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(54) **LOCK FOR DOORS/WINDOWS/SHUTTERS**

(57) Lock for doors/windows/shutters comprising a box-like body (2) provided with at least one front opening (3), a latch bolt (4) slidably housed in the box-like body (2) along a movement direction (X), provided with a stop portion (5) carrying, associated therewith, at least one first magnet (11) and susceptible of crossing the front opening (3) of the box-like body (2), a shaped counter-plate (7) provided with a housing cavity (13) delimited by at least one lateral wall and adapted to receive the stop portion (5) of the latch bolt (4) at its interior, at least one second magnet (12) mechanically associated with the shaped counter-plate (7) and susceptible of attracting the first magnet (11), movement means (10) housed within the box-like body (2), mechanically associated with said latch bolt (4) and drivable in order to move the latch bolt (4) between a retracted position and an extended position in order to insert the stop portion (5) within the housing cavity (13) of the shaped counter-plate (7); the first magnet (11) of the latch bolt (4) is provided with two first magnetic poles aligned along a first magnetization axis (Z) parallel to the movement direction (X) and the second magnet (12) of the shaped counter-plate (7) is placed at the lateral wall (8) and is provided with two second magnetic poles aligned along a second magnetization axis (Y) substantially orthogonal to the movement direction (X).

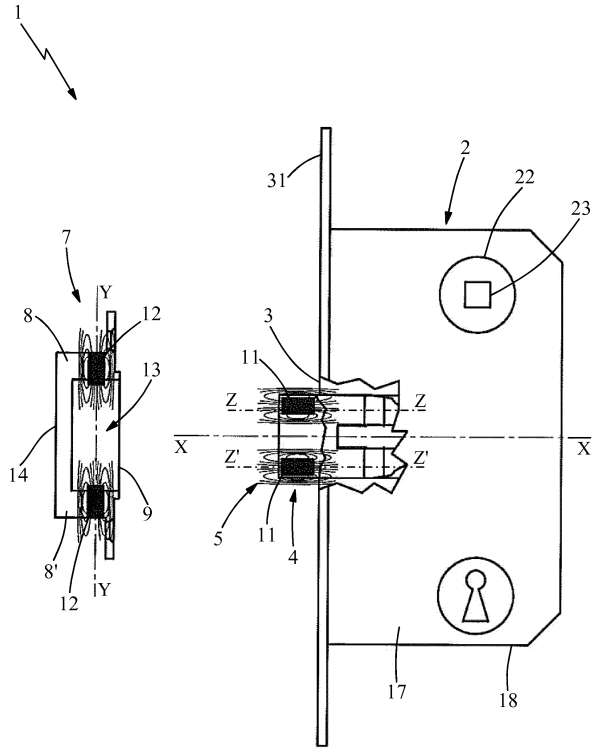

Fig. 2

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Description

Field of application

[0001] The present invention regards a lock for doors/windows/shutters according to the preamble of the independent claim.

[0002] The present lock is adapted to be advantageously used in the field of production of accessories for doors/windows/shutters, in particular in the field of production of locks, in particular locks with latch bolt and it is intended to be used for opening and closing the door/window/shutter itself, such as a door.

[0003] Therefore, the present invention falls within the field of production of doors/windows/shutters, in particular in the field of production of accessories for doors/windows/shutters and still more particularly in the field of production of locks.

State of the art

[0004] Multiple types of locks for closing and opening doors/windows/shutters are known on the market, e.g. for moving the movable wing of a door with respect to a fixed frame placed to border an opening screened by the movable wing itself.

[0005] Normally, the locks for doors/windows/shutters of known type comprise a box-like containment body intended to be embedded in the movable wing of the door/window/shutter, e.g. in the movable wing of a door.

[0006] The box-like body is provided with a front plate intended to be visible on a free lateral edge of the movable wing of the door; such edge is substantially vertical and is susceptible of facing a fixed upright of the frame.

[0007] The lock also comprises at least one latch bolt, normally made of metal material or hard plastic material, slidably inserted within the box-like body and placed to cross an opening made on the front plate of the box-like body.

[0008] The latch bolt is extended between two opposite ends, including a stop portion susceptible of being inserted within a shaped counter-plate (called such in the jargon of the field) and a movement portion placed within the box-like body.

[0009] The shaped counter-plate is normally made of metal material or hard plastic material, and is housed in the fixed upright of the frame of the door/window/shutter.

[0010] The shaped counter-plate defines a housing cavity for at least partially containing the stop portion of the latch bolt.

[0011] The latch bolt is movable between an extended position, in which it is partially extracted from the box-like body, with the stop portion placed within the shaped counter-plate, locking the movable wing of the door/window/shutter in a closed position in which it is placed to cover the opening to be screened, and a retracted position, in which the latch bolt is housed within the box-like body, it is mechanically released from the shaped counter-plate so that the user is free to move the movable wing with respect to the fixed frame, for example by rotating the door on the hinges provided on an upright of the frame in order to free the opening.

[0012] For the purpose of moving the latch bolt between the retracted and extended positions, the locks of known type are provided with at least one handle that can be maneuvered by the user and movement means housed within the box-like body mechanically connected to the handle and to the latch bolt.

[0013] The handle is placed to cross the box-like body and is mechanically connected to the movement means, which usually comprise a cam which engages the movement portion of the latch bolt.

[0014] In operation, the user acts on the handle in order to drive in rotation the cam, which is mechanically associated with the latch bolt by means of the aforesaid movement means.

