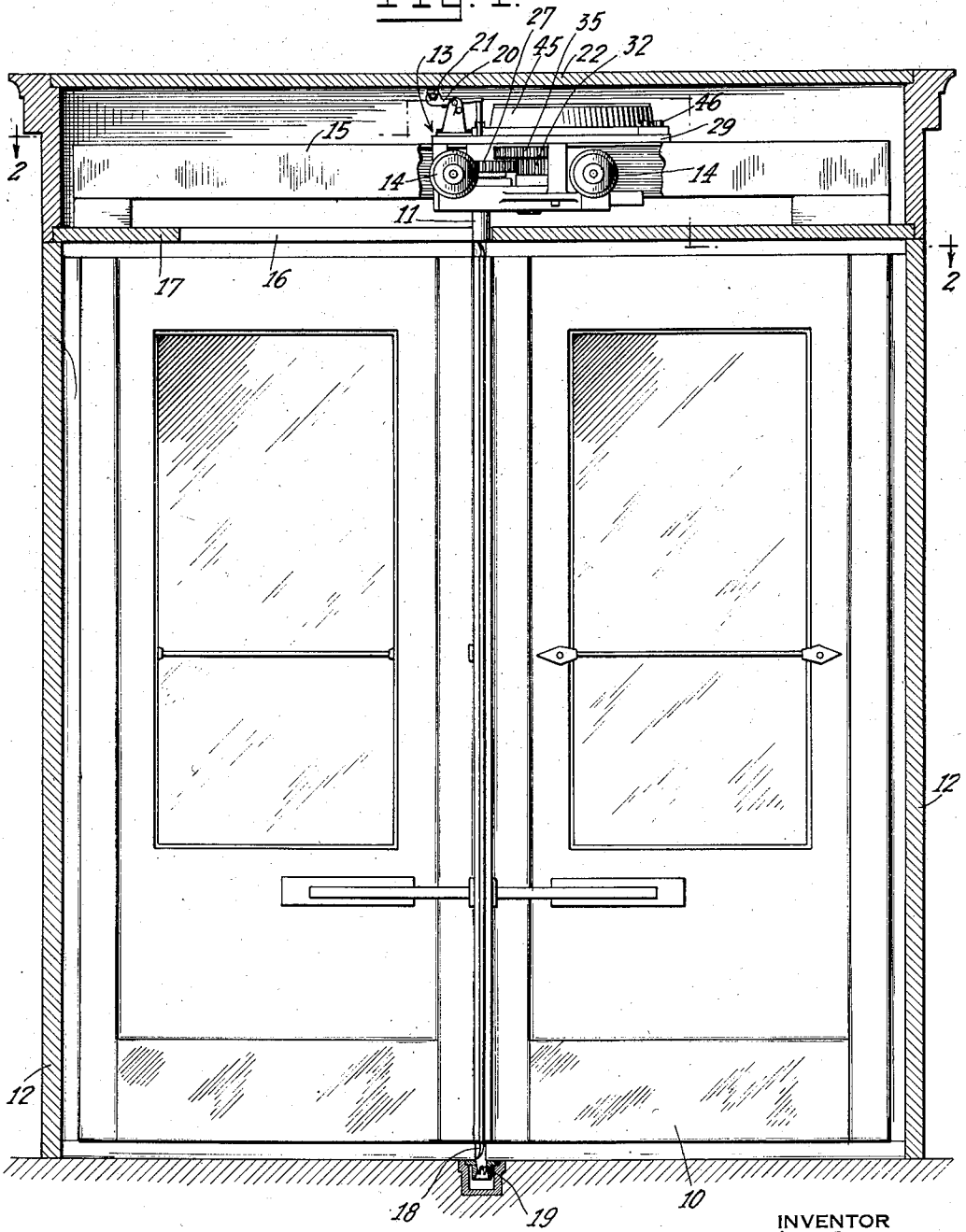
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REVOLVING DOOR

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Fig. 1.



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Fig. 2.

