

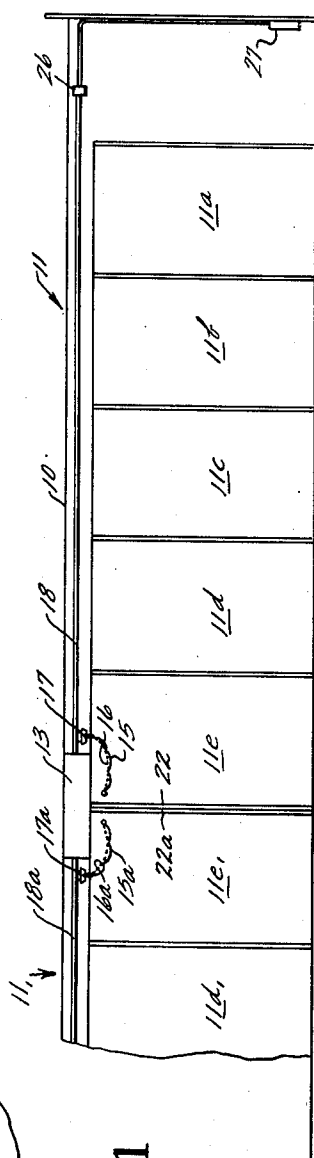
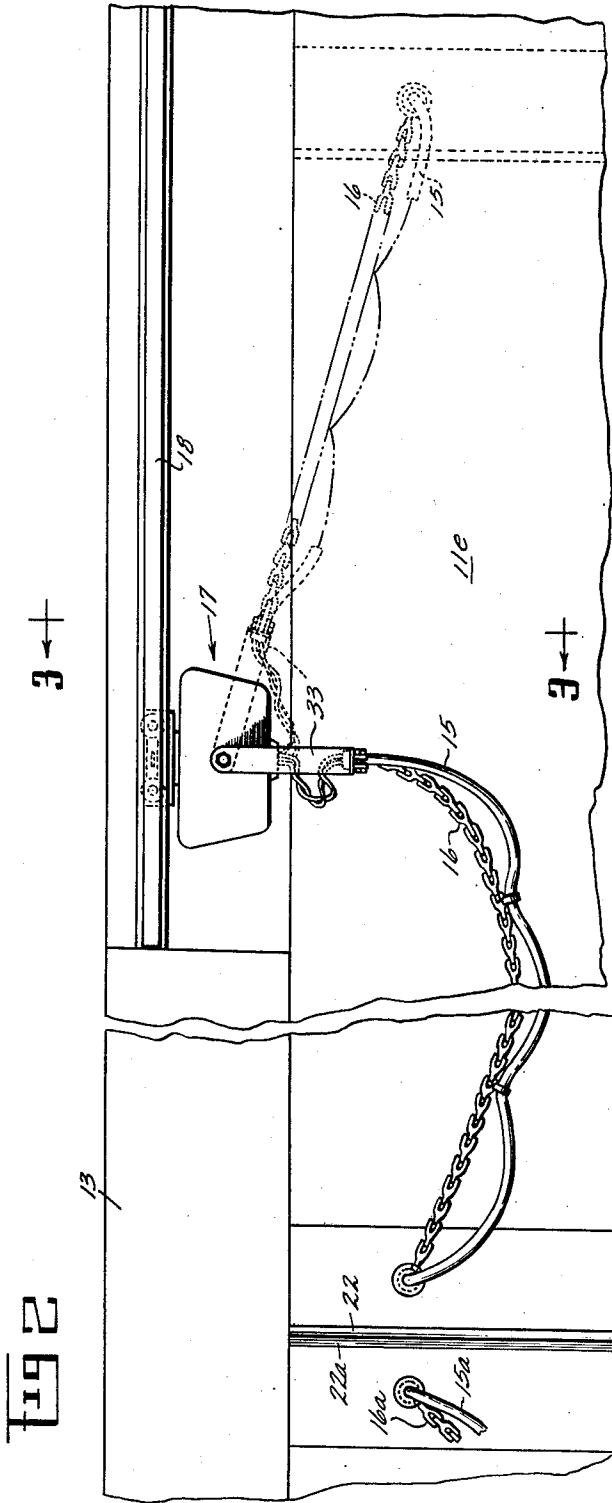
May 6, 1952

