth 42.

Thus, on each operating stroke of the solenoid plunger 66 the operating lever 61 is pivotally moved in a counterclockwise direction relative to its pivot support 62, as viewed in Fig. 3, whereby the working pawl 48 is moved in a direction toward the left, as viewed in the same figure, to provide for a counterclockwise rotation of the ratchet 39, against the action of the torsion spring 46, a distance equal to the pitch of the ratchet teeth 42. This predetermined movement of the ratchet 39 is maintained by the action of the holding pawl 49 in a well known manner.

The operation of the solenoid unit 67 is controlled by a switch unit, indicated generally at 70 (Figs. 1, 2 and 3) which is actuated in response to a downward swinging movement of the pivoted trap door 24. The pivot 29a for the trap door 24 carries a rock arm 71 which is movable with the trap door 24, and functions as a ground contact terminal for the switch unit 70. A second contact terminal 72 for the switch unit 70 is mounted upon, but insulated from a lever 73 which is pivoted at 74 on a side wall 75 of the switch unit casing 76. The lever 73 is yieldably held against a stop member 77 also carried on the side wall 76, by a coil spring 78. Thus, on movement of the door 24 from its closed position shown in full lines in Fig. 1, toward its open position shown in dotted lines at A in the same figure, the rock arm 71 is moved into engagement with the yieldable contact 72 to close the switch unit 70 to energize the solenoid unit 67.

With reference to Fig. 6 the electrical circuit for the switch unit 70 and solenoid unit 67 is seen to include a step down transformer 81 for reducing the voltage from a 110 volt supply to about ten volts. From the transformer 81 there is provided a plug-in line 82 for connection with a socket 83, which is illustrated in Fig. 4 as carried on the support 17. One line 84, from the socket 83 is grounded to the housing 34 of the counting mechanism 22 as indicated at 86. From what will be termed the hot side or terminal 87 of the socket 83 is a conductor 88 which is connected to a terminal 89 of the solenoid unit 67. The winding 91 in the solenoid unit 67, corresponding to the plunger 66, is connected at one end to the terminal 89 and has its other end connected through a conductor 92 with the yieldable contact 72 of the switch unit 70. The movable contact 71 of the switch unit 70 is grounded to the chick-receiving structure 21 as indicated at 93. Thus on engagement of the rock arm or movable contact 71 with the yieldable contact 72 the circuit through the solenoid unit 67 for operating the solenoid plunger 66 is closed, from the hot terminal 87, through the conductor 88, the solenoid winding 91 and the switch unit 70 to the ground 93.

The switch unit 70 is closed, in response to each downward swinging movement of the pivoted door 24, to provide for an energization of the solenoid winding 91 and the operation of the solenoid plunger 66 to move the ratchet 39 a predetermined distance equal to the pitch of the ratchet teeth 42. As a result, when the door 24

has been tripped downwardly twenty-five times, all of the ratchet teeth 42 will have been moved into successive engagement with the working pawl 48. When this rotated position of the ratchet 39 has been reached, further rotation of the ratchet 39 by the pawl 48 is rendered ineffective by virtue of the blank portion 44, which limits the overall rotation of the ratchet 39 to an angular distance commensurate with the angular distance covered by the series of ratchet teeth 42.

When this limiting or stop position of the ratchet 39 is reached, the projection 43 is moved into a position for engaging a yieldable contact 95 (Fig. 4) mounted on and insulated from a lever 96, which is pivoted at 97 on the side wall 36 of the counting mechanism housing 34. The lever 96 is yieldably held against a stop member 98 by a coil spring 99 to provide for the contact 95 being in the path of movement of the projection 43, which functions as a ground contact. The projection 43 and terminal 95 thus constitute a switch unit for controlling the operation of an electrical buzzer or warning device indicated generally at 101 and which is mounted on the front wall 38 of the counting mechanism housing 34.

With reference to Fig. 6 the circuit for the buzzer 101 includes the hot terminal 87 of the socket 83 and a conductor 102 which is connected to one side 103 of the buzzer. The other side 104 of the buzzer 101 has a conductor 106 connected with the yieldable terminal 95, with the movable terminal or projection 43 on the ratchet 39 being connected to ground as indicated at 105.

It is seen, therefore, that when a predetermined number of chicks have been dropped into a container 33, and with such number being twenty-five in the illustrated embodiment of the invention, the buzzer 101 will be sounded when the count of twenty-five has been reached and for each downward movement of the pivoted door 24, following the count of twenty-five. In other words, although the working pawl 48 will be ineffective to rotate the ratchet 39 after twenty-five successive movements thereof have been completed, it will remain in engagement with the twenty-fifth tooth indicated at 42*a* so that the projection 43 will be rocked into and out of engagement with the yieldable contact 95, by the action of the pawl 48 on the twenty-fifth tooth, and the counter action of the torsion spring 46. Thus, the buzzer 101 will be sounded on the twenty-fifth successive movement of the ratchet 39, and on each tripping movement of the door 24 thereafter.

