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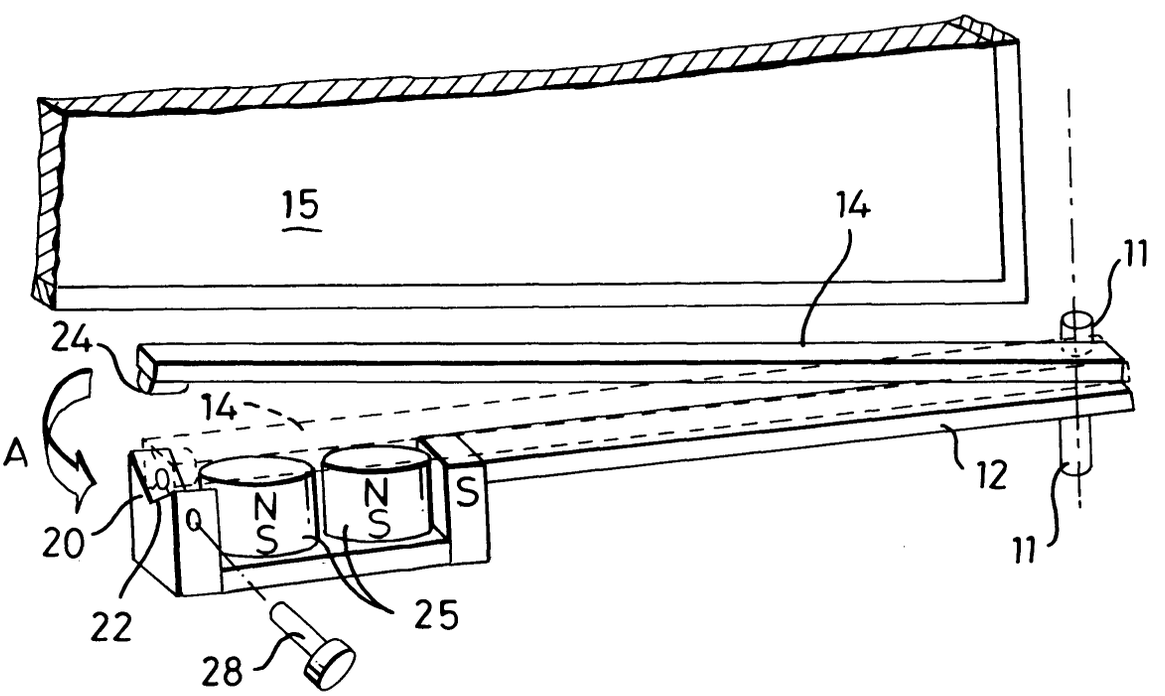
(54) Improvements relating to closure members

(57) A drive transfer and locking mechanism for a closure member (15), said mechanism comprising a first arm (12) to be moved arcuately by drive means (11) for effecting pivotal opening and closing of an aperture by the closure member (15), and a second arm (14) to support the closure member (15). Detent means (20) are provided to interengage and interconnect the first and second arms (12,14), the detent means (20) being resiliently operable in a generally vertical direction under the inherent resiliency of at least the first arm (12). The mechanism additionally includes magnetic means (25) to provide a magnetic attractive force between magnetically permeable regions of the two arms (12,14) to aid the detent means (20) in holding said interengaged and interconnected condition of the first and second arms (12,14).



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Description

Technical Field

[0001] This invention relates to closure members and in particular to powered, automatically operable, closure members that are movable arcuately about the axis of a vertical shaft.

Background Art

[0002] It is usual to drive such closure members (e.g. an automatically operable gate) via a drive arm radiating from the shaft, the closure member being supported by and releasably locked to the radiating drive arm by a drive transfer and locking mechanism. This mechanism enables the closure member to pivot with the radiating arm about the axis of the shaft during normal powered operation, but be released from the arm (to permit manual operation) in the event of a failure of the power transfer to the drive shaft due to some mechanical or electrical malfunction.