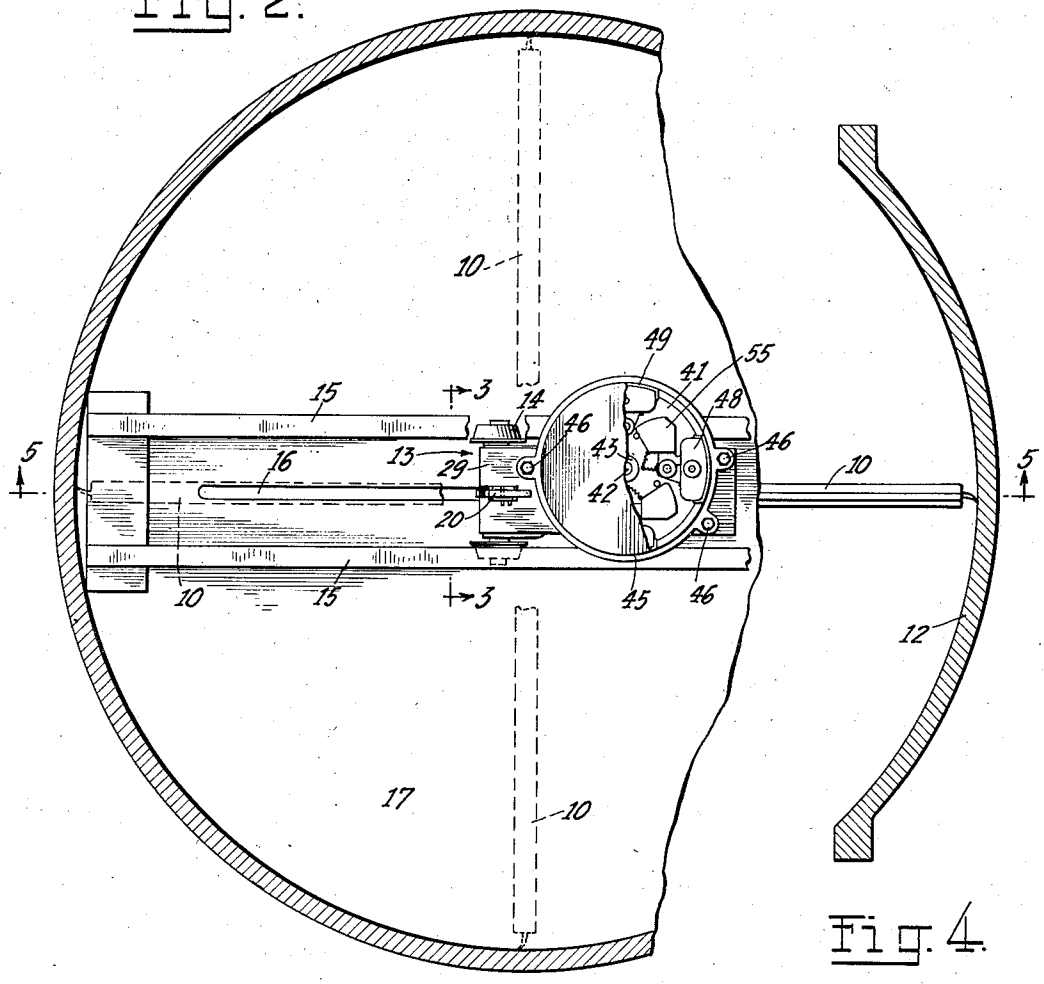


Fig. 4.

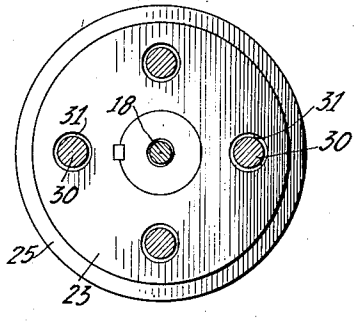
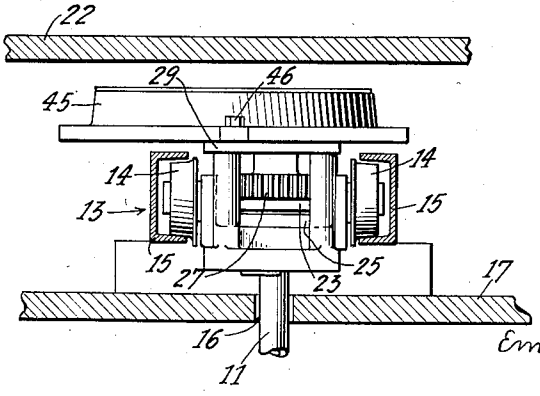


Fig. 3.



