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(54) **Barrier installation, barrier and method therefor**

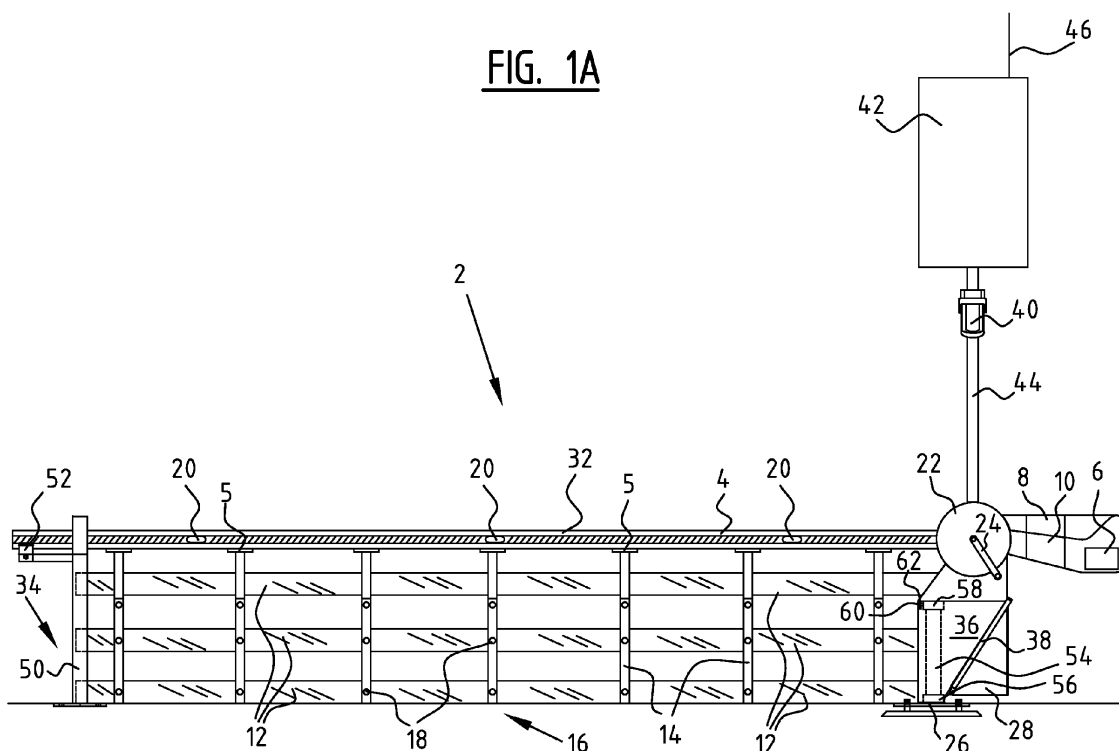
(57) The present invention relates to a barrier installation, a barrier and a method therefor. The barrier installation comprises:

- at least two barriers comprising a drive for moving the barriers from a closed position to an open position and vice versa;
- an operating means which is operatively connected to

the drive and with which the barrier installation can be operated by a road user such that the barriers can be operated to move to the open position by the road user in order to leave the crossing clear; and

- communication means operatively connected to the barriers for communication with each other and/or with the operating means.

FIG. 1A



Description

[0001] The present invention relates to a barrier installation, in particular a barrier installation for a railway level crossing. Barrier installations are used to close or leave clear a road to a user at a crossing, for instance a level crossing, a road which intersects another road, or a draw-bridge.

[0002] Known in practice are barrier installations for use at a railway level crossing. These installations close when a train approaches and open after the train has passed. Such barrier installations have the drawback that in order to detect an approaching train the installation must be connected to a complicated central system. This is particularly disadvantageous in the case of footpaths and private property, so that such crossings are often unguarded, which results in an unsafe situation.

[0003] The present invention has for its object to obviate or reduce the above stated problems and to provide a safe, effective and efficient barrier installation.

[0004] This object is achieved with the barrier installation for safeguarding a crossing according to the present invention, the barrier installation comprising:

- at least two barriers comprising a drive for moving the barriers from a closed position to an open position and vice versa;
- an operating means which is operatively connected to the drive and with which the barrier installation can be operated by a road user such that the barriers can be operated to move to the open position by the road user in order to leave the crossing clear; and
- communication means operatively connected to the barriers for communication with each other and/or with the operating means.

[0005] The road user can operate the barrier installation with an operating means such as for instance a button, a remote control, a hand crank or a handle. The barriers can hereby be opened, after which the road user can cross. The barriers are thus normally closed so that the road user is forced to stop and look around. This makes the barrier installation according to the present invention safe. The operating means can comprise a control system.

[0006] The barrier installation according to the present invention is preferably applied at a level crossing.

[0007] The drive of the barriers can for instance be a manual drive, such as a hand crank/winch or an electric or hydraulic drive, or a combination thereof.

[0008] The communication means can for instance be cables or a transmitter and receiver for wireless communication.

[0009] The barrier installation can preferably only be operated using the operating means. Lifting of the barriers is for instance prevented by blocking them unless they are operated by the operating means.

[0010] Because the barrier installation can be operat-

ed by the road user, it is possible to dispense with a coupling of the barrier installation to a central control system. The barrier installation functions as a stand-alone system. This avoids cables having to be laid underground, for instance under the track or intersecting road. Also avoided is that the central safety system has to be modified in order to adapt this system to the barrier installation. In current practice the costs for such a modification are roughly the same as the actual installation costs. This makes the installing of a barrier installation according to the present invention highly cost-effective and easier to realize.

[0011] The installation being provided with communication means achieves that the at least two barriers can both be opened or closed with one operation by the user. This avoids a road user, particularly a driver of a vehicle, having to cross the crossing multiple times in order to individually open and close the barriers. A safe crossing is hereby realized by the barrier installation according to the invention.

[0012] If desired, the operating means can be adjusted such that the at least two barriers have to be opened one by one.

[0013] In an advantageous preferred embodiment according to the present invention the operating means is set to automatically close the barriers after a predetermined time when they are in the open position.

[0014] Automatic closure of each of the barriers achieves that the barrier installation does not remain open once the road user has passed. This prevents a second road user coming upon open barriers and an unsafe situation occurring. It is preferably possible to set the predetermined time.

[0015] In a further preferred embodiment the barrier installation according to the invention comprises a sensor operatively connected to the operating means for detecting the presence of persons located on the crossing between the at least two barriers, wherein the operating means is adjusted to hold the barriers in the open position as long as the sensor detects the presence of a person between the at least two barriers. The operating means is for instance set such that the barriers close automatically after a predetermined time unless the sensor detects the presence of a person between the barriers.

[0016] This prevents a person being caught between the two barriers, which realizes a safe application of the barrier installation.

[0017] In an advantageous preferred embodiment according to the present invention the operating means is adjusted to move the barriers substantially simultaneously to the open or closed position.

[0018] Because the at least two barriers open or close substantially simultaneously, the road user does not have to wait, after a first barrier has opened, until a subsequent barrier is opened. This considerably enhances safety since it avoids the road user stopping on the crossing, for instance on the track, to wait at a still partially or wholly closed barrier.