[0015] An example of a lock of known type provided with at least one latch bolt, of the type briefly described up to now, is described in the document EP1156180.

[0016] More in detail, the lock described herein is provided with two different latch bolts, slidable in a parallel manner along two substantially horizontal directions and arranged one on top of the other. Such latch bolts are both susceptible of being moved independently between the lock position and the release position in order to be respectively locked with a first and a second shaped counter-plate, provided vertically aligned and each provided with a shaped seat in order to house the stop portion of the corresponding latch bolt.

[0017] As is known, the latch bolt of the lock of known type (also known, in the technical jargon of the field, as a lock with mechanical latch bolt) is always at least partially extracted from the box-like body, in extended position, also with the movable wing in open position.

[0018] In order to bring the movable wing into the closed position, the user must actuate the handle and bring the latch bolt into the retracted position, bring the wing of the door/window/shutter into the closed position and release the handle. At this point, the latch bolt is spontaneously moved by the movement means from the retracted position to the extended position, in which it engages the cavity of the shaped counter-plate and locks the movable wing in the aforesaid closed position.

[0019] The lock of known type described briefly above has in practice shown that it does not lack drawbacks.

[0020] The main drawback lies in the fact that the stop portion of the latch bolt produces an unpleasant sharp noise when it is placed within the housing cavity of the corresponding shaped counter-plate, with the latch bolt in the extended position in order to lock the movable wing in the closed position.

[0021] Indeed, when the latch bolt is moved from the retracted position to the extended position, the stop portion enters into the shaped counter-plate since the latch bolt itself is thrust by a spring of the movement means.

[0022] In addition, frequently the movable wing of the

door/window/shutter, such as a door, is moved from the open position to the closed position without the user actuating the handle, e.g. for ease of use. In this situation, the latch bolt is forced to be moved from the extended position (in which it is normally situated) to the retracted position by interference with the fixed upright of the frame of the door/window/shutter, in order to then return into extended position once the latch bolt is aligned with the cavity of the shaped counter-plate. Such forced movement of the latch bolt generated by the interference with the upright generates a noise that is annoying for the user.

[0023] A further drawback lies in the fact that the stop portion of the latch bolt remains permanently outside the front plate of the box-like body of the lock, and is therefore visible when the movable wing of the door/window/shutter is in open position.

[0024] The visible latch bolt is deemed unaesthetic with regard to outward appearance, since today - in the world of fashion and design - "clean" external lines are preferred.

[0025] In order to at least partially overcome the drawbacks of the lock of known type described above, a lock for doors/windows/shutters has for some time been known as provided with latch bolt with magnetic actuation.

[0026] An example of a magnetic actuation lock is described in the patent IT 1377400; such lock of known type is provided with a first magnet arranged within the latch bolt at its stop portion and with a second magnet arranged within the shaped counter-plate.

[0027] More in detail, the first magnet and the second magnet of the lock of known type are both provided with two magnetic poles, aligned with each other along a substantially horizontal direction.

[0028] The second magnet is housed in the shaped counter-plate at a bottom wall thereof facing an access opening for the insertion of the stop portion of the latch bolt.

[0029] In this manner, the first magnet of the latch bolt is aligned with and attracted by the second magnet of the shaped counter-plate when the movable wing of the door/window/shutter is moved into the closed position, automatically moving it from the release position into the lock position.

[0030] The latch bolt is configured for being invisible with the movable wing of the door/window/shutter in the open position, e.g. with the stop portion terminating with a substantially smooth wall on the same plane as the front plate.

[0031] In addition, the lock with magnetic latch bolt of known type is adapted to produce less noise when the stop portion of the latch bolt enters into the cavity of the shaped counter-plate, since even if the movable wing is moved close to the fixed upright in order to close the door/window/shutter, the latch bolt does not interfere with the upright itself, and therefore does not generate any annoying noise.

[0032] In addition, the latch bolt exits from the box-like body in order to be brought into closed position only when it is aligned with the magnet of the shaped counter-plate, without substantially intercepting the upright, reducing the generated noise.

[0033] Nevertheless, even the lock for doors/windows/shutters provided with latch bolt with magnetic actuation of known type has in practice shown that it does not lack drawbacks. The main drawback lies in the fact that the shaped counter-plate of such known locks is particularly bulky due to the space necessary for housing the magnet at its interior. Consequently, the shaped counter-plate has a considerable depth with its bottom wall that must be considerably embedded in the upright of the frame. For such purpose, it is necessary to make a particularly deep milling on the aforesaid upright of the frame.

[0034] Such milling operation is particularly costly and above all requires very thick and strong frames so that they can receive one such deep milling.

Presentation of the invention

[0035] In this situation, the problem underlying the present invention is therefore that of overcoming the abovementioned drawbacks by providing a lock for doors/windows/shutters which is provided with a shaped counter-plate with limited size.

[0036] A further object of the present invention is to provide a lock for doors/windows/shutters which is quick and simple to install.

[0037] A further object of the present invention is to provide a lock for doors/windows/shutters which is entirely reliable in operation.

[0038] A further object of the present invention is to provide a lock for doors/windows/shutters which is simple to use.

[0039] A further object of the present invention is to provide a lock for doors/windows/shutters which is provided with high aesthetic value.