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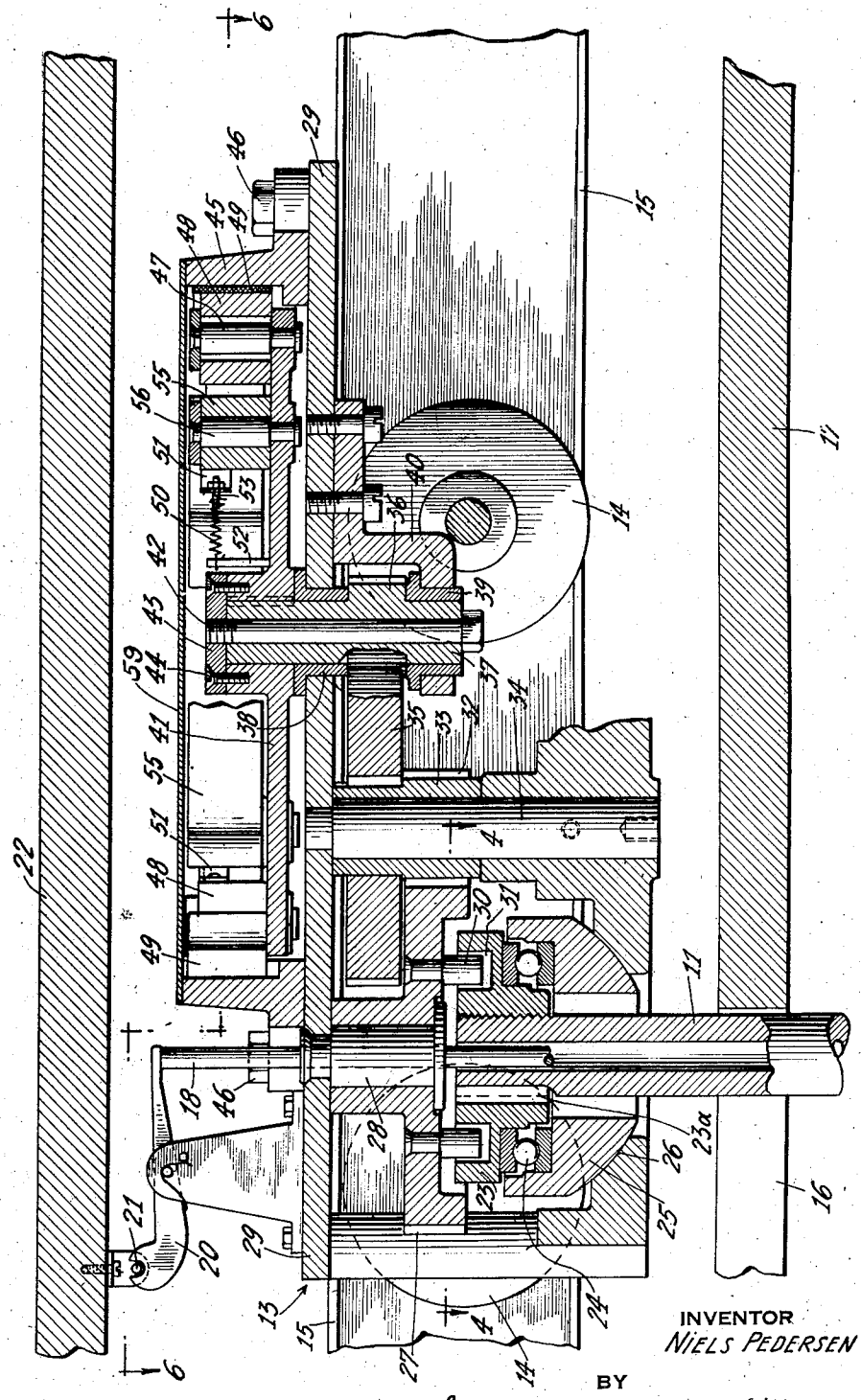
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Fig. 5.



