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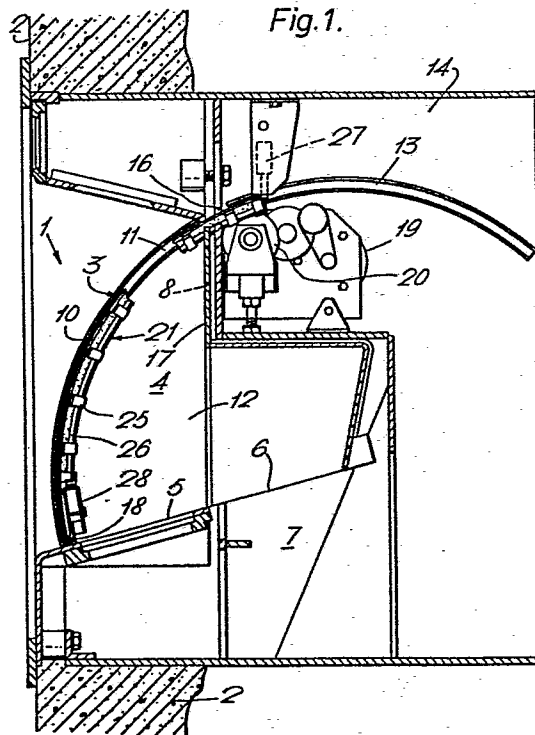
54 Equipment including retractable protective-screens.

57 The retractable protective-screen (3) of a through-the-wall automated-teller machine is in the form of a curved metal plate (10) guided at its side-edges (15), that is driven through a slot (16) in a fascia-wall (17) of the machine in both retraction and extension via a single rack-and-pinion coupling (20,21). The rack (21) is a length of powered-drive belting (22) clamped upon a foam-rubber backing (24) to the inside of the plate (10) centrally of the two side-edges (15). Nylon blocks (18) clipped to the four corners of the plate (10) run in two pairs or arcuate channel guide-pieces (11,13), the blocks (18) to the front of the plate (10) running solely in the guide-pieces (11) respectively of one pair mounted in front of the fascia-wall (17), and the blocks (18) to the rear of the plate (10) running solely in the guide-pieces (13) respectively of the other pair mounted to the rear of the wall (17).

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Fig. 1.



-1-

EQUIPMENT INCLUDING RETRACTABLE PROTECTIVE-SCREENS

This invention relates to equipment of the kind which include a retractable protective-screen in the form of a member having side-edges that are guided for movements of the member in extension and retraction of the screen, and in which the screen is driven in at least one of these movements via a coupling to the said member.

Equipment of the above-specified kind is known from cash-dispensing and other automated-teller machines.

Where the services of such machines are to be available to customers outside normal banking or business hours they are conveniently installed through an external wall of the bank or other building to be accessible from the street or other open environment. More particularly, a facia of the machine, incorporating at least a keyboard for operation by the customer to communicate with the machine, and some form of display device for conveying instructions and other messages to the customer from the machine, will be mounted in the external wall.

In such circumstances it is sometimes necessary, or regarded as desirable, to afford parts of the facia, especially those including the keyboard and display device, protection against weather conditions (especially extremes of heat and cold) and vandalism. It is to this end that retractable protective-screens have been

-2-

utilized in cash-dispensing and other automated-teller machines, such screen covering the keyboard and display device, and any other item to be protected, on the machine facia until such time as a customer requests
5 use of the machine, whereupon the screen is retracted to reveal the protected items for use by the customer in furthering the transaction to be made. When the transaction is completed the screen is extended once again to afford protection against the environment until
10 the next customer-request for use of the machine is made.

The retractable protective-screen used in a cash-dispenser or other automated-teller machine conventionally takes the form of a curved metal plate that is driven from
15 within the machine in both extension and retraction. The provision of drive to such a curved plate, especially insofar as meeting the need for it to move smoothly through the facia, has proved troublesome. Also it has been the practice to drive the plate via couplings
20 established along both of its side-edges, and this has proved expensive in that it requires the provision of special and costly components for its implementation and does not readily allow for overall commonality of such components as between one model of machine and another.
25 Furthermore the motor-torque required to drive the plate has been found to be undesirably high.

It is one of the objects of the present invention to overcome at least in part, some or all of the above disadvantages experienced with existing forms of equipment
30 of the said kind specified above.