Brief description of the drawings

[0040] The technical characteristics of the finding, according to the proposed objects, can be clearly seen in the contents of the below-reported claims and the advantages thereof will be more evident in the detailed description of a preferred but not exclusive embodiment of a lock for doors/windows/shutters according to the finding, illustrated as a non-limiting example in the enclosed drawing tables, in which:

FIG. 1 shows an exploded perspective view of the lock for doors/windows/shutters, object of the present invention;

FIG. 2 shows a front view of the lock for doors/windows/shutters according to the present invention with some parts removed in order to better illustrate

other parts;

FIG. 3 shows a front view of a particular lock for doors/windows/shutters according to the present invention regarding a shaped counter-plate and a latch bolt, with some parts removed in order to better illustrate other parts.

Detailed description of a preferred embodiment

[0041] With reference to the enclosed drawings, reference number 1 overall indicates a lock for doors/windows/shutters in accordance with the present invention.

[0042] The lock 1 is intended to be advantageously used in the field of production of doors/windows/shutters, in particular for allowing the opening and closing of movable wings of doors so as to screen an opening made on a building wall.

[0043] The lock 1 according to the invention comprises a box-like body 2 intended to be mechanically embedded within a movable wing of a door/window/shutter, such as a door, usually.

[0044] More in detail, the box-like body 2 is fixed to the wing with a front plate 31 thereof placed at a free edge of the wing at the edge opposite that in which the hinges are provided for pivoting the wing.

[0045] The front plate 31 is advantageously substantially coplanar with the free edge of the wing and has an opening 3 whose function will be clarified hereinbelow.

[0046] Advantageously, the box-like body 2 comprises a first shaped plate 16 and a second shaped plate 17 facing each other, substantially parallel and peripherally joined by a perimeter wall 18 comprising the aforesaid front plate 31.

[0047] Advantageously, between the first shaped plate 16, the second shaped plate 17 and the perimeter wall 18, a housing space 19 is defined.

[0048] In accordance with a first embodiment, the box-like body 2 of the lock 1 is made of metal material, such as zinc, aluminum, steel, iron or an alloy, such as brass or zama.

[0049] In accordance with a further embodiment, the box-like body 2 of the lock 1 is made of plastic material, preferably rigid, so as to limit the production costs.

[0050] The lock 1, object of the invention, also comprises a latch bolt 4, which is slidably housed in the box-like body 2 along a movement direction X, and is provided with a stop portion 5 having, associated therewith, at least one first magnet 11 and susceptible of crossing the front opening 3 of the box-like body 2.

[0051] In accordance with the preferred embodiment illustrated in the enclosed figures, the latch bolt 4 has elongated shape which is extended along the movement direction X.

[0052] The latch bolt 4 is also provided, in accordance with the preferred embodiment illustrated in the enclosed figures, with a movement portion 6, in particular opposite the stop portion 5 with respect to its extension in the movement direction X.

[0053] Preferably, the movement portion 6 of the latch bolt 4 is housed within the housing space 19 of the box-like body 2.

[0054] The latch bolt 4 is slidably housed within the box-like body 2, with at least the stop portion 5 susceptible of crossing the front opening 3 and is provided with at least one first magnet 11 placed at the stop portion 5.

[0055] Advantageously, the front plate 31 of the box-like body 2 delimits the front opening 3 for the passage of the stop portion 5 of the latch bolt 4.

[0056] The lock 1, object of the present invention, also comprises a shaped counter-plate 7 intended to be mechanically associated with a fixed upright of the door/window/shutter and configured for housing the stop portion 5 of the latch bolt 4. The shaped counter-plate 7 comprises at least one lateral wall 8 at least partially delimiting a housing cavity 13, which is extended starting from an access opening 9 for the access of the stop portion 5 of the latch bolt 4. The access opening 9 of the shaped counter-plate 7 is advantageously substantially coplanar with a perimeter edge of the fixed frame.

[0057] In accordance with one embodiment of the invention, the box-like body 2 of the lock 1 is intended to be embedded in the movable wing of the door/window/shutter, with the front plate 31 that is visible and aligned flush with a free edge of the movable wing itself. As an example, the door/window/shutter can be constituted by a door of a house, in particular made of wood, with the front plate 31 arranged flush with the vertical free edge of the door, i.e. with the edge parallel and opposite that pivoted to the frame.

[0058] Advantageously, the at least one lateral wall 8 of the shaped counter-plate 7 is extended along a plane substantially parallel to the movement direction X of the latch bolt 4, even if it could be set horizontally or vertically.

[0059] According to the invention, the lock 1 also comprises at least one second magnet 12 mechanically associated with the shaped counter-plate 7, susceptible of attracting the at least one first magnet 11 associated with the latch bolt 4.

[0060] The lock 1, object of the invention, also provides for movement means 10 housed within the box-like body 2, mechanically associated with the latch bolt 4, and in particular associated with the movement portion 6 of the latch bolt 4 itself.

[0061] Such movement means 10 are susceptible of moving the latch bolt 4 between a retracted position, in which it is substantially housed within the box-like body 2, and an extended position, in which it is at least partially placed to cross the front opening 3 in order to house the stop portion 5 within the housing cavity 13 of the shaped counter-plate 7 and thus constrain the movable wing to the fixed upright of the door/window/shutter, in a substantially closed position.

[0062] According to the idea underlying the present invention, the first magnet 11 of the latch bolt 4 of the lock 1 is provided with two first magnetic poles aligned along a first magnetization axis Z parallel to the movement di-

rection X and the second magnet 12 of the shaped counter-plate 7 is placed at the lateral wall 8 and is provided with two second magnetic poles aligned along a second magnetization axis Y substantially orthogonal to the movement direction X.

