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(54) **Motorized concealable sliding door having an improved box**

Motorisierte, in einer Nische versenkbare Schiebetür

Porte coulissante et motorisée, escamotable dans un caisson de refoulement

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Description

BACKGROUND OF THE INVENTION

The present invention relates to a motorized concealable sliding door, having an improved box.

As is known, there are already commercially available concealable sliding doors to be used both for outside and inside environments, which are provided with a door frame defining a box which is made of fretted strip elements which are connected to one another so as to provide the construction to be introduced into the wall.

In order to facilitate the coupling of the box covering plastering, it is necessary to apply a grating net or the like, extending through the two major faces of the box.

The box, in particular, is made of galvanized sheet metal elements which are damaged in those regions thereof where is performed a high temperature welding operation, that is one of the methods used for coupling the grating net to the box.

Under these conditions there are generated spots where the galvanized protection is-lacking and at these spots, the assembled metal parts can be easily subjected to rust.

To avoid the damaging of the galvanized protection and the corresponding formation of rust fixing methods other than welding have been proposed in the art; for instance, document EP-A-0 505 614 discloses a sliding door in which the grating net is fixed to the galvanized metal box by means of traversal staves which are previously fixed to the box by means of rivets, said staves having flaps which can be suitably bent so as to grip the net.

Another problem is that prior solutions are affected by great difficulties, in particular with respect to the application of a driving assembly, since they require a rather complex installation operation with consequent large size and projection of the door from the wall, thereby the wall housing the door can not be practically further exploited.

Another drawback of prior solutions is that prior sliding doors of the above mentioned type are scarcely flexible in operation and, moreover, they do not afford the possibility of making a double sliding door, since the prior constructions are not suitable to provide the necessary width for a double sliding door.

Yet another problem, moreover, is that of a poor thermal insulation of prior sliding doors, with consequent great thermal loss spots through the door.

SUMMARY OF THE INVENTION

Accordingly, the aim of the present invention is to overcome the above mentioned drawbacks, by providing a motorized concealable sliding door including an improved box, in which there are completely eliminated the welded regions necessary for connecting the grating net and the box strip elements, so that the sliding door

can be advantageously used mainly in outside applications.

Within the scope of the above mentioned aim, a main object of the present invention is to provide such a motorized sliding door, which allows to house its driving motor in a very compact manner, so as to prevent projecting regions from being generated with respect to the wall, thereby allowing the wall to be exploited for other applications.

Another object of the present invention is to provide such a door construction in which the rails, together with the driving members, can be reassembled outside of the door box and then can be mounted by a quick connection system on the top cross member of the door.

Yet another object of the present invention is to provide such a sliding door which is very reliable and safe in operation.

According to one aspect of the present invention, the above mentioned aim and objects, as well as yet other objects, which will become more apparent hereinafter, are achieved by a motorized concealable sliding door as defined in claim 1.

BRIEF DESCRIPTION OF THE DRAWINGS

Further characteristics and advantages of the present invention will become more apparent hereinafter from the following description of a preferred, though not exclusive, embodiment of a motorized concealable sliding door provided with an improved box, which is illustrated, by way of an indicative but not limitative example, in the accompanying drawings, where:

Figure 1 is a schematic elevation view illustrating the motorized sliding door according to the invention, and in which there is clearly also shown the door box;

Figure 2 shows a major or main wall or panel of the box, to which there is applied a grating net;

Figure 3 is a schematic cross-sectional view illustrating the connection between the grating net and box;

Figure 4 is a horizontal cross-sectional view illustrating the box with the grating net and thermally insulating layers;

Figure 5 is a schematic top-plane and cross-sectional horizontal view of the sliding door according to the present invention;

Figure 6 is a cross-sectional view illustrating the top sliding guides of the door;

Figure 7 is an elevation view illustrating the driving means for driving the sliding door;

Figure 8 is a top plane view of the subject driving means.

Figure 9 illustrates a motor-reducing unit for manually driving the door;

Figure 10 is a cross-sectional view illustrating the electric closure door bolt;

Figure 11 is a perspective view of the door bolts; and Figure 12 is a vertical cross-sectional view illustrating a sliding door provided with a double sliding door wing.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference to the number references of the above disclosed figures, the motorizing concealable sliding door provided with an improved door box according to the present invention, which has been generally indicated at the reference number 1, comprises a door frame 2, which is advantageously made of suitably contoured sheet metal section members and which defines a door box 3 arranged adjoining the opening port of the door.

This box, in particular, is made of fretted strip like elements 4 which are slidably connected to one another and caulked so as to mutually lock these elements.

The strip elements are connected by a bottom strip element 5 closing at the end the door box.

As stated, the door box is made of galvanized fretted strip like elements and, heretofore, it was very difficult to connect to the door box the grating net 10 which is conventionally used for coupling the wall finishing plastering applied on the wall in which the door box is usually housed.

A main feature of the present invention is that the grating net 10 is connected by clips 11 which are engaged on strip-like elements and suitably bent so as to provide a mechanical type of connection, which does not damage the galvanized protection.

Inside the door box there are provided thermally insulated layers 12, providing a very good thermal insulation and barrier against heat losses.