T. B. RAMSEY ET AL
DOOR CONTROLLER

2,595,291

Filed Jan. 30, 1947

2 SHEETS—SHEET 1



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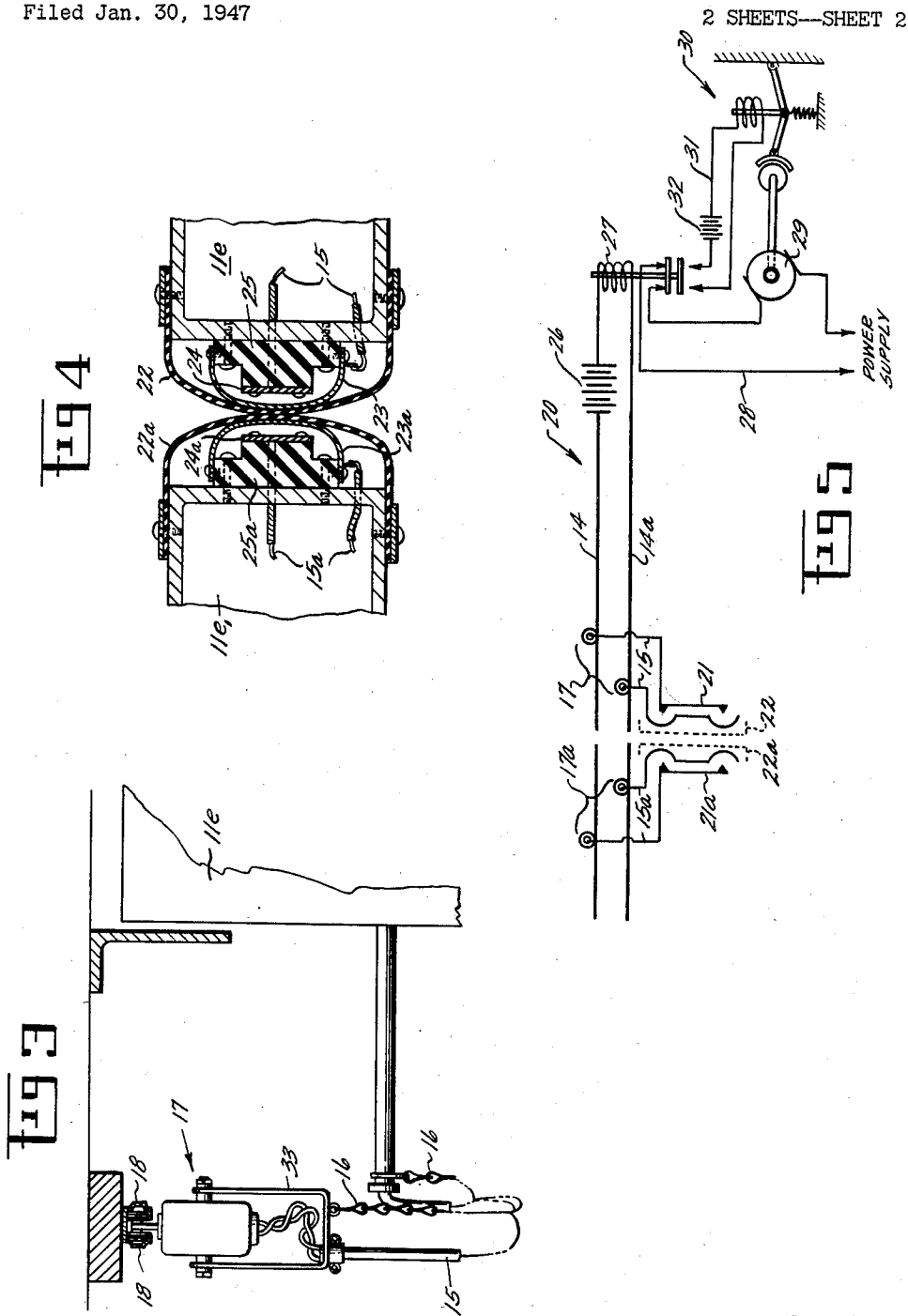
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UNITED STATES PATENT OFFICE

2,595,291

DOOR CONTROLLER

Thomas B. Ramsey and Eldon S. Gray,
Dayton, Ohio

Application January 30, 1947, Serial No. 725,178

1 Claim. (Cl. 318—275)

(Granted under the act of March 3, 1883, as
amended April 30, 1928; 370 O. G. 757)

1

The invention described herein may be manufactured and used by or for the Government for governmental purposes without payment to us of any royalty thereon.

This invention relates to a door controller especially adapted to the control of large single or double doors. Such doors, of the sliding or rolling type, are used extensively in hangers, warehouses, factories and the like.

Up to the present, no door control has existed, we believe, which would permit a gap in the fixed conductors to be left between the doors of a two-door installation. Nor has it been possible to stop almost instantly the advance of heavy doors by the closing of a low voltage-low-amperage circuit, brought about by a light pressure on the rubber-buffered leading edges thereof.

One object of the invention is to provide a door control which may be built with a gap between the conductor trolleys. Such a gap is of great value for example in airplane hangers so that airplanes having high-standing rudder assemblies can pass through the doorway.

Another object is to provide a door control which will stop the door almost instantly when the control circuit is closed and the power circuit is broken.

Another object is to provide a door control in which the conductors are protected from mechanical strain and in which no power wiring is attached to the doors.

In the drawings:

Fig. 1 is a front elevation of a double hanger door and its control according to my invention. A portion of the left hand door is broken away;

Fig. 2 is an enlarged detail of Fig. 1 showing a portion of both doors and the arrangement of trolleys and conductors on one of the doors;

Fig. 3 is a cross section of a door taken on Fig. 2 along the line 3—3 thereof;

Fig. 4 is a cross section of the leading edges of the doors showing the sensitive switch mechanism. The section is taken at any point along the height of the doors; and

Fig. 5 is a schematic diagram of the electric circuit employed showing also some schematic mechanical details of trolley arrangement and motor braking.