[0063] In this manner, the shaped counter-plate 7 of the lock 1, object of the present invention, is extended depth-wise along the movement direction X for a limited length and of course shaped for housing the stop portion 5 of the bolt 4. The size of the magnets along the axis of the poles is in fact generally greater with respect to the plane orthogonal to the axis of the poles. With the claimed configuration of the magnets, it is possible to reduce the size of the depth required for the shaped counter-plate 7, allowing a housing thereof without attaining deep milling in the fixed frame of the door/window/shutter.

[0064] In accordance with the preferred embodiment illustrated in the enclosed figures, the latch bolt 4 is provided with two first magnets 11 placed at the stop portion 5, both provided with two first magnetic poles aligned along two corresponding first magnetization axes Z, Z' both parallel to the movement direction X.

[0065] Advantageously, the first magnets 11 of the latch bolt 4 have substantially cylindrical shape and are housed at the stop portion 5, side-by-side and provided with first magnetic poles aligned along two directions, both parallel to the movement direction X of the latch bolt 4.

[0066] In accordance with the preferred embodiment illustrated in the enclosed figures, the shaped counter-plate 7 comprises at least two facing lateral walls 8, 8' and is provided with two second magnets 12 fixed to the two lateral walls 8, 8', substantially facing each other and both provided with two second magnetic poles substantially aligned along the second magnetization axis Y. Such two lateral walls 8, 8' are advantageously with horizontal position and placed one on top of the other.

[0067] More in detail, the two first magnets 11 housed in the stop portion 5 of the latch bolt 4 are intended to be placed vertically one on top of the other with the corresponding first magnetization axes X substantially horizontal, when the box-like body 2 is mounted on the movable wing of the door/window/shutter, such as for example a door.

[0068] In this situation, the two lateral walls 8, 8' of the shaped counter-plate 7 are intended to be housed in the fixed upright of a frame of the door/window/shutter, being extended along two substantially parallel and horizontal planes, in which each of the two second magnets 12 is susceptible of being magnetically coupled with a corresponding first magnet 11 of the latch bolt 4.

[0069] Advantageously, the at least one first magnet 11 of the latch bolt 4 and the at least one second magnet 12 of the shaped counter-plate 7 are neodymium permanent magnets.

[0070] In order to improve the magnetic coupling between the first magnets 11 of the latch bolt and the second magnets 12 of the shaped counter-plate 7, the stop portion 5 of the latch bolt 4 is preferably made of non-magnetic material and contains the at least one first magnet 11 at its interior.

[0071] For example, the stop portion 5 can be made of non-metal material or of non-ferromagnetic metal material such as a zinc-based alloy.

[0072] In operation, when the movable wing of the door/window/shutter is moved into a closed position, the front opening 3 of the box-like body 2 substantially faces the access opening 9 of the housing cavity 13, the latch bolt 4 is forced to be moved from the retracted position to the extended position, due to the magnetic attraction force exerted by the second magnets 12 of the shaped counter-plate 7 on the first magnets 11 of the latch bolt 4.

[0073] More clearly, the second magnets 12 generate a second magnetic field susceptible of being linked with a first magnetic field generated by the first magnets 11 of the stop portion 5 of the latch bolt 4, driving the latter from the retracted position to the extended position.

[0074] In accordance with the preferred embodiment illustrated in the enclosed figures, the first magnets 11 and the second magnets 12 are, with the latch bolt in extended position and with the stop portion 5 inserted within the housing cavity 13 of the shaped counter-plate 7, substantially aligned along the second magnetization axis Y.

[0075] In this situation, the first magnetization axes Z, Z' of the first magnets 11 remain substantially orthogonal with the second magnetization axis Y of the second magnets 12.

[0076] In order to increase the attractive force exerted by the second magnet 12 towards the first magnet 11, the shaped counter-plate 7 of the lock 1 comprises at least one ferromagnetic element 20 extended along a direction parallel to the second magnetization axis Y and substantially placed between the two second magnets 12.

[0077] Advantageously, the shaped counter-plate 7 comprises a bottom wall 14 opposite the access opening 9 and defining a bottom of the housing cavity 13. The ferromagnetic element is advantageously placed at the bottom wall 14.

[0078] Preferably, the lateral walls 8, 8' with the bottom wall 14 of the shaped counter-plate 7 define a substantially C shape of the shaped counter-plate 7 itself, in which the lateral walls 8, 8' define the depth of the housing cavity 13.

[0079] More in detail, in accordance with that illustrated in the enclosed figure 2, the bottom wall 14 of the shaped counter-plate 7 is substantially orthogonal to the lateral walls 8, 8' and is placed to connect two rear edges of the lateral walls 8, 8' themselves, substantially opposite the edges that delimit the access opening 9.

[0080] The ferromagnetic element 20 is preferably housed within the bottom wall 14 of the shaped counter-plate 7, and is extended parallel to the second magnetization axis Y substantially for the entire width of the bottom wall 14 itself.

[0081] Preferably, the ferromagnetic element 20 has elongated shape and is provided with main extension along a direction parallel to the second magnetization axis Y, to as to reduce the thickness of the bottom wall 14 of the shaped counter-plate 7 as much as possible.

[0082] In accordance with a first embodiment, the ferromagnetic element 20 has substantially cylindrical shape.

[0083] Otherwise, in accordance with a further embodiment, the ferromagnetic element 20 has substantially plate-like shape.

[0084] Preferably, the ferromagnetic element 20 is made of soft iron, so as to provide the shaped counter-plate 7 with a high magnetic permeability, limiting the supply costs since soft iron is less expensive to buy and/or produce.