Another important feature of the present invention is that there are provided motorizing or driving means, comprising an electric motor 20 which is connected to the top cross-member of the door frame and is arranged at an intermediate portion of the door.

The electric motor 20, through a bevel gear pair 21, drives a toothed pulley 22, entraining a toothed belt, indicated at the reference number 23, connected to one of the truck assemblies 24 supporting the door.

The toothed belt 23 is further entrained on a transmission toothed pulley 25, arranged near the rabbet of the door and also supported by the top cross-member.

As is clearly shown in figure 6, the truck assemblies 24 can slide on rails 25 having a C-shape and also connected to the top cross-member 26 of the door frame.

To the truck assemblies 24 there is connected a wing, indicated at the reference number 30, which, owing to the very good strength of this construction, can also have a comparatively great weight.

Moreover, the motor further comprises a coaxial-axis motor reducing unit, which allows the possibility of manually opening the door in case of power failure or

other emergency cases.

In this connection it should be apparent that by arranging the electric motor not at the end portions of the rail, but slightly beyond the start part of the box, it is possible, with respect to prior systems, to reduce the length of the driving assemblies, with a consequent small size and effective damping of possible vibration.

In order to open the door, at the abutment edge of the wing 30 there is provided a guide vertical section member 31 of omega shape, inside which can slide a small bolt 32, comprising a bolt rod including a contoured elongated slot 33, engaging with a locking pin element 34 provided on the door rabbet.

At the top the bolt 32 is provided with a bolt block 35, having a recess 36 in which can be engaged the head portion 37 of a rod 38 connected to an electromagnet 39 which will drive the bolt 32 from its locking position to its releasing position and vice versa.

With the disclosed connection assembly, the electromagnet is housed in the fixed door part and will cause the contoured head 37 to be engaged in the seat 36, as the door wing 30 is closed, and then it will allow the subsequent translating motion providing the locking of the door.

In order to release this locking, for example in a case of power failure, there is provided a manual unlocking lever, indicated at the reference number 40, which directly operates on the electromagnet.

As is shown in figure 12 it is also possible, by holding those same designing features which have been above disclosed, to provide a sliding double wing door, the wings of which are indicated at 30a and 30b, which are arranged adjoining one another and housed in a door box which, consequently, will have a greater width.

From the above disclosure it should be apparent that the invention fully achieves the intended aim and objects.

In particular, the fact is to be pointed out that a sliding door has been made, both for outside and inside use, in which the grating net can be applied to the door box in a very satisfactory way, owing to the provision of the above disclosed clips, which are mechanically connected in the galvanized region without damaging the latter.

Another very important aspect of the present invention is that the electric motor is so arranged that it allows to reduce to a minimum the occupied space, and moreover provides a very improved operation.

In practicing the invention, the used material, as well as the contingent size and shape can be according to requirements.

Claims

1. motorized concealable sliding door (1) having at least a door wing (30) and a box (3) for housing said door wing (30) where in its open position, said door further comprising a frame (2) defining sliding rails

(25) for said at least door wing, said box (3), being suitable to be housed inside a wall, grating elements being provided on the major faces of said box (3), characterized in that said box (3) is formed by fretted and galvanized strip like elements (4) and said grating elements are connected by connecting clips (11) engaged on said strip-like elements (4) and suitable to mechanically connect said grating elements and box.

2. A motorized sliding door according to Claim 1 characterized in that said door (1) further comprises thermally insulating material layers (12) arranged on the inner walls of said door box (3).
3. A motorized sliding door according to Claims 1 and 2 characterized in that said door (1) further comprises a motorizing assembly for driving the door wing (30), said assembly being connected to the top cross-member of the door frame.
4. A motorized sliding door according to one or more of the preceding claims characterized in that said driving assembly is arranged substantially at a central portion of said door box (3).
5. A motorized sliding door according to one or more of the preceding claims characterized in that said driving assembly is connected through a bevel gear pair (21) to a toothed pulley (22) cooperating with a toothed belt (23) entrained on a transmission toothed pulley (25) and being connected to one of the door wing sliding truck assemblies.
6. A motorized sliding door according to one or more of the preceding claims characterized in that said door (1) further comprises a motor-reducing unit of the coaxial-axis type, for allowing the door to be manually opened.
7. A motorized sliding door according to one or more of the preceding claims characterized in that said door further comprises a guide vertical section member (31) for closing the door wing (30), said element being omega shaped and connected at the door wing abutment edge, in said omega shaped element there being slidably provided a both (32) including at least an elongated slot (33) engageable with a locking pin element (34) provided on the door rabbit, said locking element being connected to a top block element (35) and being provided with a mating seat (36) which can be connected to a shaped head portion (37) in turn connected to an electromagnet (39) mounted on the door top cross member.
8. A motorized sliding door according to one or more of the preceding claims characterized in that said

door further comprises two adjoining sliding door wings.