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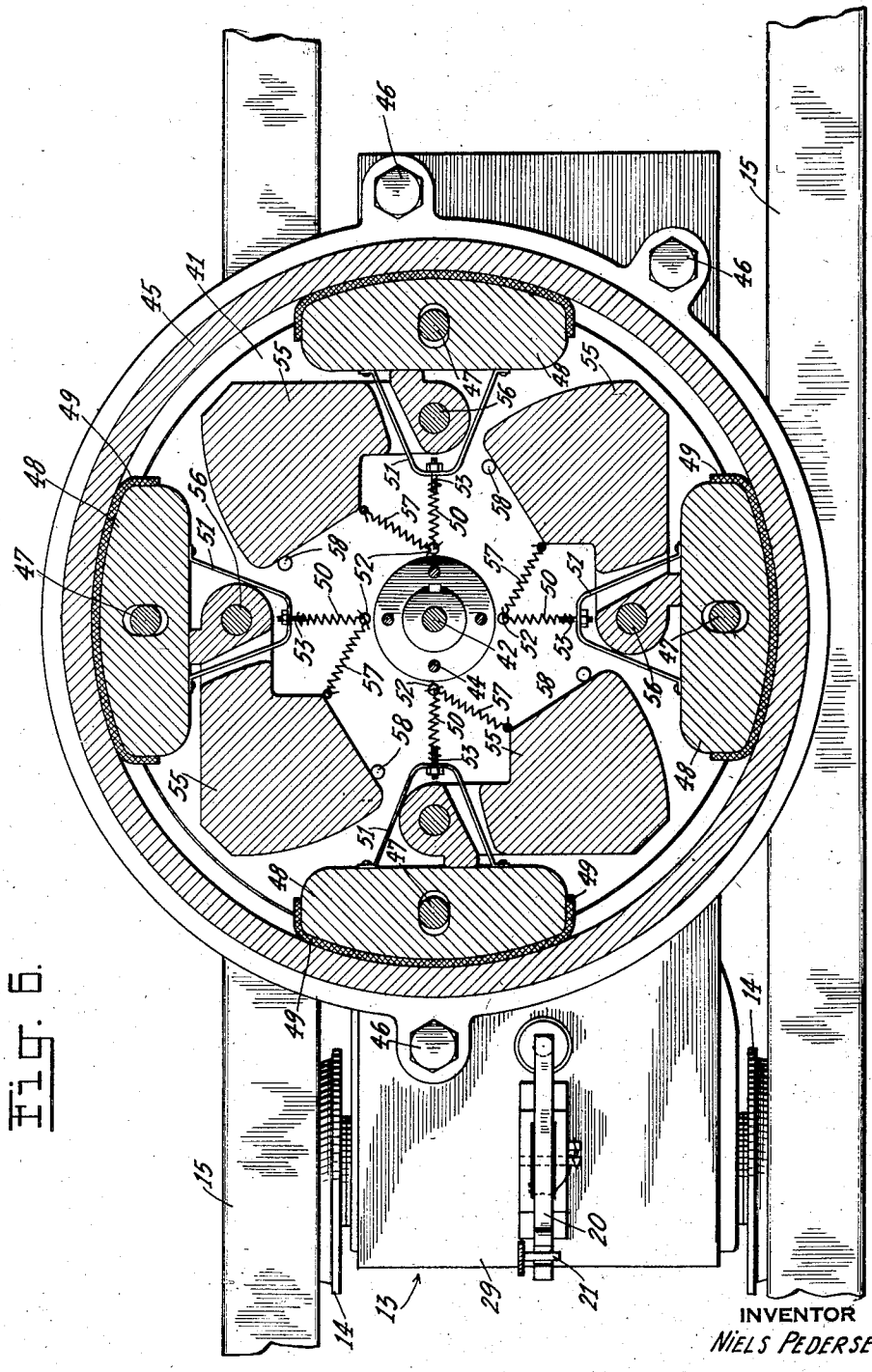


Fig. 6.

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UNITED STATES PATENT OFFICE

2,053,875

REVOLVING DOOR

Niels Pedersen, Overbrook Hills, Pa.

