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Applicant: **Weegwerktuigenfabriek Alfra B.V.,
Rondweg 27, NL-5531 AJ Bladel (NL)**

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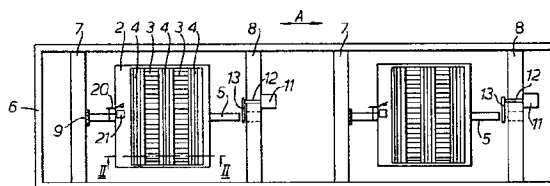
Inventor: **Louwers, Cornelis Josephus A., Irenelaan 26,
NL-5531 JD Bladel (NL)**

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Representative: **Noz, Franciscus Xaverius, Ir. et al,
Algemeen Octroolbureau P.O. Box 645, NL-5600 AP
Eindhoven (NL)**

Device for optionally coupling a reciprocatory member with a reciprocatory mechanism.

Device for optionally coupling a reciprocatory member, for example, the closing slide (4) of a silo, with a reciprocatory mechanism (6, 7, 8) for displacing said member whereby the mechanism or the displaceable member is provided with a stop (13), which is displaceable with the aid of an adjusting member (11) between a first position in which the stop is located in the trajectory or a part (5) associated with the displaceable member or the mechanism respectively and a second position in which the stop is located outside the trajectory of said part.



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Device for optionally coupling a reciprocatory member with a reciprocatory mechanism.

The invention relates to a device for optionally coupling a reciprocatory member, for example, the closing slide of a silo, with a reciprocatory mechanism, for displacing said member.

In technical practice it is often desired to couple at will a member to be reciprocated with a reciprocatory mechanism for displacing said member, for example, the closing slides of silos arranged in a row, which closing discs are desired to permit opening and closing with the aid of a single reciprocatory mechanism so that at will one or more silos can be opened whilst the other silos are kept closed.

Such a device is known, for example, from Dutch patent 112,215. In this known device the reciprocatory mechanism is formed by an elongate frame-work having transverse beams on which are arranged electro-magnetic coupling members, which can optionally be individually energized for attracting the associated closing slide in a manner such that upon a movement of the mechanism the closing slide concerned is simultaneously displaced. Since the effort required for displacing the closing slide has to be supplied by the electro-magnet, these electro-magnets have to be very strong in order to ensure that the closing slide will certainly be moved even if, for example, a comparatively heavy frictional force is exerted on the closing slide concerned. However, this brings about a comparatively heavy and expensive structure, whilst in addition the actuation of the electro-magnets requires a fairly high amount of energy. The invention has for its object to provide

a device of the kind set forth, by which the disadvantages of the known device can be avoided.

According to the invention this can be achieved by providing the mechanism or the displaceable member with a stop which is displaceable
5 with the aid of an adjusting member between a first position in which the stop is located in the trajectory of a part associated with the displaceable member or the mechanism respectively and a second position in which the stop is located outside the trajectory of said part.

When such a construction is employed the adjusting member need
10 only provide the force required for reciprocating the stop between the two positions, whereas it need not provide a force for carrying out a displacement of the displaceable member. The force required for reciprocating the stop between the two positions will, in general, be very slight as compared with the force required for reciprocating the member concerned,
15 so that both in the case of an electro-magnetically actuated adjusting member and in the case of a pneumatically, hydraulically or mechanically operated adjusting member this adjusting member can invariably have a light structure and will require proportionally little energy for displacing the stop.

20 The invention will be described more fully hereinafter with reference to an embodiment of the construction according to the invention schematically shown in the accompanying Figures.

Fig. 1 is a schematic plan view of a mechanism formed by a rectangular frame work for displacing members formed by closing slides of silos.

25 Fig. 2 is an enlarged sectional view of a closing slide taken on the line II-II in Fig. 1.

Fig. 3 is partly an enlarged side elevation and partly a cross-sectional view of the disposition of a displaceable stop.

Fig. 4 is an elevational view taken on the line IV-IV in Fig. 3.