Referring to Fig. 1, 10 is a doorway which is closed by the multiple rolling doors 11 and 11₁ of which sections 11a, 11b, 11c, 11d and 11e and 11a₁, 11b₁, 11c₁, 11d₁ and 11e₁ are successively disposed toward the meeting leading edges of the doors. The meeting place is approximately in the middle of the doorway 10. The actual

2

drive of the doors is not shown since it is no part of our invention. While we prefer that the doors 11 be driven by the means shown and described in co-pending application Serial No. 568,909 filed December 9, 1944, now Patent No. 2,425,016, by Edgar R. Weaver, other drives may be substituted. Among those suitable are those described in Patent No. 1,960,860 to E. F. Allen. The kind of doors suitable for such drives are those which arrange themselves behind each other when the door is fully open.

Also shown in Fig. 1 is a gap 13 over the meeting place of the doors, this gap being created by the discontinuity of an overhead trolley duct which contains conductors 14 and 14a. Its function has been mentioned. Attached to the leading edges of sections 11e and 11e₁ are conductors 15 and 15a respectively, which are better shown in Fig. 2. The conductors 15 and 15a are slackly supported from chains 16 and 16a for the purpose of protecting the conductors from heavy mechanical strain.

In order to obviate the necessity for conductors which would be long enough to allow full traverse of the doors 11 and 11₁, two rolling trolleys 17 and 17a are provided as supports. They run in trolley ducts 18 and 18a, in which there are mounted two wire conductors 14 and 14a (see Figs. 3 and 5).

The purpose of the conductors 14 and 14a and 15 and 15a is to connect a relay circuit 20 (Fig. 5) with sensitive switches 21 and 21a located in the leading edges of the doors 11 and 11a respectively. These switches are shown in section in Fig. 4 and diagrammatically in Fig. 5. It is to be understood that the left hand part of Fig. 5, i. e. all along the left part gap between the doors, corresponds to the right hand side of the doors, when double doors are used. Such a construction is the preferred form of the invention.

No novelty is claimed for the specific form of sensitive switch employed. Fig. 4 shows it, however, so that a clear continuous idea of the structure and operation of our control may be conveyed. In that figure, 22 is a sheet rubber, easily compressible buffer attached to the leading edge of door section 11e. 22a is its companion attached to door section 11e₁. Just below the rubber buffers there are arcuate spring-brass switch members 23 and 23a.

These are connected to the limbs of conductors 15 and 15a respectively, the other limbs being connected to conductive bars 24 and 24a which are mounted on insulating strips 25 and 25a. It is evident then that compression of buffers 22

3

and 22a, switch members 23 and 23a to an extent that electrical contact is made with bars 24 and 24a will close the sensitive switches.

Upon closure of the sensitive switches 21 and 21a, circuit 20 is energized from a battery 26 or other source of low voltage current. A relay 27 of the spring-pressed type is then energized to break a power circuit 28 in which there is included the door driving motor 29. The latter is provided with an automatic electromagnetic brake 30, the circuit 31 for which includes a battery 32 which is under control of the relay 27. Therefore when sensitive switches 21 and 21a are open, the power supply 28 may be applied, but when they are closed, the electromagnetic brake 30 is applied to the motor 29, thus stopping the doors immediately. It is to be noted that closing of the power circuit 28 by the relay 27 does not set the doors in motion; a manually controlled switch (not shown) is provided for that purpose.

As the doors roll, it is evident that the trolley carriages 17 and 17a will be pulled along the trolley conductors 14 and 14a by the sections 11e and 11e1 of the doors by means of the chains 16 and 16a respectively. Since the pull will take place in opposite directions when the doors are opened and closed, a swingable bracket 33 is provided to insure that the conductors have enough slack to accommodate the change in the direction of the movement. The action of the bracket during swinging is shown in dotted line in Fig. 2, the conductor being shown in its most extended position. Since the conductor does not have to be long enough to reach across the entire door, it is consequently not long enough to drag on the ground, which would damage its insulation. The minimum length of conductor is that which will extend across half the gap 13 when the doors are closed without any undue tension on the conductor itself or upon the supporting chain 16 or 16a thereof.

The invention claimed is:

An electric circuit assembly comprising a pair

4

of conductors, a source of low voltage current for energizing said conductors, a switch having at least two separable contact members movable along said conductors, one of said contacts being electrically connected to one of said conductors and the other of said contacts being electrically connected to said other conductor, a relay having an electromagnet and a pair of contacts actuated thereby, said electromagnet being included in the circuit defined by said pair of conductors and said separable contacts, a drive motor having an energizing circuit including said contacts of said relay, a brake solenoid having an energizing circuit controlled by said contacts of said relay, the brake solenoid being a component of an electromagnetic brake and adapted to brake said drive motor when said relay operates to de-energize said drive motor.

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