According to the present invention equipment of the above-specified kind is characterised in that the
35 coupling establishes driving engagement with the screen-member at a location spaced inwardly from both side-

-3-

edges of the screen-member.

The coupling is preferably made centrally of the screen-member and is preferably established between a drive
5 pinion, and a rack carried by the screen-member. The spacing of the coupling inwardly of the side-edges, and in particular locating it centrally of the screen-member, is advantageous in reducing the motor-torque required to drive the screen-member and also reduces the necessity
10 for special components. The use of a rack-and-pinion coupling ensures efficient and precise drive to the screen-member and if in this case a rack of flexible material is adopted this will enable conformity to the curved or other configuration of the screen-member to
15 be very readily achieved; more particularly, the rack may simply comprise a length of powered-drive belting. The rack may be clamped to the screen-member with a backing of resilient material for reducing noise.

20 The side-edges of the screen-member may be guided by four elements, for example blocks of nylon, that are located adjacent to the four corners respectively of the screen-member and run in guiding channel-pieces. This has advantage in facilitating easy movement of the
25 screen, and is of especial advantage where, as for example in an automated-teller machine, the screen-member is to move in extension and retraction through a slot in a wall of the equipment. In the latter circumstances it can be readily arranged that two of the said elements
30 run in respective channel-pieces to the front of the wall and two in respective channel pieces to the rear, throughout the screen movements. Accordingly it is possible by such an arrangement to avoid the necessity for the side-edge guides to breach the wall; this is of
35 especial advantage where the wall is to act as a security

barrier and also where the guides are to be supported by different structures to the front and rear of the wall.

- 5 The screen-member is preferably driven via the coupling in both extension and retraction, but depending upon the particular application of the screen, it is possible to arrange for it to be driven in only one of these movements, the other movement being executed, for example, manually.

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An automated-teller machine incorporating a retractable protective-screen in accordance with the present invention, will now be described, by way of example, with reference to the accompanying drawings, in which:

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Figure 1 is a sectional side-elevation of the externally-exposed facia and cooperating internal security-sleeve of the automated-teller machine, showing the retractable protective-screen partly broken away;

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Figure 2 is a view of part of the facia from the rear within the security sleeve of the automated-teller machine, the section of Figure 1 being taken on the line I-I of Figure 2;

25

Figure 3 is a side elevation of the retractable protective-screen;

30

Figure 4 shows the upper-end portion of the retractable protective-screen of Figure 3 to an enlarged scale; and

Figure 5 is a view from the inside of the retractable protective screen.

-5-

The automated-teller machine to be described is operable to dispense cash and to perform other banking functions for bank customers after, as well as during, normal banking hours. Each customer authorized to use the machine is issued with an individual rectangular plastics card that carries data relating to the customer's account recorded in one or more magnetic-recording tracks on the card, and is informed of a secret, personal-identification number for use with the card.

When the customer wishes to use the machine he inserts the card in a card-reception slot that is located to one side of the exposed facia of the machine.

Referring to Figure 1, the facia 1 of the automated-teller machine is mounted in an external wall 2 of the bank building to be accessible from outside at all times, and incorporates a protective screen 3 that covers a recessed part 4 of the facia 1 to protect that part from the weather and general environment external of the bank, as well as from vandalism. The machine responds to insertion of the customer's card through the card-reception slot (not shown), provided it is inserted with the correct orientation and satisfies a primary test as to its authenticity, by retracting the screen 3. Retraction of the screen 3 reveals a keyboard 5, the screen 6 of a visual-display unit 7, and a cash-dispensing slot 8, all mounted within the recessed part 4 of the facia 1. The customer is next instructed by messages displayed on the screen 6 of the visual-display unit 7 to operate the keys of the keyboard 5 to enter his personal identification number into the machine. The machine checks that appropriate correspondence exists between the entered number and magnetically-recorded data read from the inserted card,

-6-

and then proceeds by messages on the display-screen 6 to issue to the customer step-by-step instructions and requests for further operation of the keyboard 5 in accordance with the banking function to be performed.

5

If the requested function involves the dispensing of cash to the customer, this is carried out by a cash dispensing unit (not shown) of the machine which is located behind the recessed part 4 of the facia 1 and which delivers banknotes in accordance with the request, through the cash-dispensing slot 8. The dispensing of cash takes place after the customer's card has been returned through, and removed by the customer from, the card-entry slot. Once the delivered bank-

10 notes have been removed by the customer from the cash-dispensing slot 8, or the requested banking function has otherwise been completed, the screen 3 is extended to cover once again the keyboard 5, the display-screen 6 and the dispensing slot 8 in the recessed part 4 of

15 the facia 1, for their protection.

