July 31, 1934. G. DOULL 1,968,337

EGG LAYING REGISTERING APPARATUS

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Fig. 1.

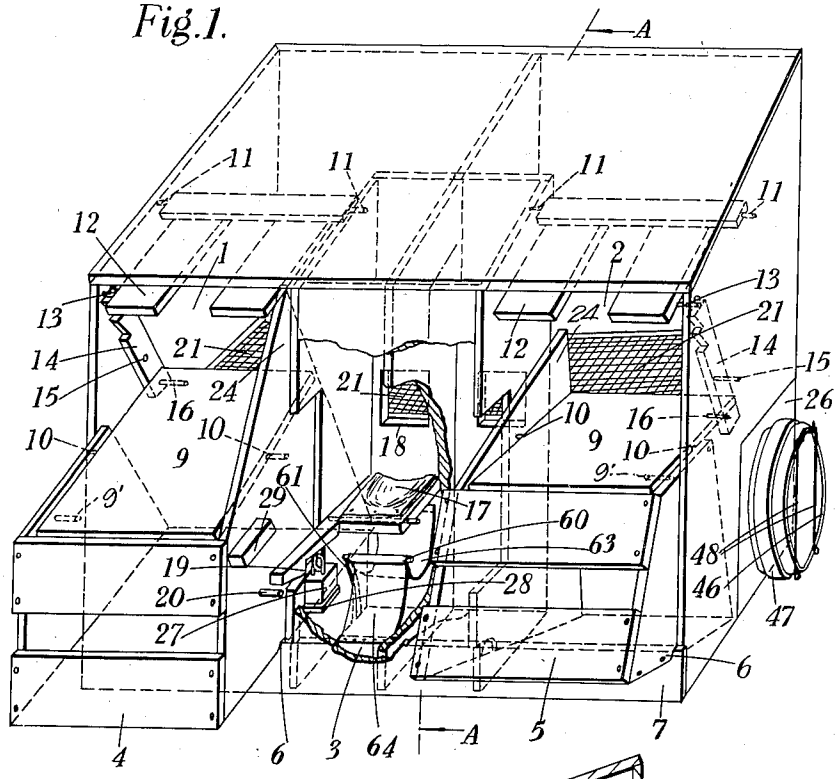
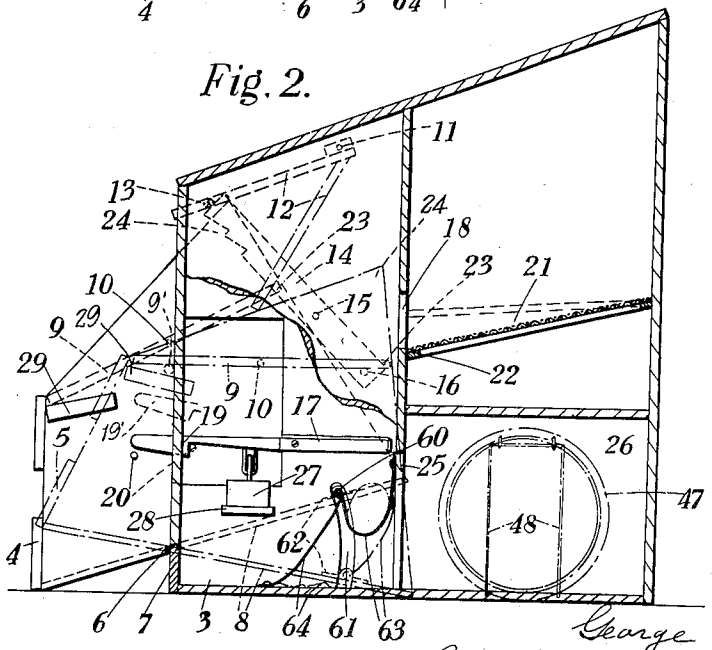


Fig. 2.



INVENTOR

George Doull

BY

Spear, Middleton, Donaldson & Hall

ATTORNEY

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Fig. 3.