[0085] Advantageously, the second permanent magnets 12 are both provided with two magnetic poles adapted to generate a magnetic field of the same polarity inside the housing cavity 13 of the shaped counter-plate 7.

[0086] In other words, as is per se known to the man skilled in the art, each of the two second permanent magnets 12 of the shaped counter-plate 7 is provided with a north magnetic pole and with a south magnetic pole (indicated with "N" and "S" in the enclosed figure 3).

[0087] In accordance with the preferred embodiment illustrated in the enclosed figures, the two second magnets 12 both have the same magnetic pole (north or south) directed towards the housing cavity 13 of the shaped counter-plate 7.

[0088] In accordance with the exemplifying and non-limiting embodiment illustrated in the enclosed figures, the second magnets 12 of the shaped counter-plate 7 are each provided with a north pole N directed towards the housing cavity 13 and the first magnets 11 of the latch bolt 4 are each provided with a south pole S directed towards the housing cavity 13 itself, so as to allow the magnetic attraction between the first and the second magnets 11, 12. Of course, the polarities can be reversed with respect to the above-described example, producing an analogous magnetic attraction.

[0089] As is well known to the man skilled in the art, it is in fact necessary that two magnets be directed towards each other with opposite polarities in order to allow their mutual magnetic attraction. Otherwise, as is per se well known, two magnets directed towards each other with the same polarities repel each other.

[0090] The ferromagnetic element 20 forms a low magnetic reluctance path, susceptible of making the second magnetic field generated by the second magnets 12 pass through the bottom wall 14.

[0091] In a further embodiment not illustrated in the enclosed figures, the second magnets 12 of the shaped counter-plate 7 are placed in the lateral walls 8, 8' aligned with the ferromagnetic element 20, in particular placed at the bottom wall 14 of the shaped counter-plate 7.

[0092] In accordance with that depicted in the enclosed figure 3, the magnetic field (illustrated in the enclosed figures by means of curved lines which join the north pole with the south pole of each first and second magnet 11, 12) is therefore induced to affect the interior of the housing cavity 13, increasing the possibilities of linking the first magnets 11 of the latch bolt and increasing the attractive force.

[0093] Advantageously, the movement means 10 of the lock 1, object of the present invention, comprise an actuator 21 housed within the housing space 19 of the box-like body 2 and susceptible of being moved by a user by means of a handle (not illustrated in the enclosed figures and per se known to the man skilled in the art) placed to cross through at least one of the first or second shaped plates 16, 17. Preferably two handles are provided that are placed to cross both shaped plates 16, 17.

[0094] Advantageously, in accordance with the embodiment illustrated in the enclosed figures, the handle is placed to cross through a through hole 22 and engages a seat 23 provided on the actuator 21.

[0095] The actuator 21 is adapted to move the latch bolt 4 between the retracted position and the extended position following the actuation of the handle by the user.

[0096] More in detail, the actuator 21 comprises a projecting portion 24 which mechanically engages (directly or indirectly) the movement portion 6 of the latch bolt 4.

[0097] In particular, the actuator 21 is composed of a cam susceptible of being rotated by the handle around a rotation axis thereof substantially transverse to the movement axis X of the latch bolt 4 and its projecting portion 24 is adapted to drive the latch bolt 4 from the extended position to the retracted position.

[0098] Advantageously, the movement means 10 also comprise at least one return spring 30 housed within the box-like body 2 and adapted to maintain the latch bolt 4 in the retracted position with the movable wing of the door/window/shutter placed distal from the fixed upright, e.g. with the wing of a door open in order to allow the passage of a user.

[0099] Indeed, the latch bolt 4, once moved from the extended position to the retracted position, tends to be moved in a natural manner from the retracted position to the extended position, for example due to the centrifugal force imparted during the rotation of the movable wing around the hinges.

[0100] Advantageously, the stop portion 5 of the latch bolt 4 is provided with an end face 32 that is flush with the external surface of the front plate 31 with the latch bolt 4 in retracted position, so as to provide the door/window/shutter with a high outward appearance value even with the wing in open position.

[0101] In accordance with the particular embodiment illustrated in the enclosed figures, the movement means 10 also comprise a carriage 25 slidably housed within the box-like body 2.

[0102] More in detail, the carriage 25 is advantageously placed within the housing space 19 internally delimited by the box-like body 2, and it is placed to retain the latch bolt 4 and comprises an arm 26 susceptible of being

thrust by the projecting portion 24 during the rotation of the actuator 21, in order to move the latch bolt 4 itself.

[0103] Preferably, the latch bolt 4 is provided with a recess 27 in which a portion of the carriage 25 is inserted. In this manner, the carriage 25 engages the latch bolt 4 during the movement thereof.

[0104] Advantageously, the movement means 10 also comprise a pawl 28, susceptible of being actuated by a key 29 used by a user in order to lock the latch bolt 4 in extended position, with the stop portion 5 inserted in the housing cavity 13 of the shaped counter-plate 7, and prevent the movement of the movable wing of the door/window/shutter by undesired or ill-intentioned users.

[0105] More in detail, the pawl 28 at least partially engages the carriage 25 and is susceptible of moving the carriage 25 itself between an interference position, in which the arm 26 of the carriage 25 is placed in a proximal position with respect to the actuator 21 and drivable by means of the handle in order to move the latch bolt 4, and a non-interference position, in which the arm 26 of the carriage 25 is placed in a distal position with respect to the actuator 21 and is mechanically separable from the latter, so as to not allow the movement of the latch bolt 4 by means of actuation of the handle, making the use of the key 29 necessary.