5 Patentansprüche

1. Eine motorgesteuerte, versenkbare Schiebetür (1) mit mindestens einem Türflügel (30) und einem Gehäuse (3), um diesen Türflügel (30) aufzunehmen, wenn er sich in seiner geöffneten Stellung befindet, wobei diese Tür ferner einen Rahmen (2) umfaßt, der Gleitschienen (25) für diesen mindestens einen Türflügel aufweist, wobei dieses Gehäuse (3) zum Einbau in eine Wand geeignet ist und Gitterteile auf den Hauptflächen dieses Gehäuses (3) bereitgestellt sind, dadurch gekennzeichnet, daß dieses Gehäuse (3) aus gewellten und galvanisch behandelten, streifenförmigen Teilen (4) gebildet ist und diese Gitterteile über Verbindungsglieder (11) verbunden sind, die an diesen streifenförmigen Teilen (4) befestigt sind, und die zur mechanischen Verbindung dieser Gitterteile und dieses Gehäuses geeignet sind.
2. Eine motorgesteuerte Schiebetür nach Anspruch 1, dadurch gekennzeichnet, daß diese Tür (1) ferner Schichten aus thermisch isolierendem Material (12) auf den Innenseiten dieses Gehäuses (3) der Tür umfaßt.
3. Eine motorgesteuerte Schiebetür nach den Ansprüchen 1 und 2, dadurch gekennzeichnet, daß diese Tür (1) ferner eine Motorbaugruppe zum Betätigen des Türflügels (30) umfaßt, wobei diese Motorbaugruppe mit dem oberen Querteil des Türrahmens verbunden ist.
4. Eine motorgesteuerte Schiebetür nach einem oder mehreren der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß sich diese Steuerbaugruppe im wesentlichen in einem mittleren Teil dieses Türgehäuses (3) befindet.
5. Eine motorgesteuerte Schiebetür nach einem oder mehreren der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß diese Steuerbaugruppe über ein Kegelpaar (21) mit einer Zahnrolle (22) verbunden ist, die mit einem Zahnriemen (23) zusammenwirkt, der von einer Zahnrolle (25) getragen wird und mit einer der Gleitschienen des Türflügels verbunden ist.
6. Eine motorgesteuerte Schiebetür nach einem oder mehreren der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß diese Tür (1) ferner eine Untersetzungseinheit vom Typ mit koaxialen Achsen besitzt, um die Öffnung der Tür von Hand zu ermöglichen.

7. Eine motorgesteuerte Schiebetür nach einem oder mehreren der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß diese Tür ferner ein senkrechtcs Führungsprofilteil (31) zum Schließen des Türflügels (30) umfaßt, wobei dieses Teil die Form eines Omega besitzt und mit der Stoßkante des Türflügels verbunden ist, wobei in diesem Teil mit der Form eines Omega ein Riegel (32) gleitend bereitgestellt ist, der mindestens eine längliche Öffnung (33) besitzt, in die ein Schließzapfen (34) eingeführt werden kann, der auf der Anschlagleiste der Tür bereitgestellt ist, wobei dieses Schließteil mit einem oberen Bolzenkopf (35) verbunden ist und mit einer Aufnahme (36) bereitgestellt ist, die mit einem ausgeformten Kopfstück (37) verbunden werden kann, das seinerseits mit einem auf dem oberen Querteil der Tür angebrachten Elektromagneten (39) verbunden ist.
8. Eine motorgesteuerte Schiebetür nach einem oder mehreren der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß diese Tür ferner zwei benachbarte gleitende Türflügel besitzt.

Revendications

1. Porte coulissante motorisée escamotable (1) ayant au moins un battant (30) et un caisson (3) pour loger ledit battant (30) lorsqu'il se trouve dans sa position d'ouverture, ladite porte comprenant en outre un encadrement (2) définissant des glissières (25) pour au moins ledit battant, ledit caisson (3) étant idoine à être encastré dans une paroi, des éléments formant un grillage étant mis en oeuvre sur les surfaces principales dudit caisson (3), caractérisée en ce que ledit caisson (3) est constitué par des bandes (4) ondulées et galvanisées et que lesdits éléments formant un grillage sont reliés moyennant des agrafes (11), lesquelles sont fixées sur lesdites bandes (4) et qui sont aptes à relier mécaniquement lesdites bandes et le caisson.
2. Porte coulissante motorisée selon la revendication 1, caractérisée en ce que ladite porte (1) de plus comprend des couches (12) en matériau isolant thermique situées sur les parois internes dudit caisson (3) de la porte.
3. Porte coulissante motorisée selon les revendications 1 et 2, caractérisée en ce que ladite porte (1) de plus comprend un dispositif moteur pour entraîner le battant (30) de la porte, ledit dispositif étant fixé à la traverse supérieure de l'encadrement de la porte.
4. Porte coulissante motorisée selon l'une ou plusieurs des revendications précédentes, caractérisée en ce que ledit dispositif d'entraînement est situé essentiellement à un point central dudit caisson (3) de la porte.
5. Porte coulissante motorisée selon l'une ou plusieurs des revendications précédentes, caractérisée en ce que ledit dispositif d'entraînement est relié par l'intermédiaire d'un engrenage conique (21) à une poulie à dents (22) coopérant avec une courroie dentelée (23), entraînée par une poulie à dents (25) de transmission et reliée à l'un des chariots glissants du battant de la porte.
6. Porte coulissante motorisée selon l'une ou plusieurs des revendications précédentes, caractérisée en ce que ladite porte (1) de plus comprend une unité réductrice du type ayant des axes coaxiaux pour permettre l'ouverture à la main de ladite porte.
7. Porte coulissante motorisée selon l'une ou plusieurs des revendications précédentes, caractérisée en ce que ladite porte (1) de plus comprend un élément profilé vertical guide (31) pour fermer le battant (30) de la porte, ledit élément ayant la forme d'un oméga et étant relié au bord de butée du battant, dans ledit élément ayant la forme d'un oméga étant mis en oeuvre un verrou glissant (32) comprenant au moins une fente allongée (33) dans laquelle peut s'encastrier un goujon de fermeture (34) mis en oeuvre sur la battée, ledit élément de fermeture étant relié à un élément de serrage supérieur (35) doté d'une encoche de raccordement (36) laquelle peut être reliée à une tête profilée (37) de sa part reliée à un électro-aimant (39) monté sur la traverse supérieure de la porte.
8. Porte coulissante motorisée selon l'une ou plusieurs des revendications précédentes, caractérisée en ce que ladite porte de plus comprend deux battants coulissants voisins.