Application February 25, 1932, Serial No. 594,989

5 Claims. (Cl. 20—18)

This invention relates to revolving doors and has for an object the provision of means of an improved character for controlling the speed of such doors. When revolving doors are turned at excessive speeds they become dangerous. It is, therefore, desirable to equip them with speed controlling devices. For satisfactory operation such devices should not exert any drag upon the doors to hinder their movement at normal speeds; and should not lock and stop the doors too suddenly when applied but rather should engage gently at a predetermined speed and above this speed should increase their braking force as the speed increases. The axis of the doors does not ordinarily remain in one position during their rotation so the control devices should compensate for this variation and continue to operate properly in spite of it. Due to poor workmanship or misuse of the doors the upper end of the shaft is often bent with the result that when the door is rotated the upper end thereof, which is employed to operate the speed controlling device, both rotates and travels in a circle. The speed controlling device and associated parts should, therefore, be constructed in such a way that a bent shaft or a shaft out of line with the true vertical axis of the door will in no way interfere with its proper operation. In addition to the permanent misalignment of the door shaft from poor workmanship or misuse it is temporarily disaligned when the lower end of the door shaft is pulled out of its socket in the floor as when moving the door from a normal or central position to a folded or side position. At this time the door will swing about its overhead support, particularly if pushed near the bottom end, and the speed controlling mechanism must accommodate this swinging movement without breakage or damage. Preferably, and as herein shown, the speed controlling device is mounted for movement with the door from its central to its side position. The roller and track supports for the doors are usually located above the doors where head room is often limited. If the control devices are to have a wide application they should be quite thin in order that they may be accommodated above the doors. The present invention aims to provide a control device which will meet all of these requirements and which will yet be inexpensive to manufacture, easy to apply and durable in service.

In order to furnish a full understanding of the invention it will be described in connection with the accompanying drawings which illustrate a preferred embodiment thereof. In the drawings,

Fig. 1 is an elevation of a revolving door in its casing together with the control device applied thereto;

Fig. 2 is a horizontal section taken on the line 2—2 of Fig. 1;

Fig. 3 is a vertical section taken on the line 3—3 of Fig. 2;

Fig. 4 is a horizontal section taken on the line 4—4 of Fig. 5;

Fig. 5 is a vertical section taken on the line 5—5 of Fig. 2;

Fig. 6 is a horizontal section taken on the line 6—6 of Fig. 5;

Referring to Fig. 1, the revolving doors 10 turn about a vertical shaft 11 within a frame 12. The upper end of the shaft 11 which supports the doors is suspended from a carriage 13 which moves upon flanged wheels 14 along supporting tracks 15, the shaft 11 moving along a long narrow slot 16 formed in the door supporting plate 17 when the doors are moved from the central to the side position. When in the central position the doors are held at the bottom by a pivot rod 18 which is moved down into a socket 19. When the doors are folded up the pivot rod is lifted up out of its socket.

Referring to Fig. 5, the upper end of the pivot rod is arranged to operate a latch 20 which engages a fixed part, for example a rod 21 secured to the top plate 22 of the frame, to hold the carriage in position. It is the more usual practice to attach the fixed latch engaging part to the tracks but it is here shown on the top plate for the purpose of simplifying the drawings.

The axis of the door oscillates out of a true vertical line for the reasons given above so in order to accommodate this swinging movement (Fig. 5) the shaft 11 is rigidly attached to a shaft head 23 which is supported by thrust bearings 24 upon a support 25 seated in a spherical socket 26 formed in the carriage frame. The head 23 is threaded upon the shaft 11 and held in proper position thereon by a key 23a. It comprises a part of a flexible driving connection for the speed controlling device.

Still referring to Fig. 5, there is mounted upon the carriage so as to move therewith the speed controlling mechanism which retards the rotation of the doors when they exceed a certain speed. The mechanism does not retard the rotation of the doors below the predetermined speed nor does it stop them abruptly when it acts but rather increases its effect as the speed of the doors increases. Directly above the oscillatable shaft head 23 there is mounted a gear 27 the parts 23

and 27 together with parts thereon comprising the flexible driving connection. The gear 27 is rotatable upon a hollow stub shaft 28 which is attached to the horizontal plate 29 of the carriage. The shaft is made hollow for the passage of the latch operating rod 18 therethrough. To compensate for the relative movements between the head 23 and the gear 27 the driving connection provided between them comprises (see also Fig. 4) pins 30 secured to the web of the gear which cooperate with oversized holes 31 formed in the head 23.