[0019] In an advantageous preferred embodiment according to the present invention the operating means comprises a hand crank.

[0020] An intuitive operation is realized by using a hand crank as operating means. The road user is confronted with a closed barrier installation and will try to understand how the barriers can be opened. The hand crank is associated with hoisting of objects and the road user will therefore intuitively understand that the hand crank serves for the purpose of opening the barriers. The hand crank is for instance connected to a magnetic switch or optical switch for operating the barrier installation with the hand crank. Both barriers are for instance opened when the hand crank is operated on one side.

[0021] In an advantageous preferred embodiment according to the present invention the drive comprises a hand crank.

[0022] Because the drive comprises a hand crank the barrier installation can be opened using the mechanical force of the user. Less energy is hereby required. The hand crank is for instance provided with a mechanical transmission such as a gear train.

[0023] The measures of the two above embodiments are for instance combined so that the hand crank can be used both for operation and for driving. The drive is for instance partially realized by the hand crank so that the barrier or barriers can be opened by the road user with a light force. This can be seen as similar to pedal assist on a cycle.

[0024] Alternatively, the drive comprises a linear motor. This realizes a compact and simple construction. The gear train can in that case be omitted. The hand crank is optionally replaced with another operating element, such as a button, rotatable key or switch.

[0025] During use one barrier is preferably opened and/or closed by means of a direct manual drive such as a hand crank, and at least one other barrier is driven indirectly or mechanically. On one side of a track or intersecting road a barrier is for instance driven with the hand crank, and on the other side of the track or intersecting road a barrier is driven by a hydraulic system which is activated by the movement of the hand crank.

[0026] A further advantage of the use of a hand crank as drive is that, in the case of a power cut, the barrier installation can still be opened solely by making use of the mechanical force exerted by the user. The at least two barriers are preferably each provided with at least one hand crank. The hand crank on the other side preferably does not co-rotate when the hand crank on the one side is operated.

[0027] In a further advantageous preferred embodiment according to the present invention the hand crank is releasable. This achieves that the barrier installation can only be operated by the authorized user. The user couples the hand crank to the barrier installation in order to operate the installation and uncouples the hand crank after use so that another road user is prevented from operating the crossing. This is particularly advantageous

in the situation of a barrier installation on private property, wherein only the landowner possesses a hand crank with which the barriers can be opened.

[0028] In addition to the use of a releasable hand crank, numerous other operating means can be envisaged for a secure operation, such as a key, a remote control, numeric keys with an associated code and so on.

[0029] In an advantageous preferred embodiment according to the present invention the operating means is situated at least partially inside the part of the crossing closed by the at least two barriers in the closed situation.

[0030] The operating means of a level crossing is for instance situated on the side of at least one barrier directed toward the track.

[0031] Because an operating means is arranged inside the part of the crossing closed by the barriers, in the unlikely event road users are caught between the barriers they can always open them by making use of said operating means.

[0032] In a preferred embodiment according to the present invention the communication means are wireless communication means.

[0033] Making use of wireless communication means achieves that no cables have to be laid. It is for instance not necessary to drill under the track at a level crossing. The barrier installation can hereby be easily installed.

[0034] An advantage is that the barriers of the barrier installation can communicate with each other without cables having to be laid under the track. This results in a cost-saving in the installation.

[0035] In addition, the wireless communication means enable remote control of the barrier installation by a user. It is for instance possible here to envisage a farmer wishing to cross a track in his tractor. Owing to the wireless control, such as an infrared remote control, the farmer need not get out in order to open the barriers.

[0036] The wireless communication means for instance comprise a transmitter and receiver for infrared optical signals or radio signals, an operating means integrated into a navigation system or a Radio Frequency Identification (RFID) tag.

[0037] In a preferred embodiment according to the present invention an energy supply is arranged on at least one side of the barrier installation outside the part of the crossing closed by the at least two barriers in the closed situation.

[0038] By providing an energy supply the barrier installation is not dependent on a central energy supply. At a barrier device according to the invention applied as level crossing it is for instance possible to dispense with connection to the central power supply of the rail network.

[0039] An energy supply is preferably arranged on both sides of the barrier installation outside the part of the crossing which closable by the barriers. This avoids cables having to be laid under the ground. In the case of for instance a level crossing this avoids the necessity of drilling under the track. It hereby becomes possible to realize the installation of the barrier installation according

to the present invention in cost-effective and simple manner.

[0040] In a further preferred embodiment according to the present invention the energy supply comprises a solar cell or a wind turbine.

[0041] Because the energy supply comprises a solar cell or a wind turbine, the energy supply takes an independent form. No batteries need be changed and no connection need be made to a central electricity network.

[0042] The energy supply preferably further comprises a battery, wherein the battery is charged by the solar cell or wind turbine. The barrier installation can then also be activated without sunlight or wind. The installation according to the present invention is hereby low-maintenance, environmentally-friendly and cost-effective.

[0043] In an advantageous preferred embodiment according to the present invention at least one of the barriers comprises couplings for coupling a fence to this barrier.

[0044] Coupling a fence achieves that the barriers can be used to hold back cattle or other animals. Walkers are also prevented from crawling under the barriers. A safe barrier installation is hereby realized.

[0045] The barriers are provided with the above stated couplings preferably comprise an adjustable counterweight. The weight of the counterweight can hereby be adjusted to the presence or absence of a coupled fence. The counterweight for instance comprises a coupling part to which extra weight can be coupled, for instance in the form of lead blocks. The weight of the segmented counterweight is for instance adjusted by placing lead shot in the counterweight or removing it therefrom.

[0046] In a further advantageous preferred embodiment according to the present invention the at least one barrier comprises a segmented counterweight.

[0047] By dividing the counterweight into compartments, for instance internally, the weight of the counterweight can be adjusted to the presence of a fence. If a fence is coupled, more weight is placed in the compartments of the counterweight. If no fence is applied, less counterweight will suffice. This achieves that the same barrier installation can be used in situations where a fence is desired and in situations where only a barrier is desired.

[0048] In a further advantageous preferred embodiment according to the present invention the fence comprises pivot points so that the fence folds up when the at least one barrier is moved from the closed position to the open position and unfolds when this barrier is moved from the open position to the closed position.

[0049] This achieves that the fence takes up little space when the barriers are in the open position. A road user is hereby not impeded when crossing the level crossing.

[0050] The fence preferably comprises a damping mechanism, for instance rubber rings at the pivot points. The fence is hereby prevented from swinging when the barrier to which the fence is coupled moves up or down-

ward.

[0051] In an advantageous preferred embodiment the fence comprises a stacking profile. The fence is for instance embodied with vertical slats to which horizontal stacking profiles are coupled by means of pivot points. The stacking profiles for instance comprise a protrusion on the upper side and a corresponding recess in the underside so that the profiles can be stacked. Because the fence comprises a stacking profile a strong, compact and continuous fence is obtained in the open position of the barriers.

[0052] In an advantageous preferred embodiment according to the present invention the barrier installation comprises a light source which is set such that the light source emits more light during the day than at night.