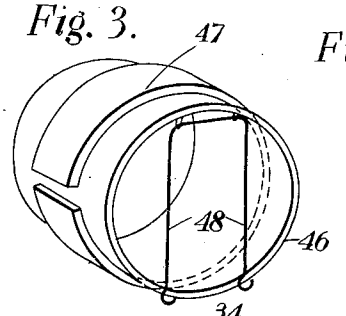


Fig. 4.

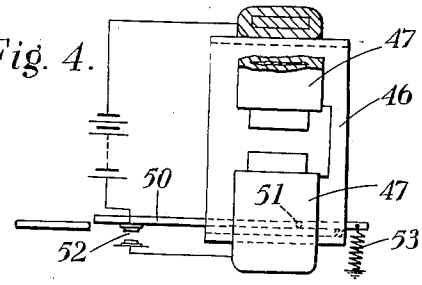


Fig. 8

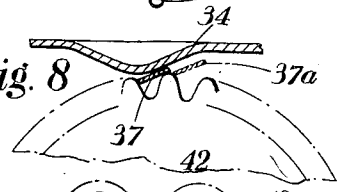


Fig. 7.

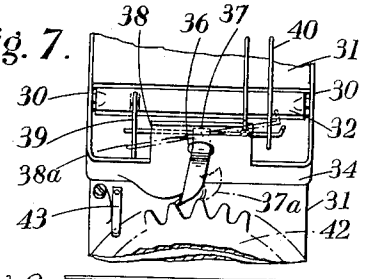


Fig. 9

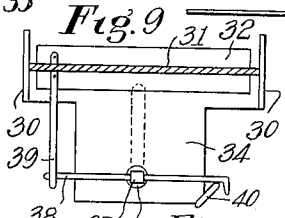
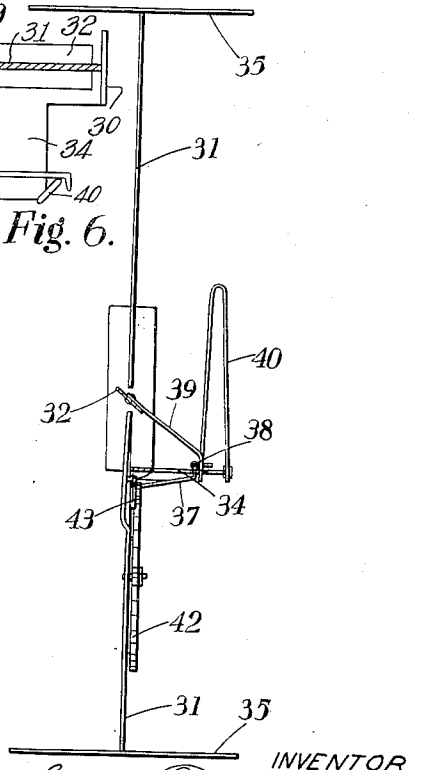


Fig. 6.



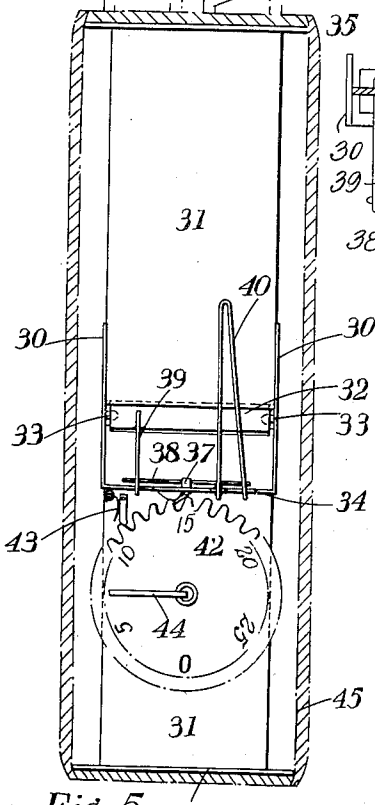


Fig. 5.