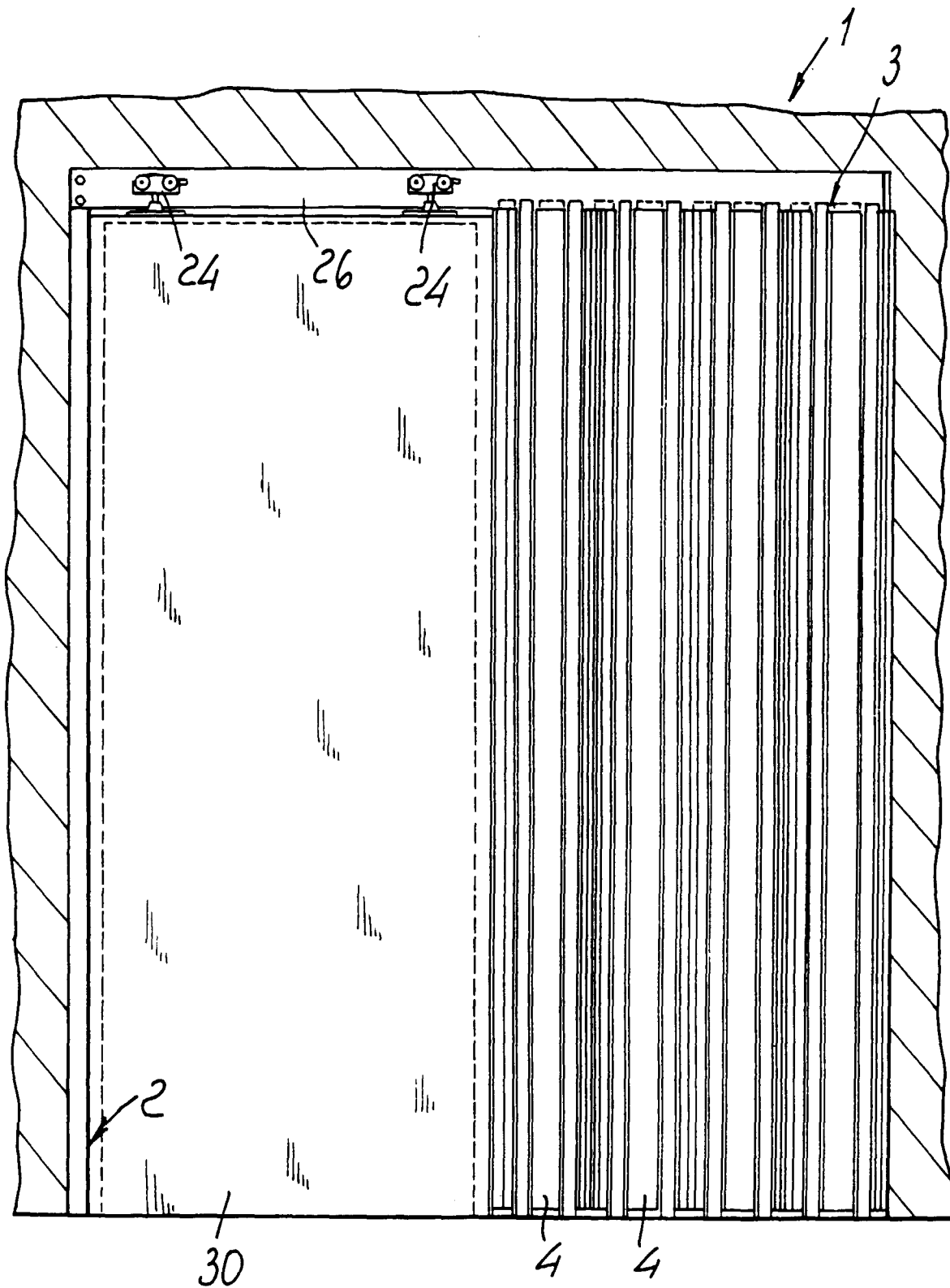


FIG. 1

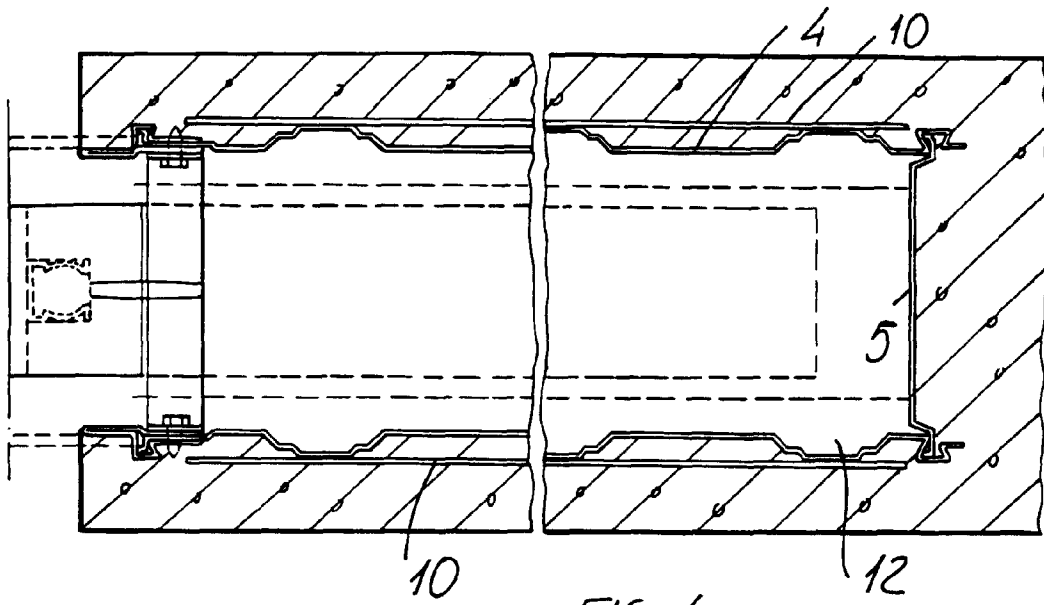


FIG. 4