[0053] Because the light source emits more light during the day than at night, the light source is readily visible during the day, while the light source does not shine too brightly at night. Because the light source does not shine too brightly at night, road users are not dazzled, this enhancing safety. In addition, the use of a bright light source at night is disruptive for the surrounding area. Energy is hereby also saved. The light source for instance comprises light-emitting diodes (LEDs), arranged for instance at multiple locations in the barriers.

[0054] Alternatively or additionally, the light source emits light during the day with a shorter or longer pulse duration than at night.

[0055] In an advantageous preferred embodiment according to the present invention the barrier installation comprises a light source and a sensor which is operatively connected thereto and which detects the presence of a road user.

[0056] Because the sensor detects the presence of a road user, the light source is only switched on when a road user is in the vicinity of the barrier installation. The light source is thus prevented from being on unnecessarily, which is favourable for the surrounding area and saves energy. The sensor is for instance a proximity sensor, a motion sensor or a sound sensor. In addition, the road user will notice that the light source switches on, whereby the road user is extra-alert. This enhances safety.

[0057] The sensor preferably only responds to people and large animals, so preventing small animals also activating the lights.

[0058] In an embodiment of the invention the sensor is placed some distance, for instance 10-200 m, from the crossing. The sensor communicates for instance wirelessly with the barrier installation.

[0059] An advantage of this embodiment is that the road user can already be detected at a great distance from the crossing. The sensor can moreover be disposed such that it detects the road user optimally. A known problem with infrared motion sensors in particular is that an approach parallel to the "viewing direction" of the sensor is poorly detected. An effective detection is realized by disposing the sensor such that this viewing direction is

positioned transversely of the road.

[0060] In an advantageous preferred embodiment according to the present invention the barriers comprise a burstplug which prevents rotation of the barriers around a substantially vertical axis, wherein the burstplug breaks when a predetermined force is exerted.

[0061] The barrier cannot normally rotate in a direction away from the crossing, or hardly so, because the burstplug prevents this. If a sufficiently great force is exerted on the barrier the burstplug will break. In case of emergency the road user can hereby break through the barrier to get to safety. Because the barrier breaks at a predetermined force, the barrier is prevented from breaking at the slightest force. Once the burstplug has broken the barrier can be moved in a direction away from the closable part of the crossing, which prevents a vehicle on an intersecting road or track being obstructed by the broken barrier. The predetermined force is adjustable, for instance by selecting a suitable thickness of the burstplug.

[0062] In an advantageous preferred embodiment according to the present invention at least one of the barriers has a modular construction.

[0063] The gears required are for instance embodied as a gear cassette. This achieves that, when the gears require maintenance, the gear cassette can be replaced as a whole, which makes maintenance very simple, quick and cost-effective.

[0064] The barrier installation preferably comprises a coupling for coupling the installation to field fencing. The barriers for instance comprise such a coupling.

[0065] Providing such a coupling achieves that at a level crossing in a field the barrier installation can be integrated into the fencing of the field.

[0066] In an advantageous embodiment of the invention each of the barriers comprises a safety mechanism which uncouples the drive when it is opposed by a certain force.

[0067] An advantage of this embodiment is that damage by vandalism can hereby be prevented, or in any case countered. When vandals for instance start hanging on a barrier of the installation, this can overload the drive, whereby it can be damaged. The safety mechanism prevents this by uncoupling the drive in this case.

[0068] The safety mechanism is for instance embodied as a load limiter between the drive and the fixed part of the barrier installation. The limiter is for instance a mechanical limiter which is reusable.

[0069] The safety mechanism is for instance embodied as two friction discs which are pressed against each other with a determined force by means of a spring. If too great a force is exerted on the drive, for instance because someone is hanging on a barrier, the friction discs will slip and the barrier will move downward, which prevents damage to the drive.

[0070] In an alternative embodiment the safety mechanism is embodied by means of a two-part configuration of each barrier. The two parts of the barrier are coupled by means of a burstplug which breaks when a determined

force is exceeded. A spring can also be used instead of a burstplug. At normal load the two parts lie mutually in line. In the case of overload the parts can move relative to each other. Once the overload has been released, the two parts move back to a position in which they lie mutually in line owing to the action of the spring.

[0071] The force at which the safety mechanism uncouples the drive is preferably adjustable.

[0072] The stated technical measures of the various embodiments can be combined to any desired combination. The barrier installation according to the present invention can for instance be applied at level crossings, road intersections, parking facilities, industrial premises and drawbridges. The same advantages and effects apply for barrier installations for use at for instance road intersections or a drawbridge as described in the embodiments relating to railway level crossings.

[0073] The invention further relates to a barrier for use in the above stated barrier installation.

[0074] The same advantages and effects apply for such a barrier as for the above mentioned barrier installation.

[0075] For use in a barrier installation with at least two barriers, such a barrier can be embodied in different ways. Firstly, one barrier can be embodied as main barrier which comprises the operating means, possibly a control system and an energy supply. The second barrier is then controlled by the first barrier by means of the communication means and provided with energy by a connection between the two barriers.

[0076] The barriers are preferably embodied as identical barriers. Both barriers comprise their own energy supply and have communication means for communication with each other and/or the operating means. This simplifies production and moreover achieves that the barriers are easy to install. Underground laying of cables can after all be dispensed with. At for instance a railway level crossing it is possible to dispense with laying cables under the track.

[0077] The invention further relates to a method for controlling a barrier installation as described above for safeguarding a crossing, wherein the method comprises the following steps of:

- moving at least two barriers from the closed to the open position substantially simultaneously when a road user operates an operating means for this purpose; and
- moving the barriers from the open to the closed position once the road user has passed the barriers.

[0078] The same advantages and effects apply for such a method as for the above stated barrier installation and the above stated barrier.

[0079] During control according to the method use is preferably made of a barrier installation as described above.

[0080] The measures of the above described barrier

installation can be applied in corresponding manner in the method according to the invention, with the same advantages and effects.

[0081] Further advantages, features and details of the invention are elucidated on the basis of preferred embodiments thereof, wherein reference is made to the accompanying drawings.

Figure 1A shows a front view of a barrier according to a first embodiment of the present invention;

Figure 1B shows a front view of a barrier according to a second embodiment of the present invention;

Figure 2 shows a side view of the barrier according to figure 1A.

Figure 3 shows a detail of the barrier according to figure 1A.

Figure 4 shows a cross-sectional top view of drum 22 of figures 1A and 2.

Figure 5 shows a cross-sectional front view of drum 22 of figure 6.

Figures 6 and 7 show a side view of a detail of figure 5.

Figure 8 shows a hydraulic diagram of a hydraulic unit for driving a level crossing according to the present invention.

[0082] A barrier installation for use as railway level crossing comprises at least two barriers 2, one of which is shown in figure 1A. Barrier 2 comprises a bar 4 which is rotatable around drum 22. Bar 4 is connected to counterweight 8 which is situated on the other side relative to drum 22. Counterweight 8 comprises internal compartments 10 with which the weight of the counterweight can be varied. In the shown embodiment a hydraulic unit 6 for driving barrier 2 is arranged in one of the compartments 10 of counterweight 8. In the closed position the barrier rests on support 34.