INVENTOR

George Doull

BY

Spear, Middleton, Donaldson & Hall

ATTORNEY

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EGG LAYING REGISTERING APPARATUS

George Doull, Castletown, Scotland

Application November 27, 1929, Serial No. 410,204
In Great Britain November 28, 1928

6 Claims. (Cl. 235—92)

The present invention relates to apparatus for automatically registering the number of eggs laid by any hen of a flock of hens, irrespective of the size of the flock.

According to this invention each hen carries attached to one of its wings a magnetically operated registering instrument which is preferably contained in a hermetically sealed capsule made of transparent material, through which the counting index can be read. This registering instrument is adapted to cooperate with a magnet placed at the exit of the laying nest, means being provided for preventing the hen from walking through this magnet and thus registering on the instrument unless she has laid an egg. The nest may comprise a trap-nest of any suitable construction provided that it has separate entrance and exit doors which so operate that the hen may only enter by the entrance door and, after she has laid an egg, only leave by the exit door.

In order that the invention may be more clearly understood, it will now be described with reference to the accompanying drawings which show one method of carrying it into effect, and in which:—

Fig. 1 shows a perspective view of a suitable form of nest.

Fig. 2 shows a section along the line A—A of Fig. 1.

Fig. 3 shows a suitable form of construction of the permanent magnet.

Fig. 4 shows a detail which is embodied when an electromagnet is used.

Fig. 5 shows a front view of the registering instrument.

Fig. 6 shows a side view of the registering instrument with the forward plate 30 removed.

Fig. 7 shows an enlarged perspective view of the mechanism of the registering device looking upwardly.

Fig. 8 shows an enlarged view of a detail of the mechanism of the registering instrument.

Fig. 9 is a plan view of Fig. 5, partly in section.

A particularly suitable form of construction of the trap-nest is shown in Figs. 1 and 2 which is so arranged that only one bird can go in at a time, but before it lays an egg it can only leave by the same passage that it went in. Immediately on laying an egg, however, the entrance passage is closed and the hen must leave by the exit passage and consequently pass through the magnet arranged thereabout and thus operate the registering instrument. According to another feature of the nest described, if the hen lays an egg below a predetermined weight she is shut in the nest and cannot get out in any way and must be liberated by hand and thus can, if desired, be eliminated from the first class layers. The nest construction described is particularly advantageous in that it only allows hens to pass through the magnet which have laid eggs above a predetermined weight, detains the layers of small eggs, and liberates broodies, cocks and other hens who fail to lay after entering the nest.

Referring to the drawings which show the arrangement of two nests in one frame, 1 and 2 are the entrance passages to the separate nests at the back of which the actual laying nests 21 are provided. 4 and 5 are two boxes constructed in the form shown, which are provided in their lower edges with notches 6 so that the boxes may be pivoted about the top edge of the lower front board 7 of the frame. By lifting the boxes, it will be seen that they may be easily pulled forward and removed from the framework of the nest, for cleaning purposes. The boxes are so balanced that they tend to tilt forward in the position shown by 4 if no other forces are exerted thereon. The boxes have no backs but are provided with complete floors 8 reaching well to the rear as shown in Fig. 2. The boxes are provided at the top with platforms 9 pivoted at 10, the front parts of which are heavier than the back parts so that the platforms tend to remain in the position shown, a stop 9′ being provided to limit the movement of the platforms.

A gate 12 is pivoted to the inside of the nest roof at 11, and is held in position against the roof by a pin 13 which engages with a pivoted lever 14. The lever 14 is pivoted unequally at 15, the top end being the heavier. At the lower end of the lever is arranged a pin 16 against which the underside of the platform 9 engages when a bird walks thereover. When the platform 9 bears on the pin 16 the lever 14 is moved and lets the pin 13 fall over the front edge of the lever.

The laying compartment is arranged at the back of the nest and consists of a fine wire net platform 21 inclined towards one corner so that the egg rolls out through the opening 18 and onto the padded platform 17 pivoted as shown. The forward end of this platform carries an extension with a notched end 19 which is adapted to engage with a pin 20 fixed on the side of the box to hold this latter in the position shown at 5.