[0003] The drive transfer and locking mechanism employed in the past to lock the closure member to the radiating drive arm comprised a spring-loaded latch movable into a keeper slot, the direction of latch movement being radially of the pivot axis, i.e. longitudinally of the radiating arm. Such a locking mechanism is effective in transmitting arcuate drive from the radiating drive arm to the closure member but is prone to corrosion and ingress of dirt, thus rendering it difficult to unlock the locking mechanism, e.g. in the event of a power failure or a dislocation of the closure member.

[0004] It is therefore considered desirable to provide, for a power driven closure member, a drive transfer and locking mechanism that can overcome or at least reduce the above-mentioned and/or other disadvantages of the prior art.

Summary of the Invention

[0005] According to this invention there is provided a drive transfer and locking mechanism for a closure member, said mechanism comprising

a first arm to be moved arcuately by drive means for effecting pivotal opening and closing of the closure member,
a second arm to support the closure member,
detent means to interengage and interconnect the first and second arms, the detent means being resiliently operable in a generally vertical direction under the inherent resiliency of at least the first arm, and
magnetic means to provide a magnetic attractive force between magnetically permeable regions of the two arms to aid the detent means in holding said interengaged and interconnected condition of the first and second arms.

[0006] Preferably the magnetic means are arranged to provide said attractive force in a vertical sense.

[0007] Advantageously the magnetic means comprises one or more permanent magnets.

Brief Description of the Drawings

[0008] By way of example, one embodiment of this invention will now be described with reference to the accompanying drawing which is a schematic perspective view of parts of a mechanism according to this invention.

Detailed Description of Example(s) of the Invention

[0009] For the illustrated embodiment, a motor unit (not shown) at or adjacent ground level has a vertical output shaft 11 of stepped form that can move arcuately to and fro through about 90°. An elongate arm 12 - formed of a cut length of rectangular cross-section steel bar - is mounted on the step of shaft 11 so as to be fast therewith. A second steel arm 14 - similarly formed as a cut length of rectangular cross-section steel bar - is mounted freely and pivotably on the projecting stub of shaft 11 so as to be supported by the arm 12 when the two overlie one another. An upright closure member 15 of rectangular form is attached to the upper arm 14 - e. g. by welding its lowermost horizontal edge to the arm 14.

[0010] A detent mechanism 20 is provided between the two arms 12,14. In this illustrated embodiment the detent mechanism 20 comprises a recess 22 at the free end of arm 12, and a downwardly directed projection 24 at the free end of arm 14. As the upper arm 14 is moved arcuately (in the direction of arrow 'A') from its full-line position to its broken-line position overlying arm 12, the projection 24 rises relative to the laterally outer edge of recess 22 and then snaps over the recess boundary to enter relatively downwardly into the recess 22 itself. In reality, during this relative motion, the weight of the closure member 15 restrains the upper arm 12 from moving in the vertical plane and it is the free end of lower arm 12 that actually moves downwards a slight amount, in a resilient fashion due to the inherent resiliency of the arm 12 - the resilient restoring force tending to return the arm 12 to the horizontal plane perpendicular to the axis of shaft 11.

[0011] In order to retain the two steel arms 12,14 in this mutually overlying relation, with the arms 12,14 mutually interengaged and interlocked via the detent mechanism 20, the lower arm 12 is provided with a recess 26 housing a pair of permanent magnets 25 providing a downwardly directed magnetic attraction force upon the overlying portion of the upper steel arm 14. The magnetic permeability of the steel used for arms 12,14 ensures a forceful retention of the latch effected by the de-

tent mechanism 20.