When the predetermined number twenty-five has been indicated to the operator by the buzzer 101, the counting mechanism 22 is reset by the provision of a resetting lever 107 (Figs. 4 and 10) arranged in an upright position below the pivot 59 for the holding pawl 49. The upper end 108 of the resetting lever 107 is pivotally supported on the pivot 59, and its lower end 109 is of a bifurcated construction for straddling a screw 111 carried in the end of a second solenoid plunger 113 for the solenoid unit 67. A projection or arm 112 of an angular shape, is projected laterally from the resetting lever 107, at a position adjacent to its upper end 108, for movement into engagement with the holding pawl 49.

Thus on operation of the solenoid unit 67 and retraction of the solenoid plunger 113, the resetting lever 107 is pivotally moved in a clockwise direction relative to its pivot 59, as viewed in Fig. 4, whereby the arm 112 is moved into engagement with the holding pawl 49, to move such pawl in a clockwise direction relative to the pivot 59, as viewed in the same figure, out of engagement with the ratchet teeth 42. The holding pawl 49, in turn, is moved into engagement with the guide extension 54 of the working pawl 48 whereby to pivotally move the working pawl 48 into a counter-clockwise direction, relative to the pivot 58, out of engagement with the ratchet teeth 42.

The ratchet wheel 39 is thus released for movement in the direction indicated by the arrow 47, by the action of the torsion spring 46, to a reset or starting position defined by the engagement of the projection 43 with the working leg 53 of the working pawl 48. This engagement is maintained by the virtue of the fact that the pivoted movement of the working pawl 48 by the holding pawl 49 is limited by the engagement of the guide extension 54 with a stop member 115 projected inwardly from the side wall 36 of the counting mechanism casing 34. It is to be noted that the extension 54 is in an overlapped relation relative to the short leg 57 of the holding pawl 49, to prevent the pawl 49 from riding over the pawl 48 during a resetting operation. It is seen, therefore, that the counting mechanism 22, after being reset, is again ready for operation to accurately count a predetermined number of downward tripping movements of the door 24.

As shown in Fig. 6 the electrical circuit for the resetting solenoid plunger 113 includes a winding 116, corresponding to the plunger 66, having one end connected to the terminal 89 of the solenoid unit 67, and its opposite end connected to one terminal 117 of a push button switch 118 the other terminal 119 of which is connected to ground as indicated at 121. The push button switch 118 (Fig. 3) is carried on the front wall 38 of the counting mechanism housing 34 at a position above the buzzer 101.

In some instances it is desired that an accumulative count of the chicks passed into a container 33 be maintained. For this purpose there may be provided an electrically operated accumulative counter 122 of any well known type, which can be carried on the top side of the counting mechanism housing 34 (Fig. 4).

With reference to Fig. 6 a counter 122 is indicated as including a counting wheel 123 having an associated pawl 124 operated by a solenoid plunger 126. The winding 127 for the plunger 126 has one end thereof connected through a conductor 128 to the terminal 89 of the solenoid unit 67 and its other end connected through a conductor 129 with the yieldable terminal 72 of the switch unit 70. Thus, the plunger 126 is operated in response to each tripping movement of the door 24.

From the above description it is seen that the invention provides a chick counting device which is of a simple and compact construction, and efficient in operation to accurately count chicks, concurrently with their separation into specified containers according to sex. Since chick sexers are generally listed in advance for work at various hatcheries, the device is readily dismantled for carrying and transport purposes as a compact package by merely removing the supports 17 from the base 16, and then retracting or folding the base. The supports 17, with their cor-

responding parts, can then be arranged in a nested relation.

Although the invention has been described with respect to a preferred embodiment thereof, it is to be understood that it is not to be so limited since changes can be made therein which are within the full intended scope of this invention as defined by the appended claims.

I claim:

1. For use in the sexing of chicks, a chick counting device comprising a pair of chick-receiving structures, one of said structures being provided for receiving pullet chicks and the other for receiving rooster chicks, a pair of signal devices corresponding to said structures, means on each of said structures for actuating a corresponding signal device when a predetermined number of chicks have been deposited in the structure, and a retractable and extendible base member attached to and positioned between said structures such that when said base member is extended said chick-receiving structures are moved to spaced apart positions to provide for the positioning of a box of unsexed chicks on said base member between said structures, and when said base member is retracted said structures are moved to positions adjacent each other.

2. For use in the sexing of chicks, a chick counting device comprising a substantially U-shape frame unit having upright leg members

and a substantially horizontal base member, a pair of chick-receiving structures mounted on said leg members, a pair of signal devices corresponding to said structures, means on each of said structures for actuating a corresponding signal device when a predetermined number of chicks have been deposited in the structure, said base member being of a retractable and extendible construction such that when said base member is extended said chick-receiving structures are moved to spaced apart positions to provide for the positioning of a box of unsexed chicks on said base member between said structures, and when said base member is retracted said structures are moved to positions adjacent each other.

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