[0083] Barrier 4 comprises coupling means 5 for coupling a fence 16 to bar 4. In the shown embodiment coupling means 5 are aluminium blocks which are pushed at a certain distance from each other into a channel on the underside of the barrier. The blocks are provided with holes through which bolts are placed. Vertical strips 14 are fixed on either side of the blocks. A number of horizontal planks 12 are situated therebetween. These horizontal planks 12 are coupled to vertical strips 14 by means of pivot points 18. Fence 16 will hereby fold up when bar 4 is moved upward (as in figure 2).

[0084] In order to prevent fence 16 coming into contact with drum 22 in the open position, in a first embodiment the top part of strips 14 is rigidly connected to bar 4. The bottom two horizontal planks are however rotatable (figure 1A).

[0085] In a second embodiment of the level crossing the barrier 4, as seen in the closed position, is for this purpose placed lower relative to the rotation shaft of drum 22 (figure 1B).

[0086] Bar 4 comprises light-emitting diodes (LEDs)

20. Sensor 40 is further provided. Sensor 40 is a motion sensor which is adapted to detect large animals and people. When sensor 40 detects a large animal or human, LEDs 20 are switched on in order to thus alert the road user. Sensor 40 is situated on mast 44. LEDs 20 are adapted such that they shine brighter during the day than at night. This is for instance realized by means of a light-sensitive sensor or by a time switch (not shown).

[0087] A solar cell 42 is moreover situated on mast 44. Solar cell 46 charges a battery (not shown). The battery provides for the energy supply of drive 6, sensor 38 and LEDs 20.

[0088] In addition, an antenna 46 for sending and receiving signals from or to the operating means or another barrier is situated on mast 44.

[0089] The system is installed on a foot 26 comprising a foot plate and a round upright 54 (figures 1, 2). The round upright 54 comprises two rings 58. Framework 36 is placed over the upright. Owing to the dimensioning of upright 54, rings 56 and framework 36, framework 36 is situated several millimetres above the foot plate, whereby they are prevented from rusting together.

[0090] The construction as shown in figures 1A, 1B and 2 makes it possible for framework 36 to rotate around the upright. This is prevented by burstplug 60. The whole is further fixed by screw 62. If burstplug 60 breaks due to a determined force being exerted, for instance because a vehicle drives into barrier 4, framework 36 can rotate. The thickness of burstplug 60 determines the force required.

[0091] Mast 44 is placed on framework 36 and fixed by means of screws from the inside of framework 36. Framework 36 is closed by closure 36. Upright edge 38 prevents rain being able to flow into framework 36.

[0092] Framework 36 has a bend (figure 2) so that a space 29 is formed between the bottom part of framework 36 and counterweight 8. The purpose of space 29 is two-fold. On the one hand users are prevented from possibly injuring themselves by getting caught between the parts of barrier 4. Secondly, space is created for the fence in the highest position of the barrier; the fence does not come into contact with framework 36.

[0093] Barrier 2 can be operated by means of hand crank 24. A hand crank 24 is arranged on both the outer side and the inner side of barrier 2 (figure 2). Barrier 2 can hereby be operated from both sides. When barrier 2 is opened using hand crank 24, the hand crank of a barrier on the other side will not co-rotate when this barrier is opened, for instance using a hydraulic unit.

[0094] Support post 34 comprises two posts 50 which are placed opposite each other and which are connected by means of rubber support element 52 (figure 3). A space is present between posts 50. In closed position the bar 4 will rest on support element 52 and fence 16 will here be situated between posts 50.

[0095] Drum 22 comprises fixed part 70 and rotatable part 72 (figure 4). Primary shaft 74 runs through both parts. Primary shaft 74 is connected at the outer ends to

hand cranks 24 by means of flanges 76, 78.

[0096] Primary friction plate 80 is coupled by spring-mounted pressure plate 82. Flexible coupling 84 is fixedly connected to primary shaft 74. Flexible coupling 84 allows roughly a one-third free turn by means of springs. A permanent magnet (not shown) which opens a valve 114 of hydraulic unit 6 via a magnetic switch co-displaces with primary friction plate 80. In addition, primary friction plate 80 actuates a Bowden cable which controls a two-way valve with spring 116 in hydraulic unit 6.

[0097] The primary shaft also comprises a pressing ring 86, pivot bearing 88, ring 90 co-rotating with bush, and primary gear 92. Primary gear 92 is enclosed between friction discs and couples primary shaft 74 to gear train 94 when pressing ring 86 is pressed. Gear train 94 is coupled to output shaft 75, which is coupled to rotatable part 72 via gear 77.

[0098] Pressing ring 86 is actuated by a spring 104 with adjustable bias (figure 5, 6, 7). Spring 104 is adjustable, whereby the basic pressure on the friction discs around primary gear 92 can be adjusted. Spring 104 couples primary gear 92 to output shaft 75 via gear train 94.

[0099] If a greater force than necessary is exerted on barrier 4, for instance because a person is hanging on bar 4, the friction discs will slip, whereby bar 4 closes and overloading of the installation is prevented. The bar on the other side of the track is preferably also closed by means of control via a control system (not shown).

[0100] During use a small hydraulic cylinder 106 with a force of 20-40 kg acts counter to the spring pressure of spring 104, whereby the friction connection between primary shaft 74 and primary gear 92 is uncoupled via lever 102.

[0101] Cylinder 106 is also shown in the hydraulic diagram of figure 8. A pump unit 108 with adjustable pressure-relief valve and reservoir 109 is connected to an overpressure switch 110, main cylinder 112, 12V normally closed valve 114, two-way valve with spring 116 and flow-controlled non-return valve 118, and via flexible coupling 111 to cylinder 106. Valve 114 and two-way valve 116 are activated by rotating primary friction plate 80. Pump unit 108 can for instance be operated using a magnetic switch.

[0102] When a road user approaches barrier 2, sensor 40 will detect this. LEDs 20 in bar 4 are switched on. The road user will hereby be alert. The road user looks to see whether the track can be crossed. If this is the case, the road user turns hand crank 24, which activates drive 6 of barrier 2, whereby bar 4 will open.

[0103] The crank turns primary shaft 74 of drum 22. Primary friction plate 80 rotates and a magnetic switch is turned, whereby valve 114 is opened. A Bowden cable which co-rotates with friction plate 80 opens valve 116.

[0104] Cylinder 106 is activated before main cylinder 112 is activated. Cylinder 106 moves lever 102 counter to the spring pressure of spring 104, whereby the friction connection between primary shaft 74 and primary gear 92 is uncoupled. Bar 4 is in that case opened by means

of cylinder 112. If the cylinder does not overcome the spring pressure of spring 104, the bar is driven by the rotating movement of primary shaft 74 which drives output shaft 75 via gear train 94. Because output shaft 75 is mounted on gear 77 in rotating part 72, this part will begin to rotate and move the bar 4 fixed thereto upward.