30 The device illustrated in the Figures is designed for opening and closing a plurality of silos arranged in a row (not shown in detail in the Figures). Each silo is provided with a dosing member 1 having a rectangular frame 2 in which a number of parallel, relatively spaced, horizontal strips 3 are arranged. The dosing member has furthermore a plurality
35 of parallel, relatively spaced strips 4, which are rigidly secured to a bar

5 extending at right angles to the direction of length of the strips 4 to form a closing slide. It will be obvious that the construction of the grating formed by the frame 2 and the strips 3 arranged therein and the construction of the closing slide formed by the strips 4 and the bar 5 are such that in the position of the closing slide shown in Fig. 2 the various openings of the grating are closed by the strips 4 so that no material can flow out of the silo disposed above the dosing member 1. By displacing the strips 4 with respect to the strips 3 with the aid of the bar 5 the passages of the dosing member can be opened to a greater or lesser extent.

A desired number of silos with the associated dosing members 1 can be arranged in a row as is schematically shown in Fig. 1 for two dosing members 1, whilst the closing slides formed by the strips 4 and the bars 5 of the associated dosing members can be reciprocated with the aid of a single mechanism formed by an at least substantially rectangular frame 6 having transverse beams 7 and 8 on each side of each dosing member 1. The frame 6 can be reciprocated in known manner for actuating the dosing members as is indicated by the double arrow A (Fig. 1).

Referring to Fig. 1, the frame 6 is shown in the outermost right-hand position, in which the bars 5 fastened to the strips 4 are also pushed into their outermost right-hand position with the aid of adjustable pushers 9 fastened to the beams 7, in which position the strips 4 close the passages in their dosing member 1. It will be obvious that the left-hand end of the bar 5 is not fixed to the pusher 9 concerned, it is on the contrary loosely in contact herewith.

Figs. 3 and 4 show on an enlarged scale that opposite walls of the hollow beam 8 have holes 10, the centre lines of which are in register with the centre lines of the bars 5.

To each beam 8 is furthermore fastened an electro-magnet 11, with the aid of which a shaft 12 extending parallel to the bar 5 can be turned through a given angle about its longitudinal axis. A plate 13 forming a pawl or a stop has near one end a hole through which the shaft 12 is passed. To the end of the pawl 13 is furthermore fastened a block 14, which has a flat face 15 being in engagement with a flat side of one end of the shaft 12 in a manner such that the plate 13 can shift in place in the di-

rection of length of the shaft 12 with respect to the latter, though it cannot turn about the centre line of the shaft 12 with respect to the latter. The pawl 13 is retained on the shaft 12 with the aid of a locking ring 17, which is fastened to the shaft 12 at the end remote from the magnet 11 with the aid of a bolt 18. The part of the shaft 12 located between the housing of the magnet 11 and the pawl 13 is surrounded by a compression spring 19, which tends to push the pawl 13 towards the locking ring 17.

When the magnet 11 is not energized, the pawl 13 occupies the position indicated by solid lines in Fig. 4, in which the pawl 13 is in contact with a lug 20 fastened to the beam 8 and preventing the pawl 13 from turning further under the action of its weight. From Fig. 4 it will be apparent that in this position the pawl or stop 13 is located at the side of the openings 10, viewed in the direction of the centre lines of these openings. If, on the contrary, the magnet 11 is energized, the shaft 12 is turned through a given angle so that the pawl 13 moves into the position 13' indicated by broken lines, in which the pawl or stop is located in front of the openings 10 concerned.

Figs. 1 and 2 furthermore show that each bar has fastened to it an adjustable wing 20, which - in the closed position of the dosing member part of which is formed by the bar concerned - co-operates with a switch 21 fastened to the frame 2 for signalling the closed position of the dosing member concerned.

It will be obvious that when the magnets arranged on the various transverse beams 8 are not energized and when the frame 6 is alternately moved, the right-hand ends of the bars 5 as seen in Fig. 1 will move through the holes 10 in the beams 8 so that the closing slides 4,5 will not be caught along by the frame 6 out of the closed position of the dosing members.