20

Referring now also to Figures 2 to 5, the protective screen 3 is in the form of a curved steel plate 10 that runs in two pairs of arcuate guides. The guides of one pair are formed by curved channel-pieces 11 that are mounted on the opposed side-walls 12 of the recessed part 4 of the facia 1, whereas the guides of the other pair are formed by similarly-curved channel-pieces 13 that are welded to the opposite side walls 14

25 of a steel sleeve that extends backwardly from the recessed part 4 of the facia 1 and provides a protective enclosure for the reserves of banknotes from which dispensing is made through the slot 8. The plate 10

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-7-

with its side-edges 15 guided for movements of the screen in extension and retraction by the channel-pieces 11 and 13, extends through a slot 16 in the back-wall 17 of the facia 1. The side-edges 15 of the plate 10 are
5 engaged with the respective channel-pieces 11 at the two front corners of the screen 3, and with the respective channel-pieces 13 at the other two, rear corners. More particularly, nylon blocks 18 are clipped to the side-edges 15 at the four corners of the plate 10 and run in
10 the respective channel-pieces throughout extension and retraction of the screen 3 within the recessed part 4.

The plate 10 is driven through the slot 16 in extending and retracting the screen 3, by an electric motor 19
15 that is mounted immediately behind the back-wall 17 of the facia 1. Drive from the motor 19 is applied to the screen 3 via a pinion 20 that engages with a rack 21 on the plate 10. The rack 21 is mounted centrally of the inside face of the plate 10, and extends on
20 this face throughout the whole of the curved length of the plate 10 apart from a small leading portion that remains projecting through the slot 16 when the screen 3 is fully retracted.

25 The rack 21 is provided by a length of nylon-reinforced rubber belting 22 cut from a powered-drive belt, so having integrally-formed rounded teeth 23 for engagement by the pinion 20; the pinion 20 is in this respect of the kind used in powered-drive belt systems. The
30 belting 22 is clamped to the plate 10 against a foam-rubber backing 24, being held in place by metal clips 25 that are welded to the plate 10 at intervals along both sides of the rack 21. Two metal strips 26 that

extend the length of the belting 22 are wedged beneath the clips 25 on the two sides to apply clamping pressure along the length of the belting 22 and retain it firmly in place against its foam backing 24. The foam
5 backing 24 provides the rack 21 with a measure of resilience in compression that allows for larger tolerances of manufacture of the screen 3, and provides for quieter operation in extension and retraction.

10

Manufacture of the screen 3 is simplified by the provision of central drive to the plate 10, and also by the use of readily-available belting for provision of the arcuate rack 21; the specific construction
15 described also allows for easy replacement of the rack during maintenance. The use of central drive avoids the complications experienced with earlier proposals for drive to be applied along both side-edges, and also enables a standard mechanism to be used as between
20 screens of different widths required for different models of machine; the torque required of the motor 19 is also less than with the earlier proposals, and this enables a cheaper and more-readily available electric motor to be used. Reduction in the torque requirement
25 also arises from the use of the four-corner mounting of the plate 10 in the side-guides. More especially, smoother movement of the screen 3 and less frictional loading is experienced by confining the engagement of the plate 10 with the channel-pieces 11 and 13 to the
30 blocks 18 at the corners. With this corner-mounting it is not necessary for the guides on either side of the screen 3 to be continuous from the side-walls 12 of the fascia 1 through the back-wall 17 onto the side-walls 14

-9-

of the security sleeve; the two blocks 18 to the front of the screen 3 are confined to their own channel-pieces 11 on the walls 12, whereas the two blocks 18 to the rear are confined to their own channel-pieces 13 on the walls 14, throughout the full range of movement of the plate 10 in extension and retraction of the screen 3. This significantly eases the tolerances required of manufacture and intercoupling between facia and security sleeve.

10

The torque required of the motor-drive for screen-retraction can be equalized with that for extension by use of a spring (not-shown) for counter-balancing the plate 10. Such a spring is in this context coupled to the plate 10 to be in tension when the screen 3 is closed so as to assist the motor 19 in retraction.