[0105] When the road user employs the hand crank, antenna 46 transmits a signal to the barrier placed on the other side of the track (not shown). This barrier will open substantially simultaneously with the shown barrier 2.

[0106] Fence 16 of barrier 2 will fold here under the influence of gravitational force. The energy required is supplied by solar cell 42 and/or associated battery. Bar 4 closes automatically after a predetermined time period. This can be realized for instance by a control system (not shown) placed in framework 36 and closed by closure 36.

[0107] The present invention is by no means limited to the above described preferred embodiments thereof. The rights sought are defined by the following claims, within the scope of which many modifications can be envisaged.

[0108] It is thus possible for instance to arrange a signal lamp intended for the purpose of warning approaching crossing vehicles, such as trains in the case of an intersecting track or cars in the case of an intersecting road. This signal lamp is activated when the barriers are open.

[0109] It is further possible for instance to provide the barrier installation with detection means for detecting a crossing vehicle such as a train. It is hereby possible to open and close the barriers automatically or to prevent the possibility of the barriers being opened when a crossing vehicle approaches. In the latter case, the operating means on the outside of the barrier is blocked when a train is detected, but operating means on the inside continue to function.

[0110] The barrier installation can be applied at a fixed location, or the barrier installation can be provided as mobile barrier installation. This is particularly advantageous in combination with the wireless communication means. A mobile installation can for instance support traffic controllers during events.

[0111] The invention can be applied at railway level crossings, intersecting roads, drawbridges, parking facilities and industrial premises.

Claims

1. Barrier installation for safeguarding a crossing, comprising:

- at least two barriers comprising a drive for moving the barriers from a closed position to an open position and vice versa;
- an operating means which is operatively connected to the drive and with which the barrier

- installation can be operated by a road user such that the barriers can be operated to move to the open position by the road user in order to leave the crossing clear; and
 - communication means operatively connected to the barriers for communication with each other and/or with the operating means.
2. Barrier installation as claimed in claim 1, wherein the operating means is set to automatically close the barriers after a predetermined time when they are in the open position.
 3. Barrier installation as claimed in claim 1 or 2, comprising a sensor operatively connected to the operating means for detecting the presence of persons located on the crossing between the at least two barriers, wherein the operating means is adjusted to hold the barriers in the open position as long as the sensor detects the presence of a person between the at least two barriers.
 4. Barrier installation as claimed in claim 1, 2 or 3, wherein the operating means is adjusted to move the barriers substantially simultaneously to the open or closed position.
 5. Barrier installation as claimed in one or more of the claims 1-4, wherein the operating means or the drive comprises a hand crank, wherein the hand crank is preferably releasable.
 6. Barrier installation as claimed in one or more of the claims 1-5, wherein the operating means is situated at least partially inside the part of the crossing closed by the at least two barriers in the closed situation.
 7. Barrier installation as claimed in one or more of the claims 1-6, wherein the communication means are wireless communication means.
 8. Barrier installation as claimed in one or more of the claims 1-7, wherein an energy supply is arranged on at least one side of the barrier installation outside the part of the crossing closed by the at least two barriers in the closed situation, wherein the energy supply preferably comprises a solar cell or wind turbine.
 9. Barrier installation as claimed in one or more of the claims 1-8, wherein at least one of the barriers comprises couplings for coupling a fence to this barrier, preferably wherein the at least one barrier comprises a segmented counterweight and/or wherein the fence comprises pivot points so that the fence folds up when the at least one barrier is moved from the closed position to the open position and unfolds when this barrier is moved from the open position to the closed position, and/or wherein the fence comprises a stacking profile.
 10. Barrier installation as claimed in one or more of the claims 1-9, comprising a light source which is set such that the light source emits more light during the day than at night and/or a light source and a sensor which is operatively connected thereto and which detects the presence of a road user.
 11. Barrier installation as claimed in one or more of the claims 1-10, wherein the barriers comprise a burstplug which prevents rotation of the barriers around a substantially vertical axis, wherein the burstplug breaks when a predetermined force is exerted.
 12. Barrier installation as claimed in one or more of the claims 1-11, wherein at least one of the barriers has a modular construction.
 13. Barrier installation as claimed in one or more of the claims 1-12, wherein each barrier comprises a safety mechanism which uncouples the drive when it is opposed by a certain force.
 14. Barrier for use in a barrier installation as claimed in one or more of the claims 1-13.
 15. Method for controlling a barrier installation as claimed in one or more of the claims 1-14 for safeguarding a crossing, comprising of:
 - moving at least two barriers from the closed to the open position substantially simultaneously when a road user operates the operating means for this purpose; and
 - moving the barriers from the open to the closed position once the road user has passed the barriers.