[0106] Advantageously, the carriage 25 is drivable by the pawl 28 along a direction substantially orthogonal to the movement direction X of the latch bolt and in particular substantially parallel to the second magnetization axis Y of the second magnets 12.

[0107] The finding thus conceived therefore attains the pre-established objects.

[0108] In particular, the lock 1, object of the present invention, is quick and simple to install since the shaped counter-plate 7 has reduced size.

[0109] In addition, the lock 1 is simultaneously entirely reliable and has high outward appearance value, with high ease of use and clean, fashionable external lines.

Claims

1. Lock for doors/windows/shutters comprising:

- a box-like body (2) intended to be mechanically associated with a movable wing of a door/window/shutter and provided with at least one front opening (3);
- a latch bolt (4), which is slidably housed in said box-like body (2) along a movement direction (X), is provided with a stop portion (5) having at least one first magnet (11) associated therewith and susceptible of crossing the front opening (3) of said box-like body (2);
- a shaped counter-plate (7) intended to be mechanically associated with a fixed upright of said door/window/shutter, provided with a housing cavity (13) delimited by at least one lateral wall (8) starting from an access opening (9) in order to receive, at its interior, the stop portion (5) of said latch bolt (4),
- at least one second magnet (12) mechanically associated with said shaped counter-plate (7) and susceptible of attracting said at least one first magnet (11);
- movement means (10) housed within said box-like body (2), mechanically associated with said latch bolt (4) and drivable in order to move said latch bolt (4) between a retracted position, in which it is substantially housed within said box-like body (2), and an extended position, in which it is at least partially placed to cross said front opening (3) in order to insert said stop portion (5) within the housing cavity (13) of said shaped counter-plate (7);

said lock being **characterized in that** the first magnet (11) of said latch bolt (4) is provided with two first magnetic poles aligned along a first magnetization axis (Z) parallel to said movement direction (X) and the second magnet (12) of said shaped counter-plate (7) is placed at said lateral wall (8) and is provided with two second magnetic poles aligned along a second magnetization axis (Y) substantially orthogonal to said movement direction (X).

2. Lock for doors/windows/shutters according to claim 1, **characterized in that** said latch bolt (4) is provided with two first magnets (11) placed at said stop portion (5), both provided with said two first magnetic poles aligned along two corresponding first magnetization axes (Z, Z') parallel to said movement direction (X).

3. Lock for doors/windows/shutters according to claim 1 or 2, **characterized in that** said shaped counter-plate (7) comprises at least two facing lateral walls (8, 8') and is provided with two second magnets (12) fixed to said two lateral walls (8, 8'), substantially facing each other and both provided with two second magnetic poles substantially aligned along said second magnetization axis (Y).

4. Lock for doors/windows/shutters according to claim 3, **characterized in that** said shaped counter-plate (7) comprises at least one ferromagnetic element (20) extended between said two second magnets (12), substantially parallel to said second magnetization axis (Y).

5. Lock for doors/windows/shutters according to claim 4, **characterized in that** said shaped counter-plate (7) comprises a bottom wall (14) opposite said access opening (9) and defining the bottom of said

housing cavity (13); said ferromagnetic element (20) being placed at said bottom wall (14).

6. Lock for doors/windows/shutters according to claim 5, **characterized in that** said lateral walls (8, 8') with said bottom wall (14) define a substantially C shape of said shaped counter-plate (7), in which said lateral walls (8, 8') define the depth of said housing cavity (13).

7. Lock for doors/windows/shutters according to claim 5, **characterized in that** said ferromagnetic element (20) is extended along a direction parallel to said second magnetization axis (Y) within said bottom wall (14).

8. Lock for doors/windows/shutters according to claim 5, **characterized in that** said ferromagnetic element (20) is made of soft iron.

9. Lock for doors/windows/shutters according to one of the preceding claims, **characterized in that** said at least one first magnet (11) and said at least one second magnet (12) are neodymium permanent magnets.

10. Lock for doors/windows/shutters according to one of the preceding claims, **characterized in that** the stop portion (5) of said latch bolt (4) is made of non-magnetic material and contains said at least one first magnet (11).