A solenoid-operated latch 27 mounted behind the back-wall 17 of the recessed part 4 of the facia 1 engages with the upper, rear-edge of the plate 10 when the screen is extended. The latch 27 blocks retraction of the screen 3 until an electrical signal to withdraw it is received from a control unit (not shown) of the machine. The motor 19 is energized at the same time from the control unit to drive the plate 10 and retract the screen 3. Microswitches (not shown) respond to full retraction of the screen to signal this condition to the control unit and interrupt energization of the motor 19. The motor 19 is again powered from the control unit so as to drive the plate 10 in the opposite sense and extend the screen 3, until other microswitches (not shown) signal that it is fully extended. Provision

-10-

is made to halt extension of the screen 3 in the event that this is obstructed. In this respect a finger-bar (not shown) is mounted on a bracket 28 on the inside face of the plate 10 near the lower, front-edge, and deflection of the bar caused by an obstruction, 5 is signalled to the control unit to bring about the required interruption of power supply to the motor 19.

Electrical heaters (not shown) are incorporated in the 10 channel-pieces 11 to ensure freedom of the plate 10 for movement in spite of exposure of the machine facia 1 to low-temperature conditions.

Although the retractable protective-screen of the 15 present invention has been referred to and described above in the context of cash-dispensing and automated-teller machines, the present invention is not limited in its application to this specific context. The screen may also be applied, for example, to 20 depositories such as provided in the outside wall of a bank to receive cash and other valuables for safe-keeping overnight; in this context the screen covers the entrance-way to a safe or vault for protection, and is retracted to reveal the deposit-receiving mechanism 25 of that entrance-way only while a deposit is being made.

CLAIMS

1. Equipment which includes a retractable protective-screen in the form of a member (3) having side-edges (15) that are guided for movements of the member (3) in extension and retraction of the screen, and in which
5 the screen-member (3) is driven in at least one of these movements via a coupling (20,21) to the said member (3), characterised in that the coupling (20,21) establishes driving engagement with the screen-member (3) at a location spaced inwardly from both side-edges (15).
10
2. Equipment according to Claim 1 characterised in that said coupling is established by a pinion (20) that engages with a rack (21) carried by the screen-member (3).
15
3. Equipment according to Claim 2 characterised in that the rack (21) extends centrally of the screen-member (3) substantially parallel to the two side-edges (15).
- 20 4. Equipment according to Claim 2 or Claim 3 characterised in that the rack (21) comprises a length of powered-drive belting (22).
5. Equipment according to any one of Claims 2 to 4
25 characterised in that the rack (21) is clamped to the screen-member (3) with a backing of resilient material (24).
6. Equipment according to any one of Claims 1 to 5
30 characterised in that the side-edges (15) of the screen-member (3) are guided by four elements (18) that are located adjacent to the four corners respectively of the screen-member (3) and run in guiding channel-pieces (11,13).

-12-

7. Equipment according to Claim 6 in which the screen-member (3) moves in extension and retraction through a slot (16) in a wall (17) of the equipment, characterised in that two of said elements (18) run in respective
5 channel-pieces (11) to the front of the wall (17) and two of said elements (18) run in respective channel-pieces (13) to the rear of the wall (17) throughout extension and retraction of the screen.
- 10 8. Equipment according to any one of Claims 1 to 7 characterised in that the screen-member is a curved metal plate (3).

Fig. 1.