FIG. 1A

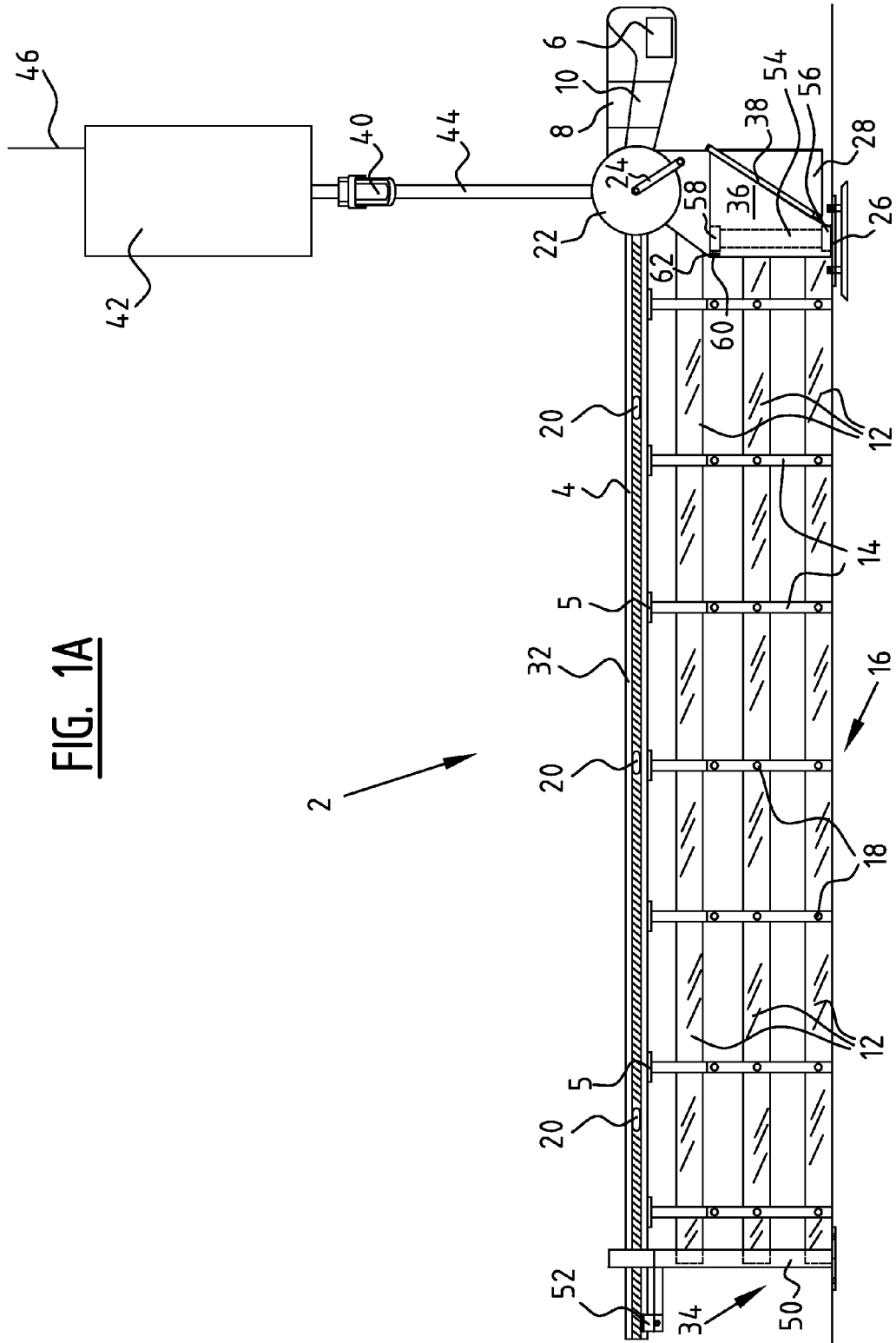
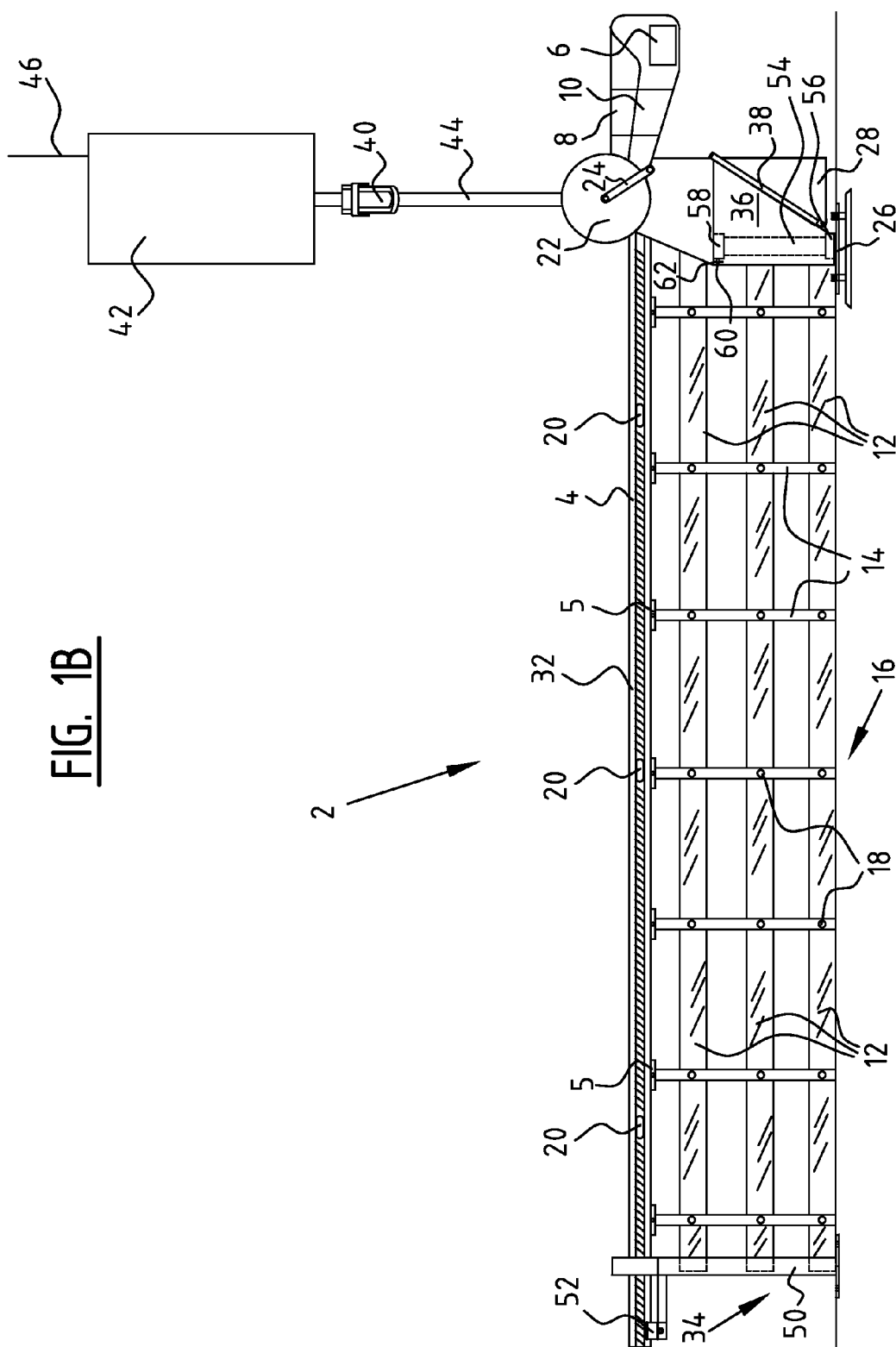
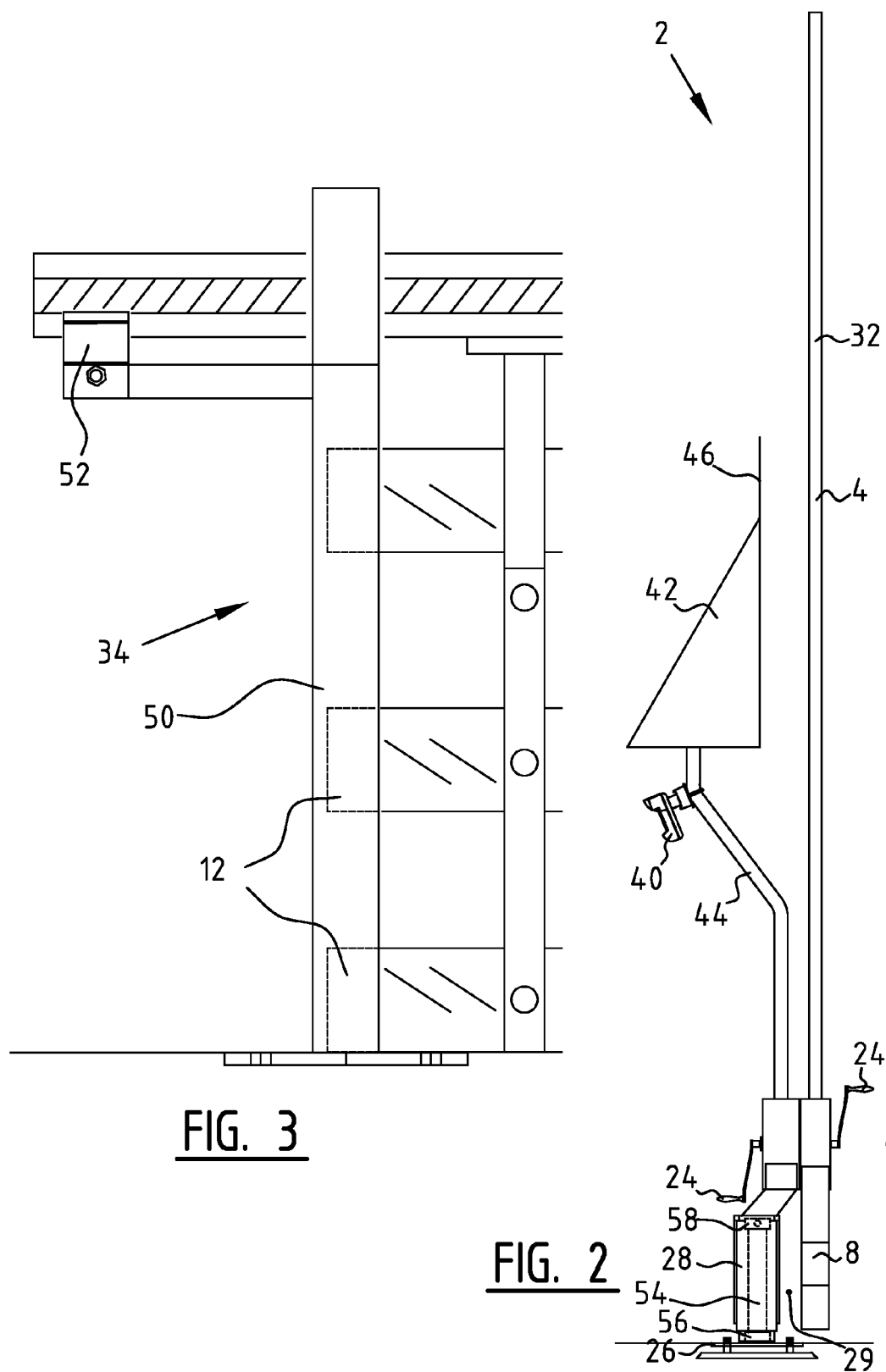