[0012] However, if this attraction force needs to be overcome to disconnect the inter-connection of arms 12 and 14, a release device 28 can be operated. The release device comprises a screw or other threaded element threadably enaged in a laterally directed threaded bore entering the recess 22. When the threaded member 28 is screwed inwardly, it engages and forcibly dislodges the projection 24 out of its retaining recess 22 against the inherent resiliency of lower arm 12 and the magnetic attractive force due to magnets 25.

[0013] It will be appreciated that the above-described and illustrated embodiment connects the output from an automatic gate drive motor to a gate 15 to be driven and such that the drive can be released on demand. Furthermore the drive can be released or disengaged spontaneously and automatically in the event that a vehicle, say, collides with the closure member 15 as the latching of the detent mechanism and the magnetic attraction force is overcome and broken. The mechanism is unaffected by ingress of dirt particles or other contaminants, is simple to release by an unskilled user operating the element 28, and incorporates instant disconnection in the event of violent impact (to protect the expensive motor drive mechanism to shaft 11 from damage) as the attractive magnetic holding force and the inherent resilient detent mechanism are overcome. The intrinsic protection of the mating surfaces or parts 22,24 and the absence of other moving parts renders the system singularly immune to damage or long term deterioration.

[0014] It will be further appreciated that, in the event of a power failure or other emergency, the mating parts 22,24 can be released by means of the screw 28 acting upon one of the mating surfaces from the other mating part. Because the magnetic attracting force has a square-law relation to the spacing distance, as soon as the magnetic holding "seal" is broken, the parts 12,14 can be easily moved apart independently of one another.

[0015] Other modifications and embodiments of the invention, which will be readily apparent to those skilled in this art, are to be deemed within the ambit and scope of the invention, and the particular embodiment(s) hereinbefore described may be varied in construction and detail, e.g. interchanging (where appropriate or desired) different features of each, without departing from the scope of the patent monopoly hereby sought.

Claims

1. A drive transfer and locking mechanism for a closure member (15), said mechanism comprising a first arm (12) to be moved arcuately by drive means (11) for effecting pivotal opening and closing of an aperture by the closure member (15), and a second arm (14) to support the closure member (15), said drive transfer and locking mechanism being **characterised by**
detent means (20) to interengage and interconnect the first and second arms (12,14), the detent means (20) being resiliently operable in a generally vertical direction under the inherent resiliency of at least the first arm (12), and
magnetic means (25) to provide a magnetic attractive force between magnetically permeable regions of the two arms (12,14) to aid the detent means (20) in holding said interengaged and interconnected condition of the first and second arms (12, 14) .

2. A drive transfer and locking mechanism according to Claim 1, **characterised in that** the magnetic means (25) are arranged to provide said attractive force in a vertical sense.