If it is desired to displace one or more of the closing slides with the frame 6, the electro-magnets 11 associated with the closing slide(s) concerned have to be actuated so that the pawls or stops 13 concerned get in front of the openings 10 in the beams 8. When the frame 6 is then moved from the position shown in Fig. 1 to the left, the right-hand end of a bar 5 will come into contact with a stop 13, which counteracts a further rela-

tive displacement between the closing slide and the frame 6. The plate 13 can be further displaced along the shaft 12 under the action of the force exerted on said plate 13 until the plate 13 is in contact with the beam 8. In this way the forces exerted on the plate 13 are prevented from acting
5 on the shaft 12 and/or on further parts of the electro-magnet 11.

Energization of the electro-magnet 11 may, as the case may be, take place without risk, when the right-hand end of the associated bar 5 extends through the openings 10, since in this case the pawl 13 initially comes into contact with the bar 5, but will further turn between the end
10 of the bar and the beam 8 as soon as the associated bar has been withdrawn from the openings 10 resulting from a displacement of the frame 6.

When the electro-magnet is switched off, the pawl 13 will drop back into the position shown in Fig. 4 as soon as the frame 6 is moved back into its outermost right-hand position shown in Fig. 1.

15 It will be obvious that the electro-magnet 11 need only bring about a slight turn of the comparatively light-weight pawl plate 13 and is not required to generate further efforts so that a comparatively light electro-magnet may be used. A direct-current as well as an alternating-current electro-magnet may be employed, the direct-current magnet being, however
20 preferred, since in general it can be better protected against burning than an alternating-current magnet.

As a matter of course, pneumatically, hydraulically or mechanically operating adjusting members may as an alternative, be used rather than electro-magnets for displacing the pawl. Instead of using magnets bringing
25 about a turn of the pawl between the two positions, adjusting members may be employed which bring about a linear displacement, for example, an elevation or a shift of the stop or pawl 13 in a transverse direction.

The invention is, of course, not limited to a device for actuating one or more closing slides for silos, since the construction according to
30 the invention may also be successfully used with other members to be displaced. The adjustable stop, instead of being connected with the reciprocatory mechanism, may, as an alternative, be connected with the member to be displaced. Obviously within the scope and spirit of the invention many variants of the above-described embodiment of the invention illustrated
35 in the Figures are thus possible.

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CLAIMS

1. A device for optionally coupling a reciprocatory member, for example, the closing slide of a silo, with a reciprocatory mechanism for displacing said member characterized in that the mechanism or the displaceable member is provided with a stop, which is displaceable with the aid of an adjusting member between a first position in which the stop is located in the trajectory of a part associated with the displaceable member or the mechanism respectively and a second position in which the stop is located outside the trajectory of said part.
2. A device as claimed in Claim 1, characterized in that with the aid of the adjusting member the stop can be turned between the first and the second position about a rotary axis extending parallel to the intended direction of displacement.
3. A device as claimed in Claim 2, characterized in that the stop is displaceable along the rotary axis against spring force up to a part of the mechanism or the displaceable member respectively with which the stop is coupled.
4. A device as claimed in anyone of the preceding Claims characterized in that the part of the mechanism or the displaceable member respectively with which the stop is coupled has a passage that can be closed with the aid of the stop and that is in register with a part of the displaceable member or the mechanism respectively formed by a bar.
5. A device as claimed in anyone of the preceding Claims characterized in that the adjusting member is formed by an electro-magnet.