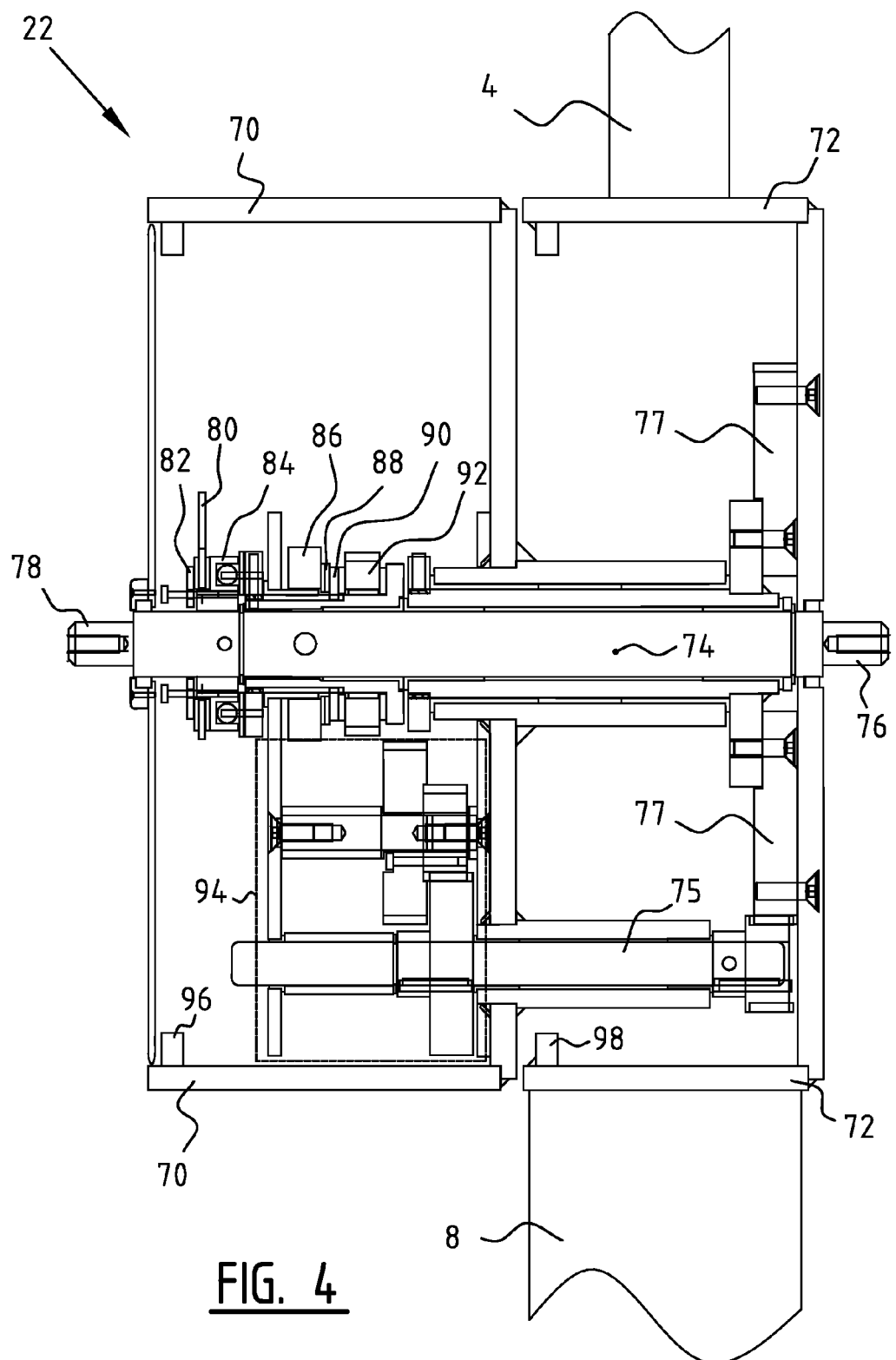
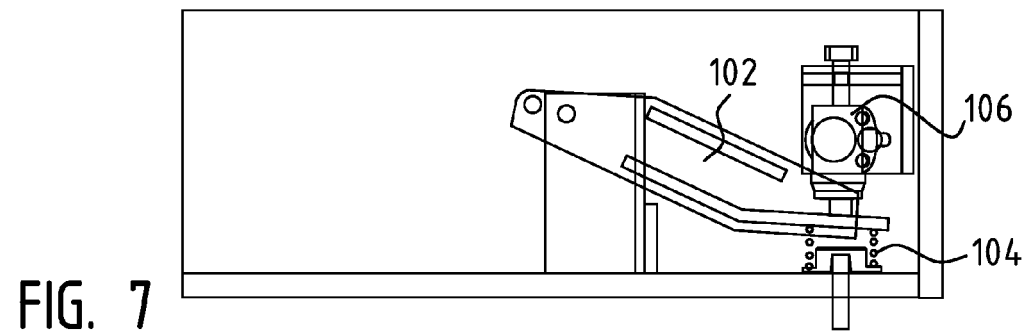
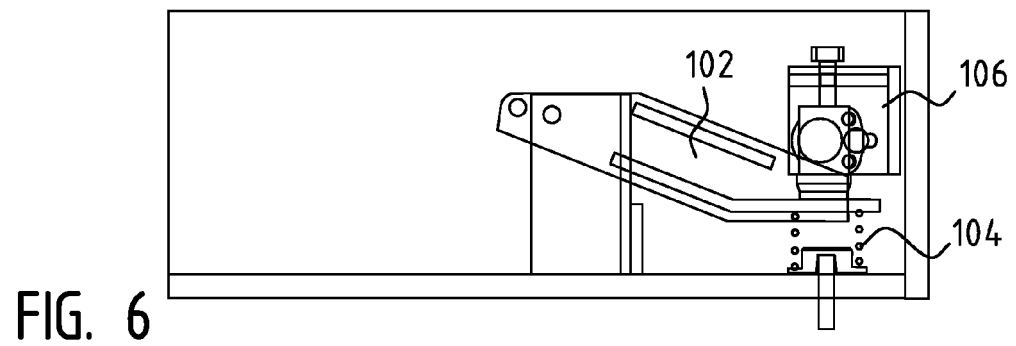
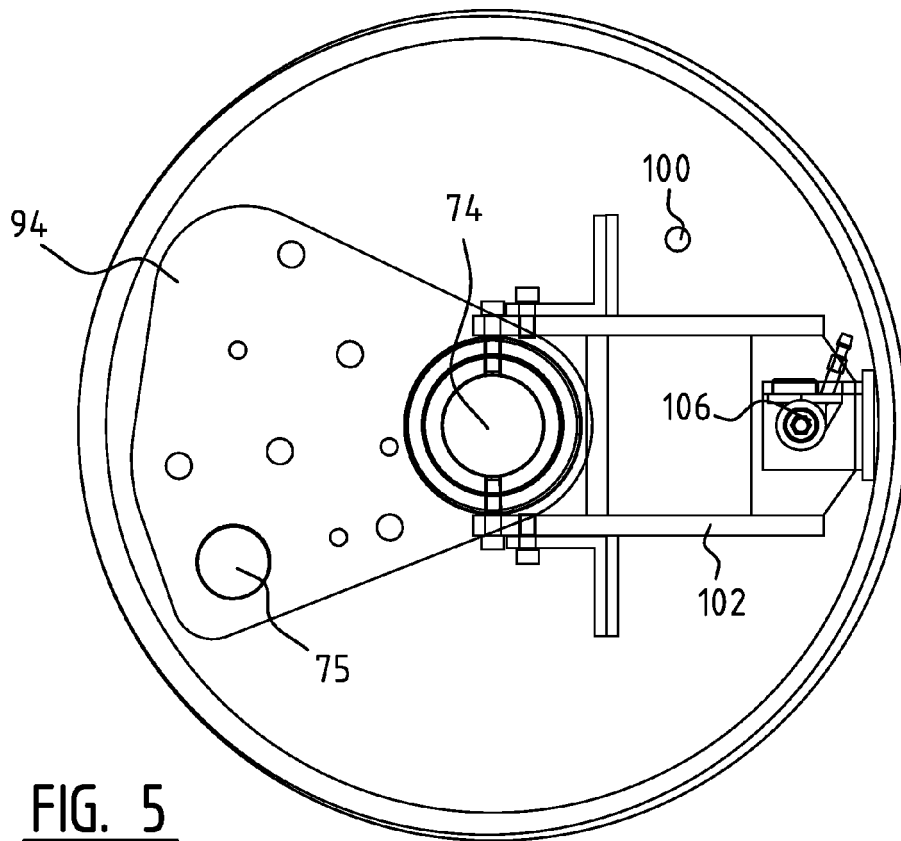