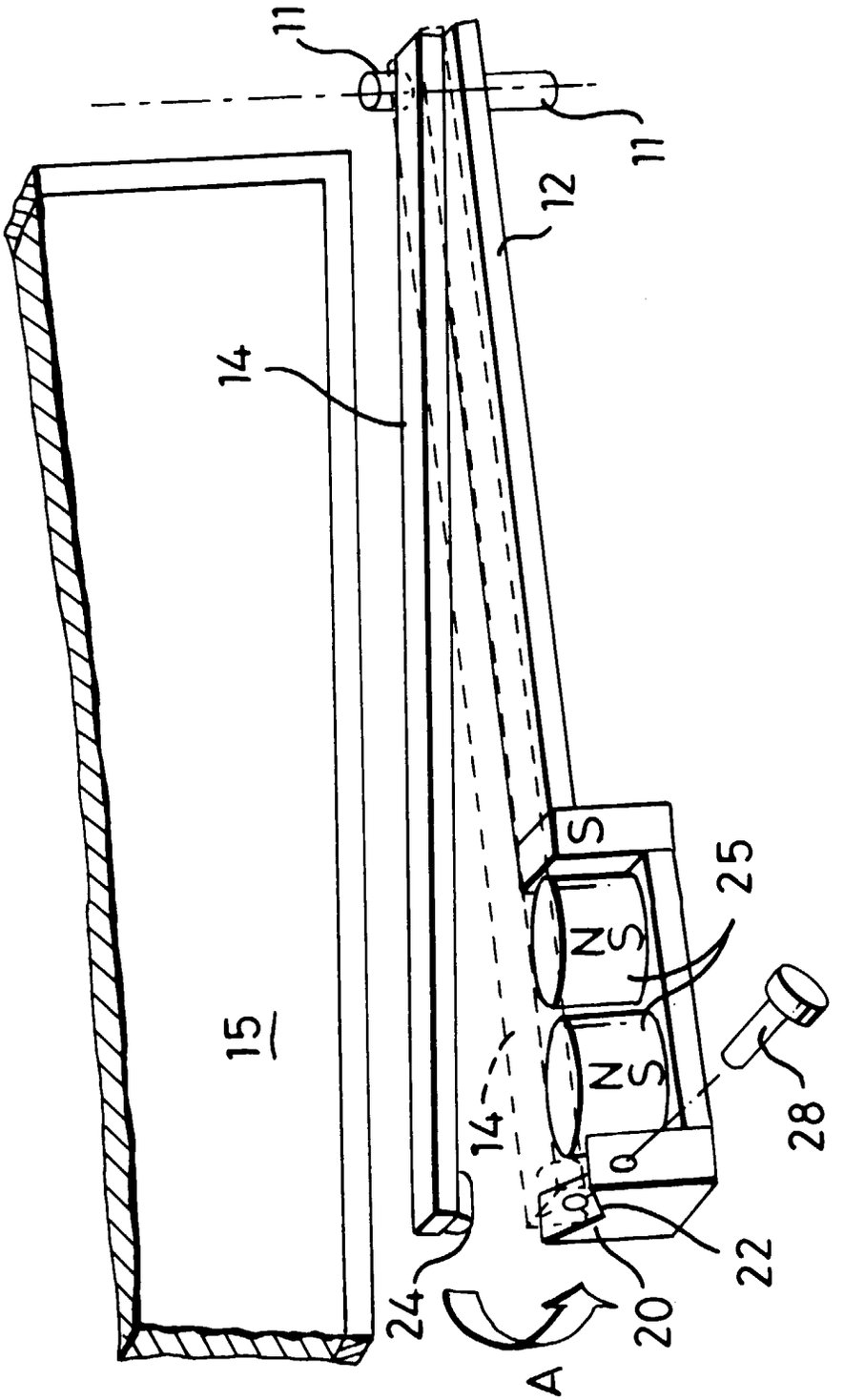
3. A drive transfer and locking mechanism according to Claim 1 or Claim 2, **characterised in that** the magnetic means (25) comprises one or more permanent magnets (25).

4. A drive transfer and locking mechanism according to any one of the preceding Claims, **characterised in that** the detent mechanism (20) comprises a recess (22) at the free end of one of the two arms (12,14) - preferably the first arm (12) - and in that a downwardly directed projection (24) is provided at the free end of the other of the two arms (12,14) - preferably the second arm (14).

5. A drive transfer and locking mechanism according to any one of the preceding Claims, **characterised by** a release device (28) for disconnecting the interconnection of the first and second arms (12,14).

6. A drive transfer and locking mechanism according to Claim 5, **characterised in that** said release device (28) comprises a screw or other threaded element (28) threadably engaged in a laterally directed threaded bore for operative engagement of the detent mechanism (20).

7. A drive transfer and locking mechanism according to Claim 6 when dependant from Claim 4, **characterised in that** the release device (28) provides for said operative engagement of the detent mechanism (2) upon screwing the threaded member (28) inwardly of said bore to engage and forcibly dislodge the detent mechanism's said projection (24) out of the detent mechanism's said retaining recess (22) against the inherent resiliency of said first arm (12) and the magnetic attractive force due to magnetic means (25).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