When the hen enters the entrance 2 (Fig. 1), her weight on the inner side of platform 9 bears on the pin 16 which depresses the lower end of lever 14, and thereby releases the gate 12 which

closes behind her. If she wishes to get out again she simply pushes the gate 12 out before her, setting it up again on the top of the lever 14 or on one of the notches in the front edge thereof. This gate, however, prevents any bird from entering while the nest is occupied. The hen lays on the fine wire net platform 21 and the egg rolls out through the opening 13 onto the platform 17 thereby releasing the pin 20 and permitting the box to fall forward and take up the position as shown at 4. In this movement the long pointed side 24 of the box lifts up the gate 12 and again sets it on the top of the lever 14. The inner edge 23 of the platform 9, however, has moved so high that the entrance passage is closed sufficiently to prevent exit of the hen. The space between the edge 23 of the platform 9 and the edge 22 of the laying platform 21 has now increased and there is sufficient room for the hen to jump down into the box. Her weight on the back portion of the floor of the box, however, moves the box back into the position shown at 5, and leaves sufficient room at 25 for the hen to move into the back exit passage 26. In the meantime, the egg has been transferred from the platform 17 to the collecting receptacle 3 and the notch 19 thus again engages with the pin 20 to hold the box in the position ready for the next hen.

Several nests as described, may be arranged side by side so that the exit passage 26 proceeds the whole length of the row of nests. At the ends of this passage are arranged the magnets 47 which may be either permanent magnets or electromagnets or, alternatively, one end of the passage may be closed and a magnet arranged at one end only. A suitable form of construction of the magnet is shown in Fig. 3. In this figure, the permanent magnet 47 is shown arranged around a tubular member 46 adapted to be secured in the end of the exit passage or placed on the ground in front of the exit opening. Wires 48 are provided at the end of this tubular member which open outwards in order to prevent a bird from entering the nest through the exit passage.

Although a particular form of construction of the magnet has been shown in the figure, it is to be understood that the magnet may be square or of any other suitable form. If an electromagnet be used it is preferable to arrange it so that it is energized by the closure of a switch which is actuated by the hen as it emerges through the exit passage. A suitable form of switch is shown in Fig. 4 in which 47 represents the magnet and 50 is a platform pivoted at 51 over which the hen has to walk in passing through the magnet. When the hen treads on this platform it closes the contacts 52 and thus energizes the magnet to operate the registering instrument. A spring 53 may be provided to open the contacts when the hen moves off the platform.

In order to detain a hen in the nest should it lay too light an egg, a weight 27, supported on a bracket 28, is so connected with the front part of the pivoted platform 17 that this latter may rise through a certain distance without lifting the weight. If the egg is heavy enough it also lifts the weight and then passes into the arrangement which transfers the egg to the collecting tray 3, and which will be more fully described later, but on the contrary, if the egg is of insufficient weight to lift the weight 27, the end 19 of the pivoted platform 17 comes in the path of movement of the stop 29 fixed to the box as at 19'. In this position the egg is still held on the platform 17 and cannot fall into the transferring arrangement. Thus it will be seen that the box is prevented from tilting backwards when the hen walks onto the rear part of the floor 8, and thus it is impossible for the hen to get into the exit passage 26 since the opening 25 is too small. Also the entrance passage is closed, due to the position of the box and thus the hen is trapped in the nest. The hen may thus be easily caught and eliminated from the first class layers by lifting out the box from the nest frame. Also the egg laid can be easily selected.