FIG. 1B









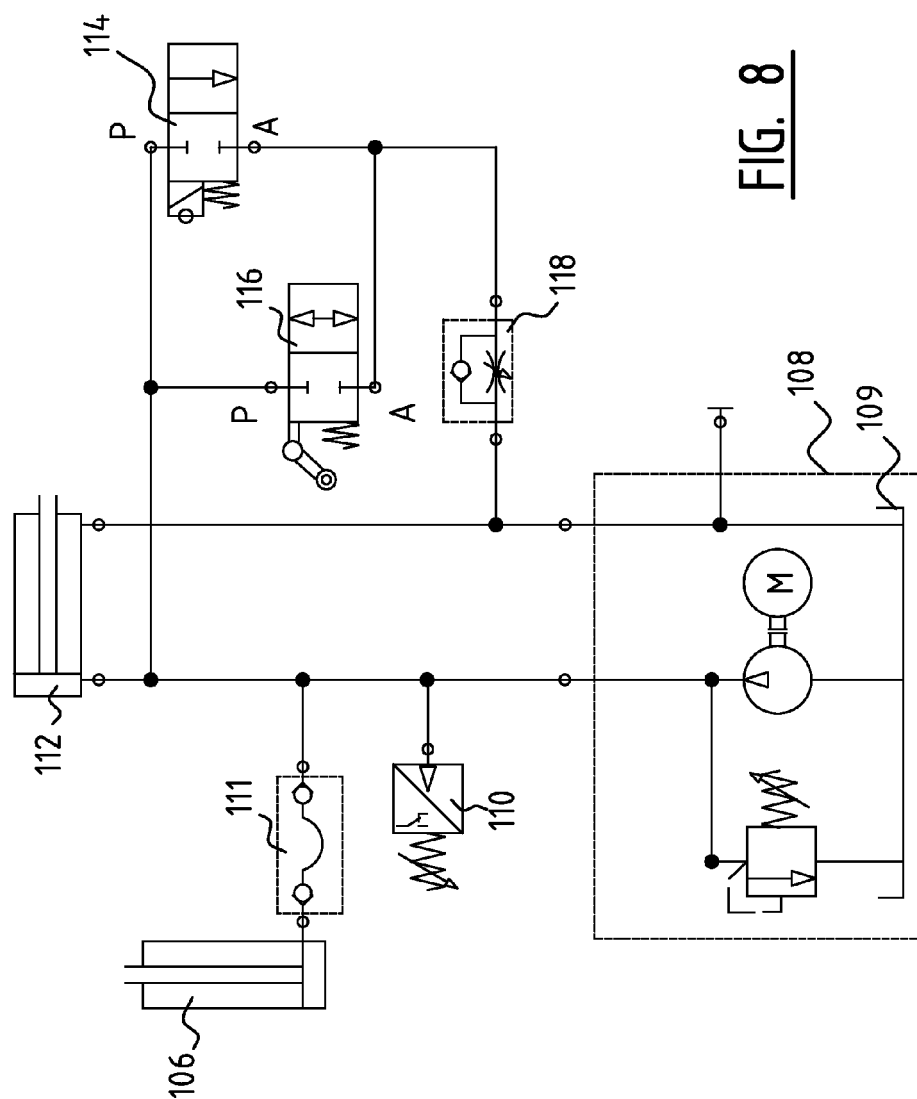


FIG. 8



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 1
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