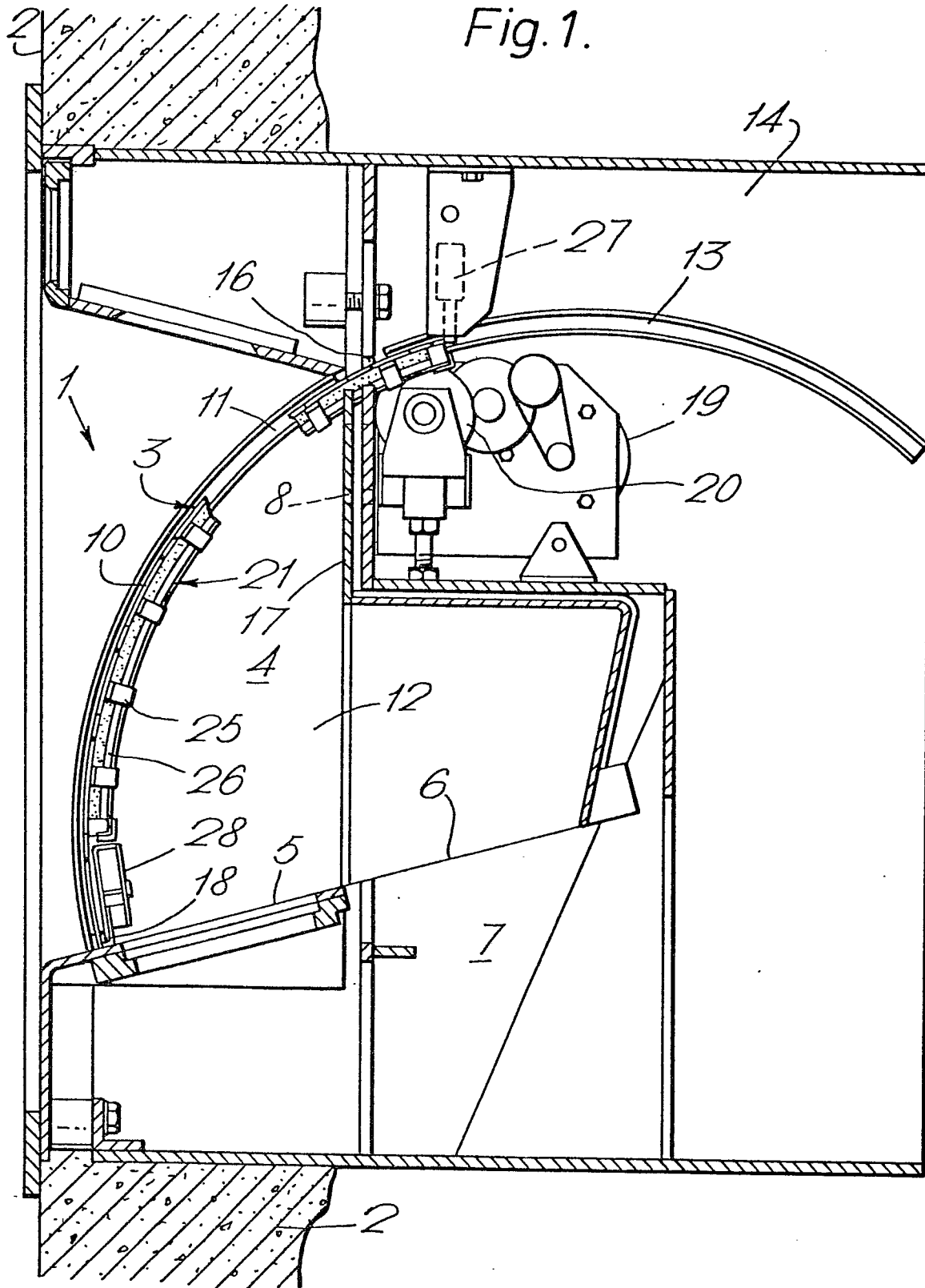
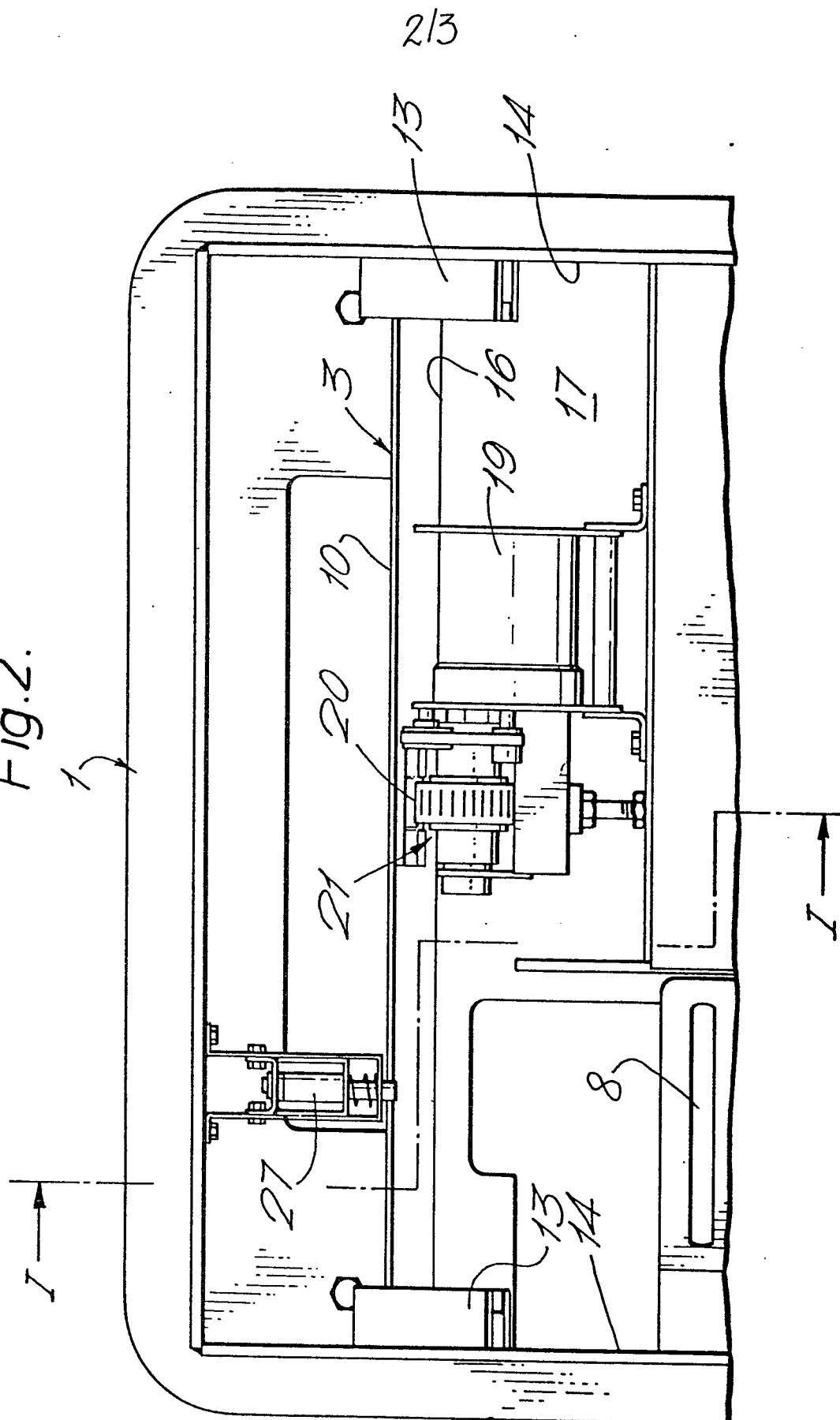