The arrangement for transferring the egg from the platform 17 to the collecting tray 3 will be more clearly understood from Fig. 2. 60 is a rod which works in a slot 61 in the nest frame (see also Fig. 1) and engages between the floor 8 of the box and the clip 62 secured thereto. The rod 60 has secured thereto one end of a strip of fabric 63 or other suitable material, the other end of which is secured to the back wall of the collecting compartment, the length of this strip of fabric being such that when the rod 60 is in its lowest position, the fabric is substantially taut. A further length of fabric 64 is connected between the rod 60 and the floor of the collecting tray 3 as shown, the length of which is such that the fabric is substantially taut when the rod 60 is in its upper position. As will be clearly seen, the movement of the rod 60 is controlled by the movement of the box 4. When an egg falls onto the platform 17, the box 4 is released and lifts the rod 60 to the upper position. When the platform 17 is sufficiently tilted, the egg falls onto the strip of fabric 63 as shown. When the hen jumps down into the box and treads on the rear part of the floor 8, the rod 60 is lowered and the strip of fabric 63 thus becomes taut and moves the egg either into the collecting tray 3 or onto the other strip of fabric 64. When the next egg is laid and the box moves forward, the rod 60 again rises and, if the egg should have rested on the strip of fabric 64, it will now be moved into the collecting tray 3.

The construction of the registering instrument carried by each hen is clearly shown in Figs. 5, 6, 7, 8 and 9. Fig. 7 is a perspective view of part of the mechanism. This device consists of two soft iron cores 31 made of thin iron plate, in the gap between the ends of which is pivotally mounted an armature 32 also made of thin iron plate. The armature is pivotally mounted on small pivots 33 in the side plate 30 made of brass, which interconnects the soft iron cores 31. A brass plate 34 is mounted at right angles to 31 and has a hole at 36 through which a thin strip of metal 37 works loosely. This strip is bent at one end to cooperate with the teeth of the counting wheel 42 and the other end carries a cross-member 38 against the outer edge of which a member 39, secured to the armature 32, engages. A spring 40 is secured to the top of the member 34 and tends to hold the cross-member in the position shown in full line at 38 (Fig. 7). The member 34, where it is connected to the member 31, has a portion thereof shaped as shown in Fig. 8, and the end of the strip 37 is bent as shown so that when the armature is operated as hereinafter described to move the member 39 and thus the cross-member into the position 38*a*, (Fig. 7) the end of the member 37 is moved into the position 37*a* (Fig. 8) shown in dotted lines, beyond the next tooth of the counting wheel. Due to the member 39 and the spring 40 pressing on the arm

38 which is on the side of the bearing in the member 34 opposite to the end of the member 37, this latter is forced outwards between the next two teeth of the counting wheel after it has been moved back over one tooth. The reverse movement of the wheel itself is prevented by the pawl 43 controlled by a spring. When the armature is released the end of the member 37 feeds the counting wheel round in a counter-clockwise direction by one tooth due to the action of the spring 40.

The counting wheel 42 may have any suitable number of teeth, for example 30 teeth, and be provided with indicating marks so that the number of eggs laid can be ascertained. The registering instrument is provided with circular iron end pieces 35 and is enclosed in a hermetically sealed transparent capsule 45 provided with hooks 49 by which the complete registering device may be attached to the wing of the hen by a piece of string or other suitable means. The capsule is preferably fitted right up at the root of the wing where the body of the hen is so formed that it readily accommodates the capsule, and conceals it with the wing. The capsule is fitted on the side of the hen which will be adjacent to the gap between the ends of the magnet when the hen passes therethrough. The size of the opening blocked by the wire 48 in the magnet should not be larger than necessary but just sufficient for a hen to pass comfortably through, so that the magnet is as near to the registering instrument as possible. The end pieces 35 which serve for positioning the registering instrument in the capsule also help to pick up the magnetic field if they are made of iron.

The device operates as follows. When the registering instrument is subjected to the action of the magnetic field due to the capsule being moved past the gap in the magnet 47, the soft iron cores 31 pick up the magnetic field and become magnetized, thereby causing the armature 32 to rotate from the position shown in Fig. 6 to a position in line with the cores 31. Due to this movement the member 39 secured to the armature 32 is moved and causes the cross member 38 to be moved into the position 38*a* shown in Fig. 7 whereby the member 37 is moved into the position 37*a* shown in Figs. 7 and 8 to engage with the next tooth of the counting wheel 42. A spring-controlled pawl 43 prevents the counting wheel from being rotated backwards during this movement. When the registering device is moved out of the magnetic field the spring 40 which had been compressed by the movement of the armature causes the member 38 and the armature to be restored to their original positions by which movement the member 37 causes the counting wheel 42 to be moved one tooth forward.