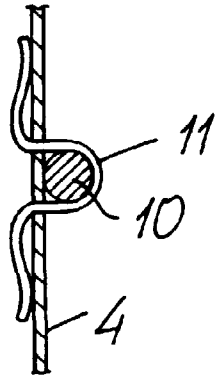


FIG. 3

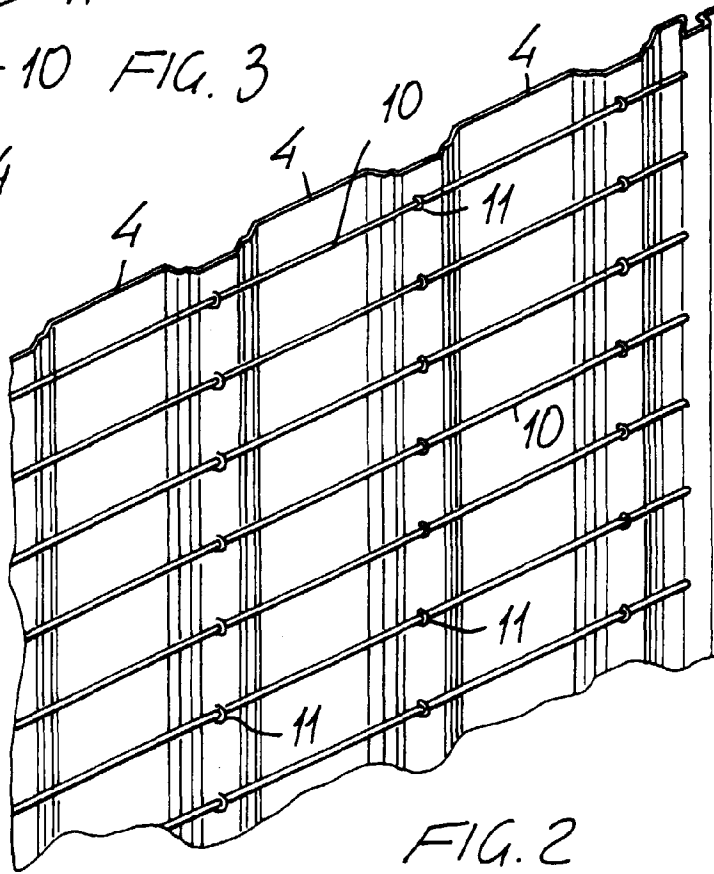


FIG. 2

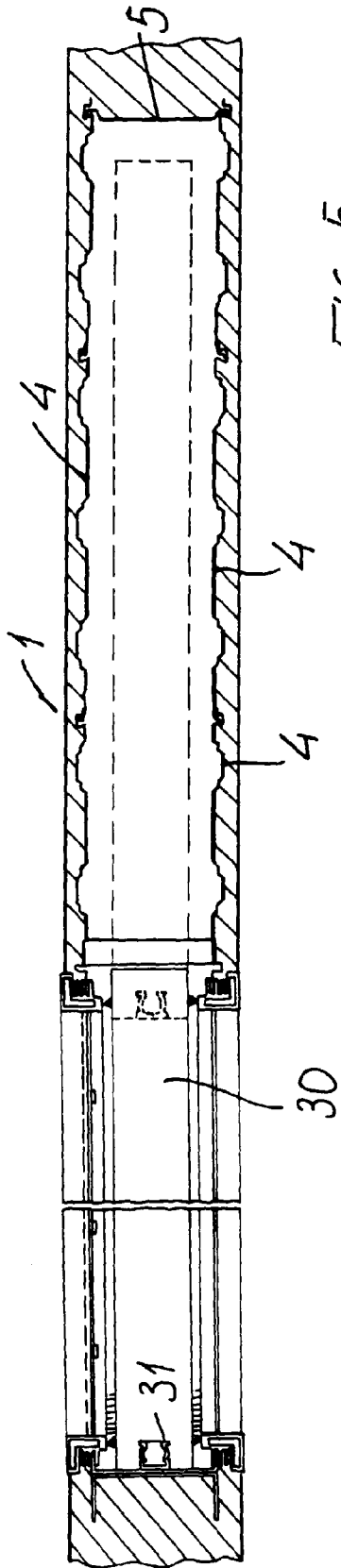