The gear 27 meshes with and drives a pinion 32 formed on a sleeve 33 which is rotatable upon a fixed vertical shaft 34. Integral with the sleeve 33 is a gear 35 which meshes with and drives a pinion 36 formed on a sleeve 37. The sleeve rotates in bearing bushings 38 and 39 secured respectively in the carriage plate 29 and a bracket 40 bolted thereto. Keyed to the upper end of the sleeve 37 is a brake disc 41. A bolt 42 and a cap 43 into which it is threaded retain the disc upon the sleeve. The cap is anchored to the disc by screws 44.

The brake disc operates (Figs. 5 and 6) within a brake drum 45 which is secured to the carriage plate 29 by cap bolts 46. Within the drum and slidable upon studs 47 mounted on the brake disc are a plurality of brake shoes 48 lined with suitable material 49. The brake shoes are held inward by springs of any suitable character, for example the tension springs 50 which are attached at one end to the shoes by loops 51 and at the other end are attached to anchor bolts 52. The brake shoes 48 are fairly heavy and are thrown outward by centrifugal force as the disc 41 rotates. Above a predetermined speed, which may be varied by adjusting the tension or character of the springs 50, the shoes engage the drum and gradually retard the rotation of the doors. Adjustment may be provided as by attaching the springs to the loops 51 by threaded devices 53. The shoes 48 may not be heavy enough for large doors, so if desired their action may be supplemented by auxiliary weights 55 which are pivoted upon studs 56 and resiliently held inward by springs of any suitable character, such, for example as the tension springs 57 which are attached to the anchor studs 52. Stop pins 58 limit the inward movement of the weights 55. The top of the space formed by the drum 45 is closed by a cap 59.

In operation the weights 48 remain in their inward positions until the doors are rotated above a predetermined speed. Above this speed they gradually move outward to engage the fixed drum 45 and place a drag upon the movement of the doors. As the speed increases the drag increases. This automatically keeps the speed within certain limits and avoids injury to persons who are using the door. By adjusting the screw devices 53 the speed at which the brake shoes act can be varied. The heavy weights 55 come into action to assist the lighter weights, the time at which they begin to act depending upon the strength of the springs 57. The weights 55, in fact, may be omitted altogether for light doors. The flexible connection 23, 27 permits the control mechanism which does not oscillate to any extent to be operatively connected at all times with the door shaft which does oscillate considerably, particularly when the doors are not anchored at the bottom. The speed controlling mechanism may, therefore, operate entirely independently of the gyrations of the door shaft and even if the shaft is bent or swung out of alignment it will not cause any damage to the control mechanism or to the door suspension mechanism. The control mechanism is compact and may be installed even in places where the head room is very small. It is also placed in such a position that it does not interfere with the travel carriage supporting the doors. Various changes and modifications may be made within the scope of the subjoined claims.

I claim:

1. The combination with a revolving door, of an overhead carriage therefor, a shaft for said door, a ball and socket support for said shaft and door upon said carriage, a speed controlling device mounted wholly as a self-contained unit upon and travelling with said carriage, and a loose motion connection between said shaft and said device for establishing a permanent driving connection therebetween for all positions of the door.

2. The combination with a revolving door of a shaft therefor, bearings for said shaft which permit gyration of said shaft, a speed controlling device for said door, and a pin and oversized socket driving connection between said shaft and said device providing a permanent loose driving connection for said device in all oscillated positions of the door.

3. The combination with a revolving door, of a shaft therefor which is subject to gyration, a speed controlling device for said door, and a loose motion permanent driving connection between the shaft and the device.

4. The combination with a revolving door, of a vertical shaft therefor which is subject to gyration, a speed controlling device for said door, said device including a second vertical shaft driven by the rotation of said door shaft, means constituting a relatively fixed braking element, and rotative means actuated by said second vertical shaft for cooperating with said fixed braking element for retarding the rotation of said door, and means for flexibly connecting said second shaft with the shaft of the door whereby to compensate for deviations of the shafts from the vertical.

5. Apparatus for controlling the rotational speed of a revolving door, comprising in combination, a shaft operated by the rotation of said door and a braking device operated by said shaft, said device including a primary braking device which is rendered effective above a lower predetermined limit of rotation for gently retarding the rotation of said door, and a secondary braking device which is rendered effective above a higher predetermined limit of rotation for more positively retarding the rotation of said door.

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