Fig.2.



3/3

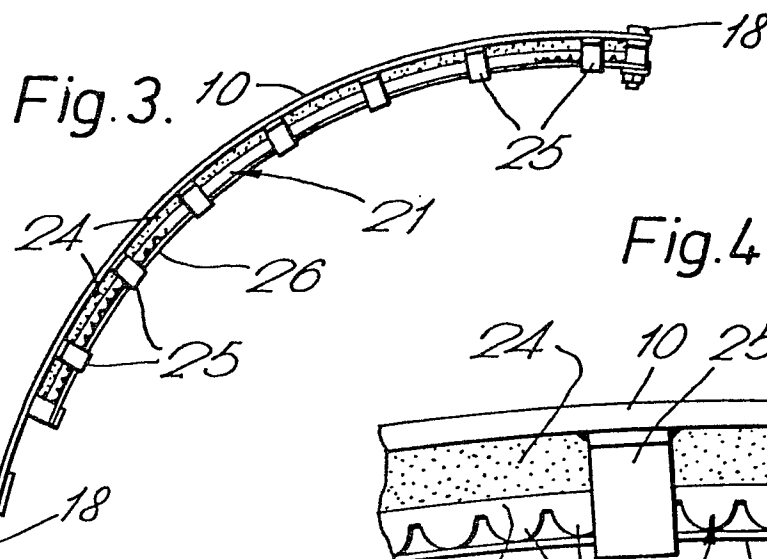


Fig. 4.

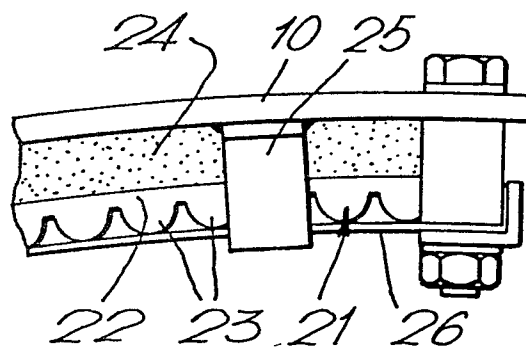


Fig. 5.