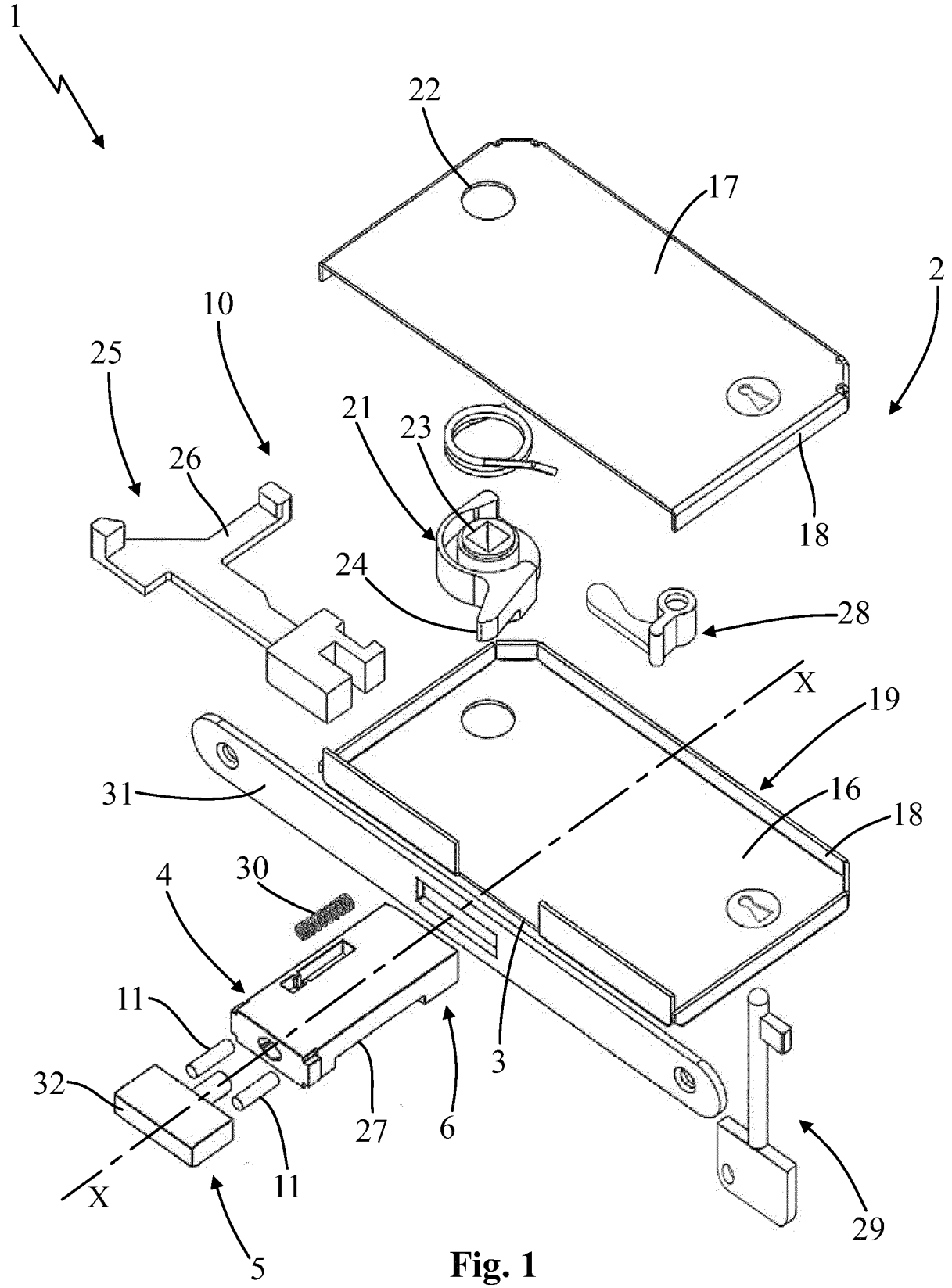

Fig. 1

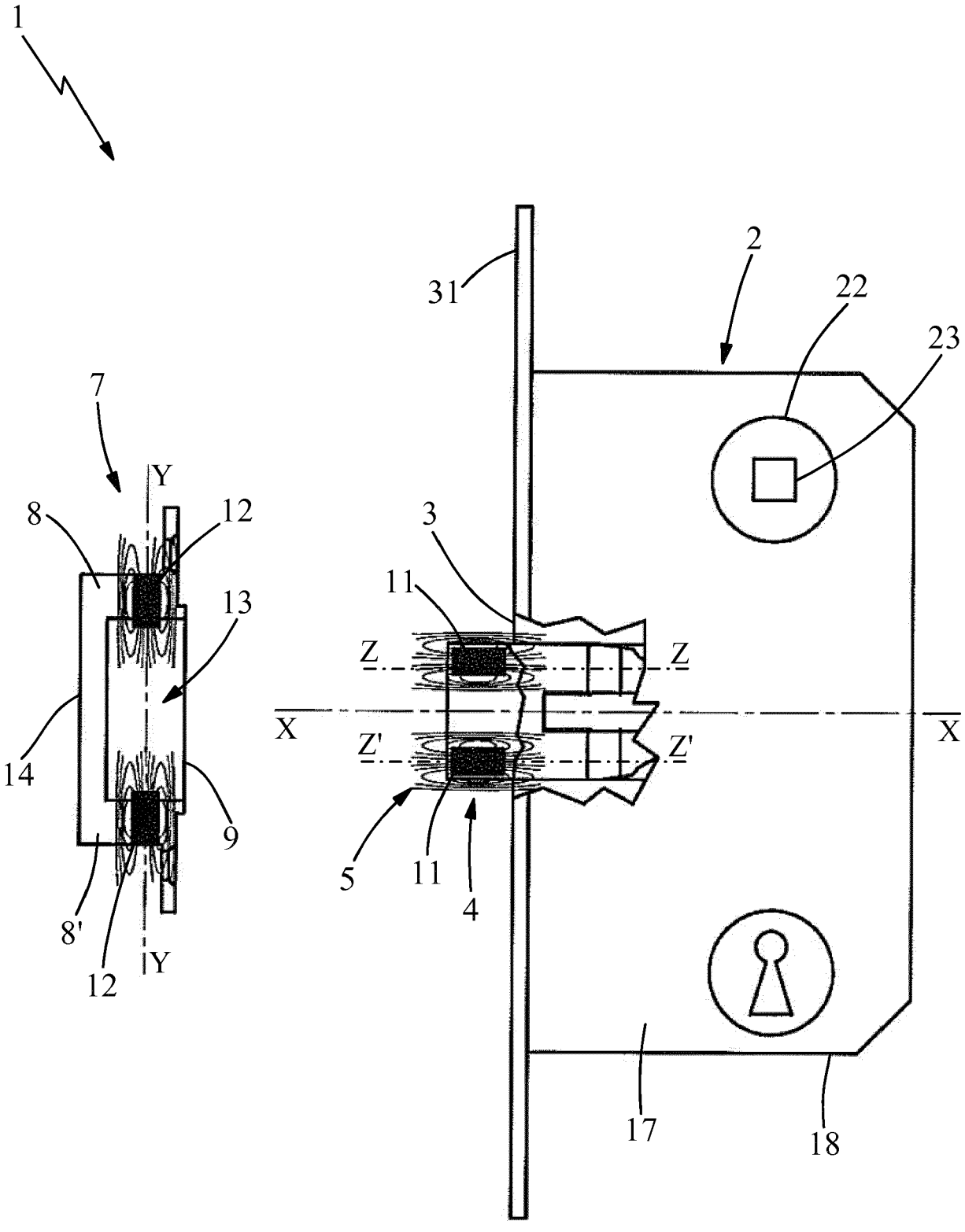

Fig. 2

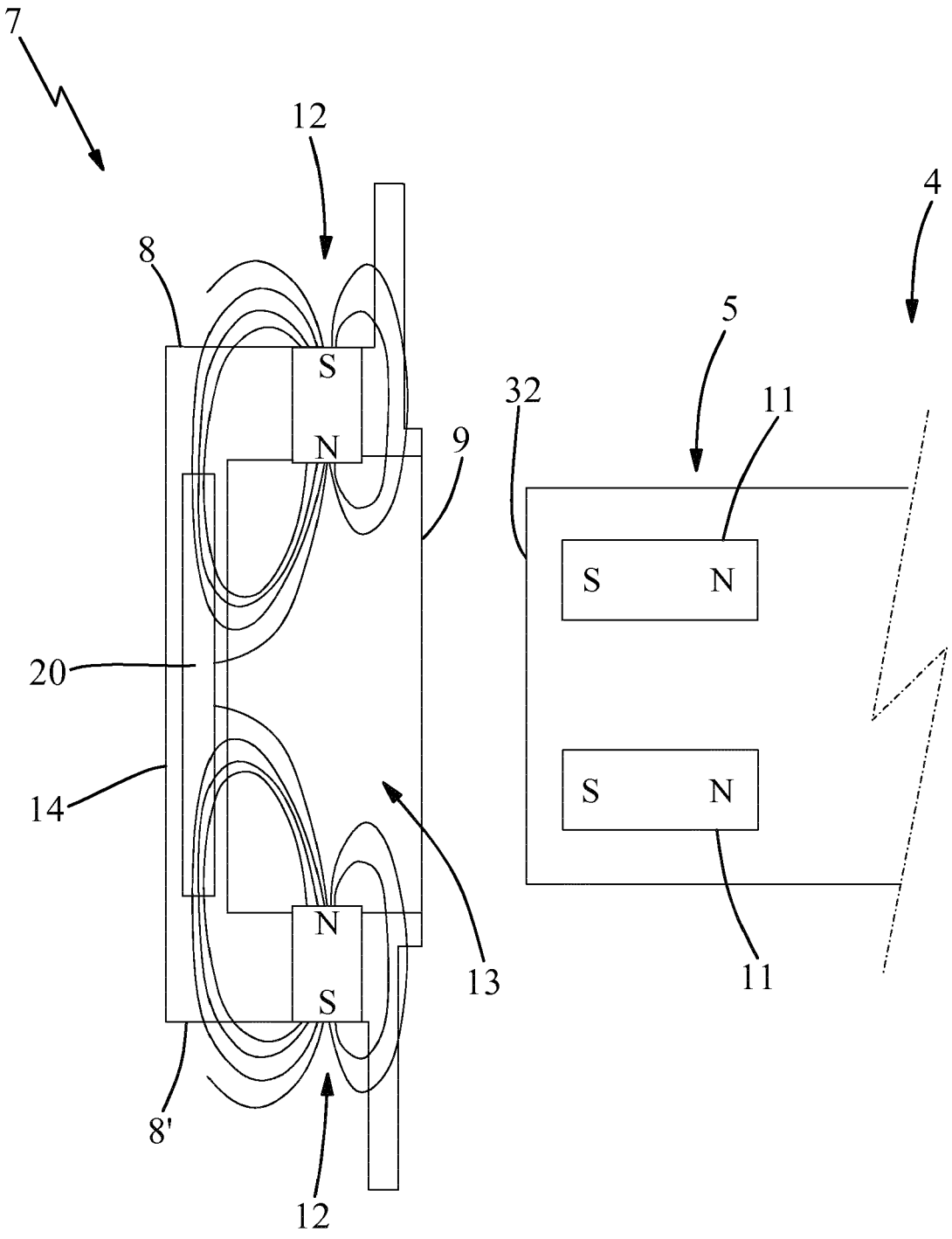

Fig. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 19 17 7551

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 2016/305161 A1 (MCMAHON STEPHEN V [US]) 20 October 2016 (2016-10-20) * figure 2 * -----	1-10	INV. E05B47/00 E05C19/16
A	US 3 107 934 A (ROYAL LEE) 22 October 1963 (1963-10-22) * the whole document * -----	1-10	ADD. E05B15/02 E05B15/10 E05B17/00
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TECHNICAL FIELDS SEARCHED (IPC)

E05C
E05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	4 October 2019	Cruyplant, Lieve

CATEGORY OF CITED DOCUMENTS

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04-10-2019

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