FIG. 5

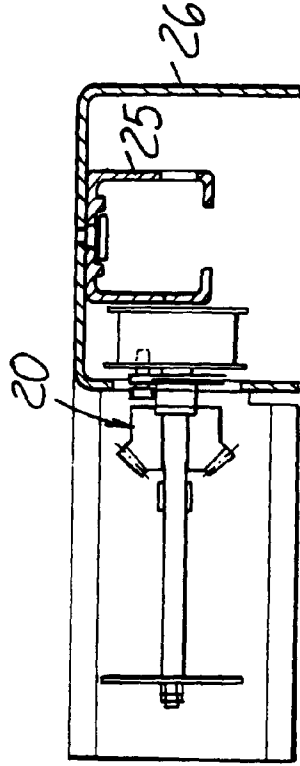


FIG. 9

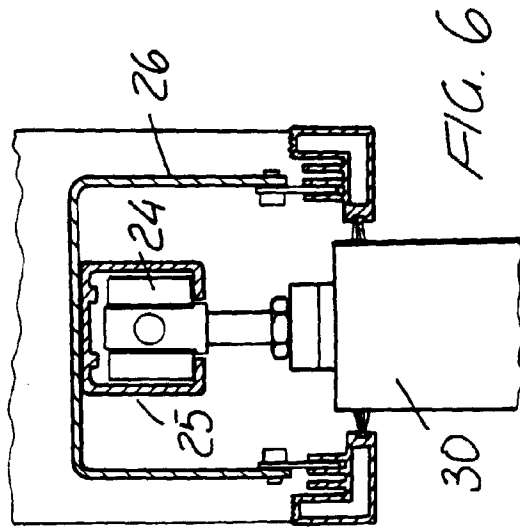