The determination of the number of eggs laid by a hen can be ascertained in several ways. One way is to make a note, as in a record book, of the reading of the counting wheel opposite pointer 44 on a certain date. On a following date a reading can again be made of the counting wheel and the number of teeth passed, and likewise the number of eggs laid, since the preceding reading may then be obtained by simple subtraction.

Another way to determine the eggs laid in a period of time is to set the counting wheel at zero at the beginning of the period. This may be done by detaching the capsule from a hen and manually passing it through a suitable magnetic field, as that one which is a part of the next, a sufficient number of times to step the counting wheel ahead until the zero marking comes opposite pointer 44 and then reattaching it to the hen. At the end of the period the number of eggs laid as shown by the number of teeth the wheel has been advanced, can be read directly from the wheel as the marking opposite the pointer 44.

As shown, the wheel has been marked off every fifth tooth to assist in determining the number for each tooth. The proper number for each tooth is determined by counting the teeth following the preceding marked tooth and adding this to the marked tooth number. It must be determined of course, as judged from the period elapsed between readings and the egg laying capacity of the particular hen whether or not the zero point on the counting wheel has passed the pointer 44 and this fact be taken in consideration in determining the eggs laid.

Preferably, each capsule is differently numbered from the others so that each hen of the flock bears its own number.

Although the invention has been described with particular reference to one form of construction of the nest and registering instrument, it is to be understood that it is not limited to these particular forms of construction but only by the scope of the appended claims.

I claim:—

1. In apparatus for automatically registering the number of eggs laid by a hen in a nest, the combination of a magnetic field through which the hen must pass on leaving the nest after laying an egg, and cannot pass until then, and a magnetically operable registering instrument adapted to be carried by the hen comprising a counting mechanism and means for operating said counting mechanism when the registering instrument is submitted to the action of the field of said magnet.

2. In apparatus for automatically registering the number of eggs laid by a hen in a nest, in which the hen after laying is caused to pass through an exit passage which is closed to the hen before she has laid an egg, the combination of a magnet associated with the exit passage and a magnetically operable registering instrument adapted to be carried by the hen and provided with means for registering on a counting mechanism the number of times the instrument passes through the field of said magnet.

3. Apparatus for automatically registering the number of eggs laid by a hen in a nest having an exit opening which is closed until an egg has been laid, comprising the combination of a magnetically-operable registering instrument adapted to be carried by the hen, and means associated with the exit opening of the nest which is adapted to produce a magnetic field for operating said registering instrument when it is passed therethrough.

4. Apparatus for automatically registering the number of eggs laid by a hen in a nest having an exit opening which is closed until an egg has been laid, comprising the combination of a magnetically-operable registering instrument adapted to be carried by the hen, and an electromagnet situated at the exit opening of the nest for operating the registering instrument when it is passed through the field of said electromagnet.

5. Apparatus for automatically registering the number of eggs laid by a hen in a nest having an exit opening which is closed until an egg has been laid, comprising the combination of a mag-

netically-operable registering instrument adapted to be carried by the hen, an electromagnet situated at the exit opening of the nest for operating the registering instrument when it is passed through the field of said electromagnet, and means operated by the movement of the hen for exciting said electromagnet.

6. Apparatus for automatically registering the number of eggs laid by a hen in a nest having an exit opening which is closed until an egg has been laid, comprising in combination a magnetically-operable registering instrument comprising a soft iron core, a movable armature, a counting mechanism, means for transmitting the motion of said armature to operate said counting mechanism, and means for producing a magnetic field at the exit opening of said nest to operate the registering instrument when it is moved thereinto.

GEORGE DOULL.