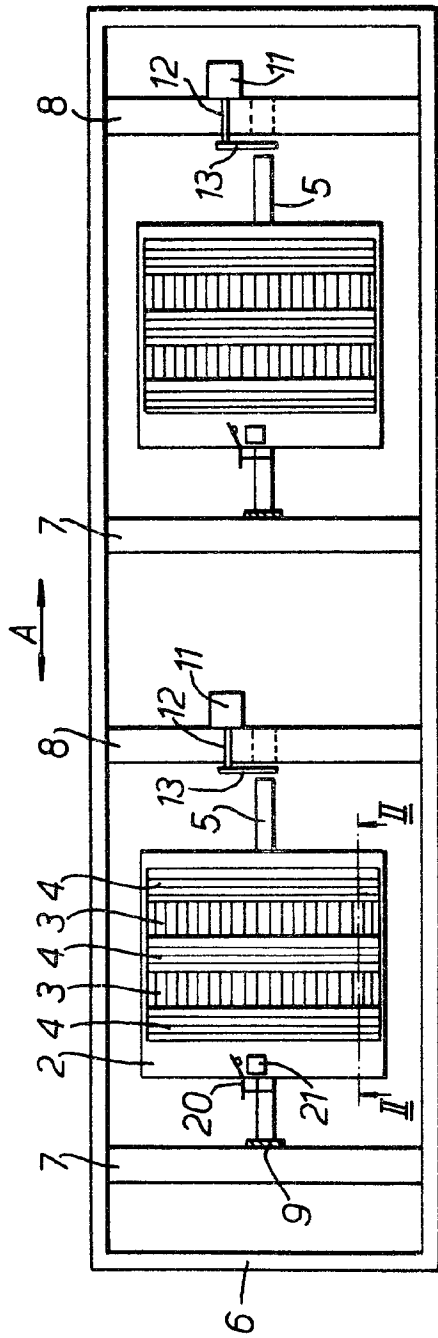


FIG. 1.

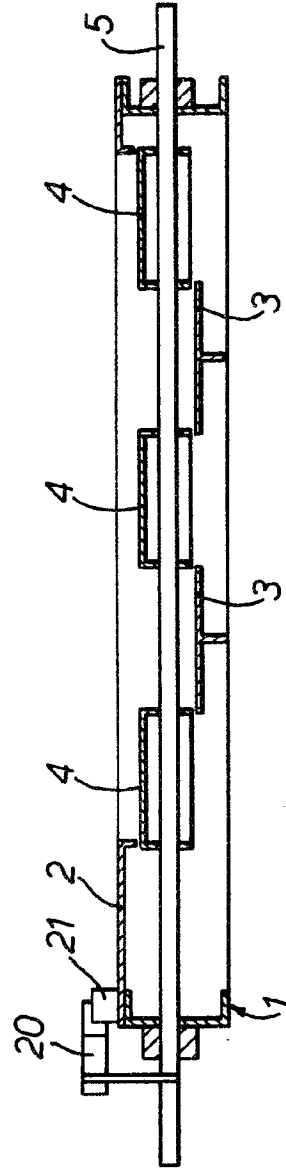
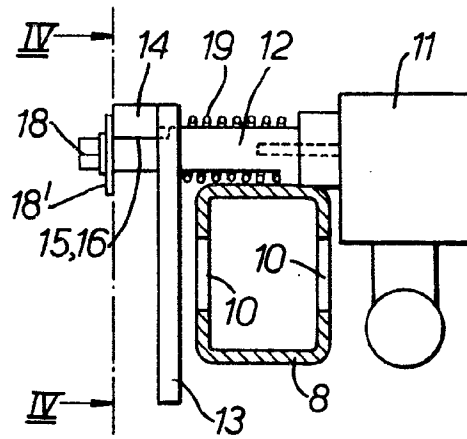
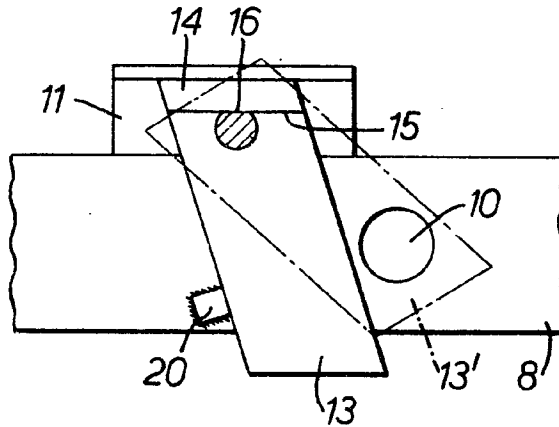


FIG. 2.

"2/2"

*Fig. 3.**Fig. 4.*



DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
	<u>FR - A - 1 257 981</u> (ELBA-WERK) * Abstract; figures * --	1,5	B 65 D 90/66
	<u>NL - A - 70 10498</u> (PLEVIER) * Claims 1,2,4,5; figures * ----	1,5	
			TECHNICAL FIELDS SEARCHED (Int. Cl.)
			B 65 D
			CATEGORY OF CITED DOCUMENTS
			X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
			&: member of the same patent family, corresponding document
The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
The Hague	16-04-1981	BAETENS	