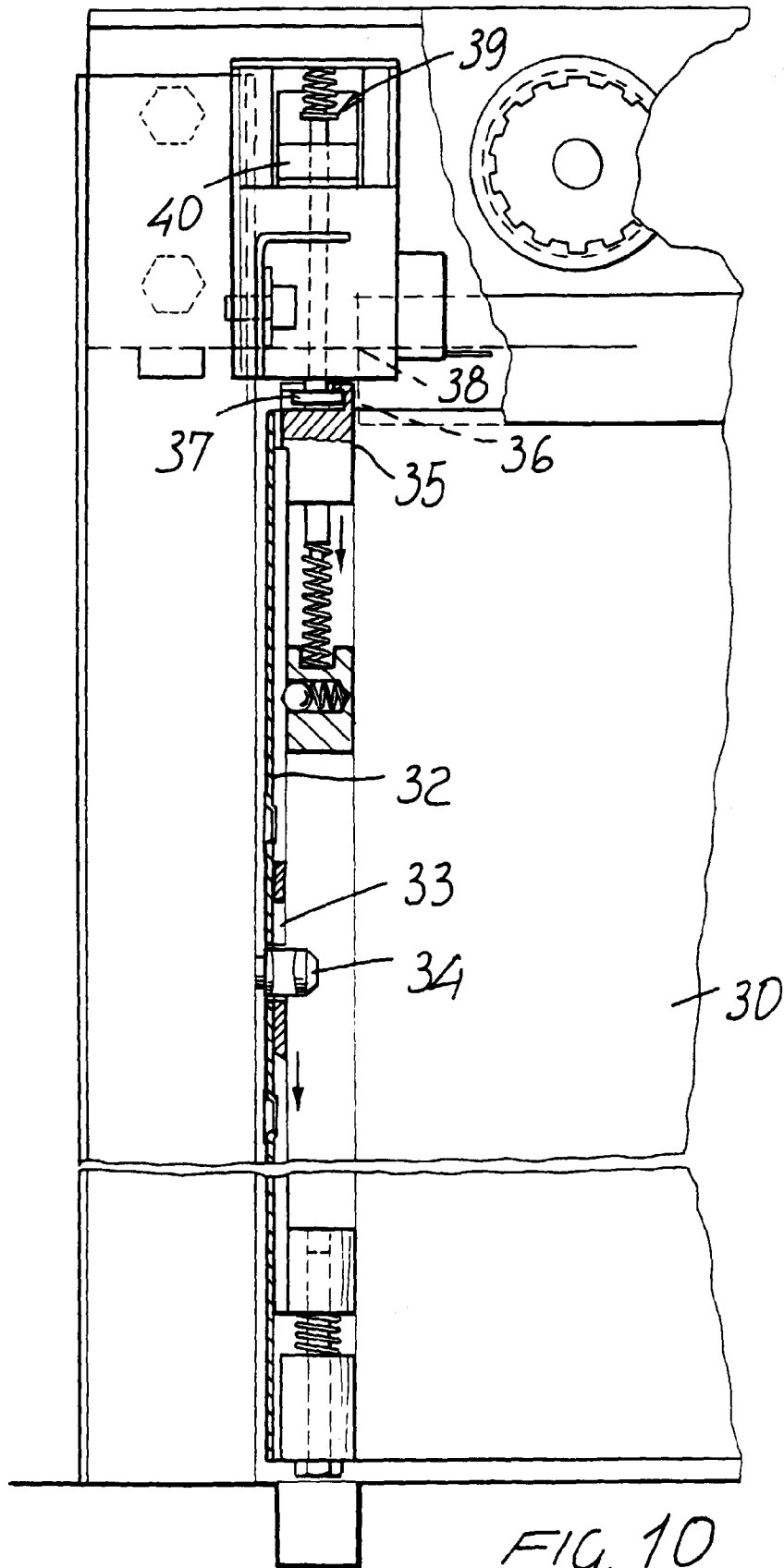
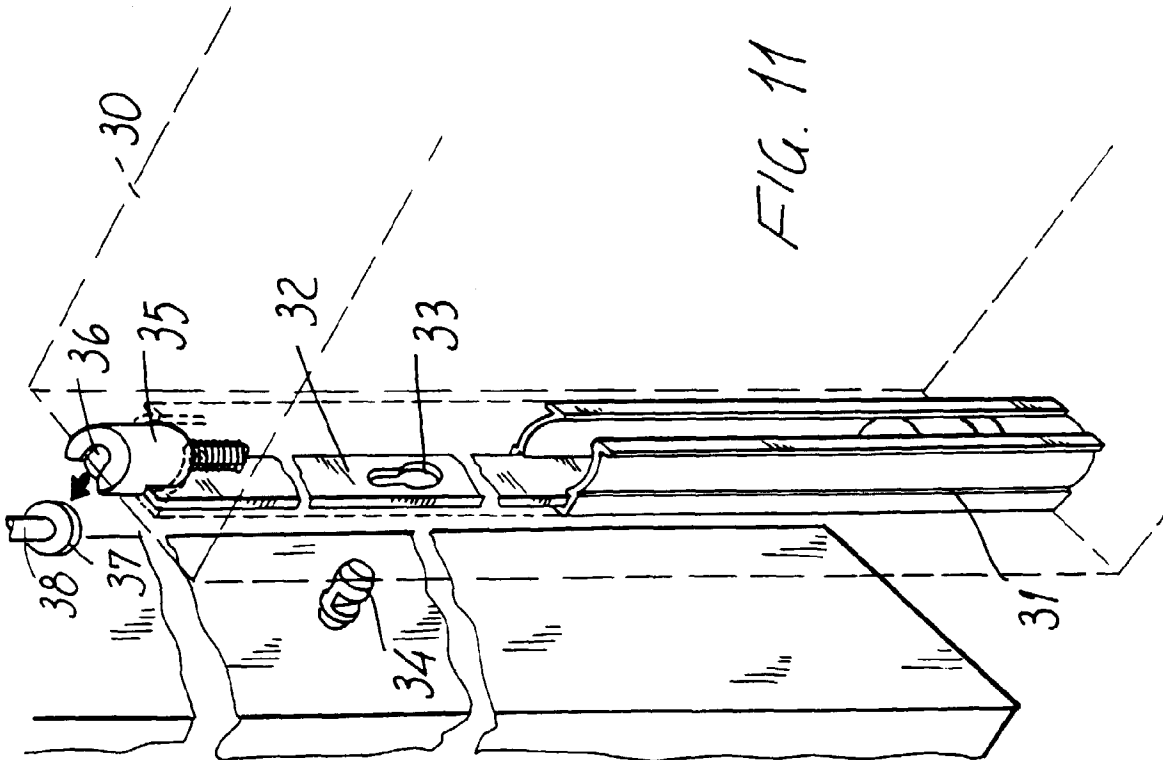
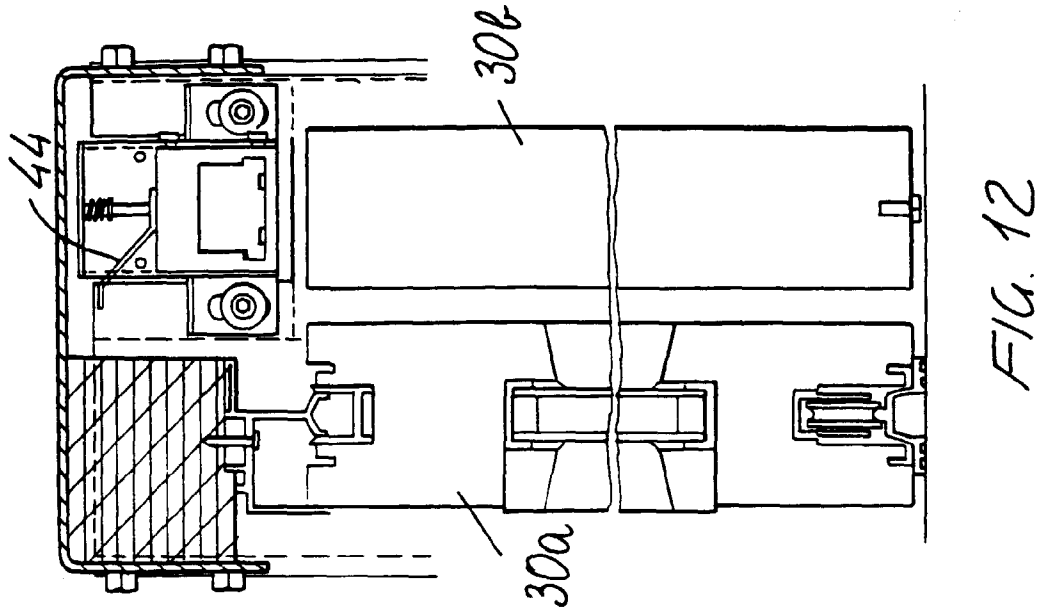


FIG. 6





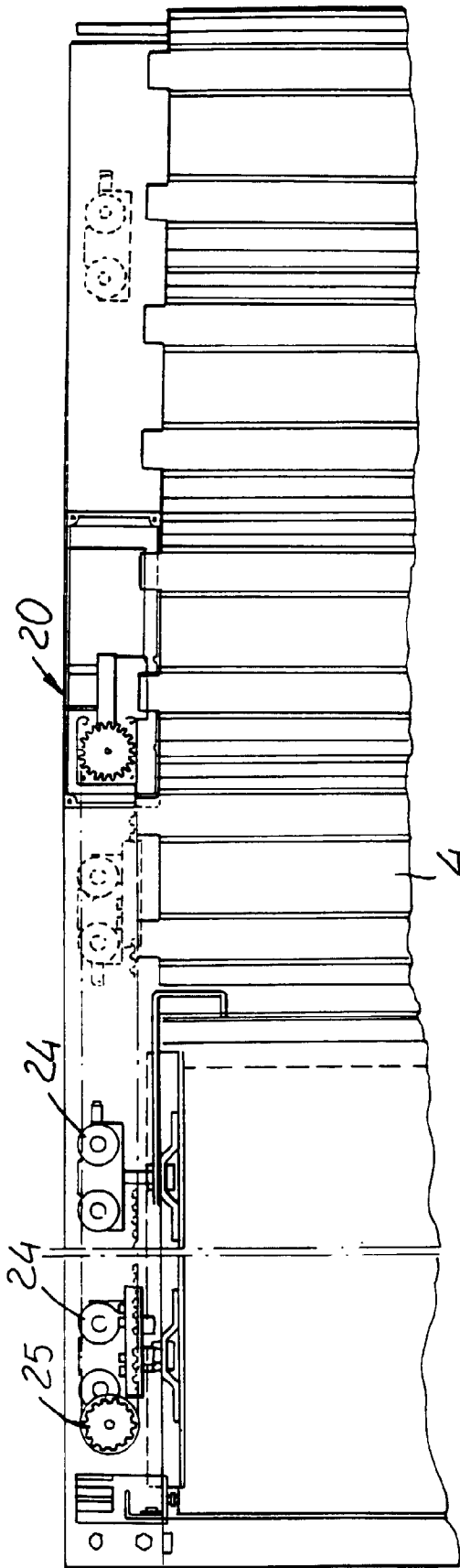


FIG. 7

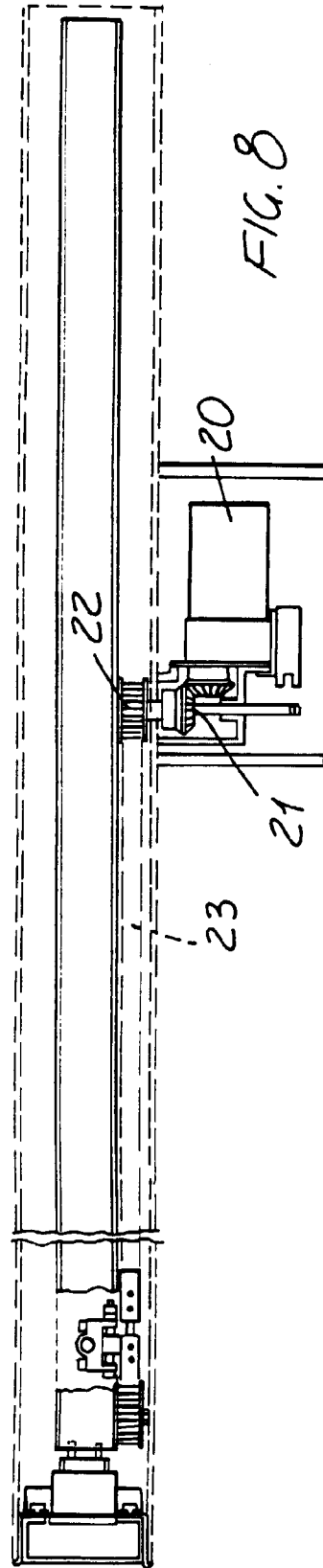


FIG. 8