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(54) APPLICATION DEVICE FOR APPLYING A BAND OF MATERIAL ALONG A CORNER

(57) This invention concerns an applicator device (1) for applying a band or strip (2) of foil or sheet material, in particular of fleece or nonwoven fabric material, simultaneously onto two abutting support surfaces (3, 3') defining together a profiled interior or inner corner (4).
Said device (1) comprises at least the following functional means:
- roll holding means (5) for holding a band supply roll (6) of foil or sheet material, in a rotary manner,
- band guiding means (7) comprising at least two mutually cooperating rolls,
- band shaping means for at least initiating the folding of said band (2) along a longitudinal folding line (2') to form two longitudinal band parts (2", 2"'),
- band positioning means for positioning said folding line (2') into the bottom line (4') of said profiled interior corner (4),
all said functional means being mounted onto a support frame (11) provided with a handle (12) and/or a handle fixing site,
applicator device (1) characterized
in that it also comprises displacement guidance means (19) configured to rest on both support surfaces (3, 3'), at a distance from the corner (4).

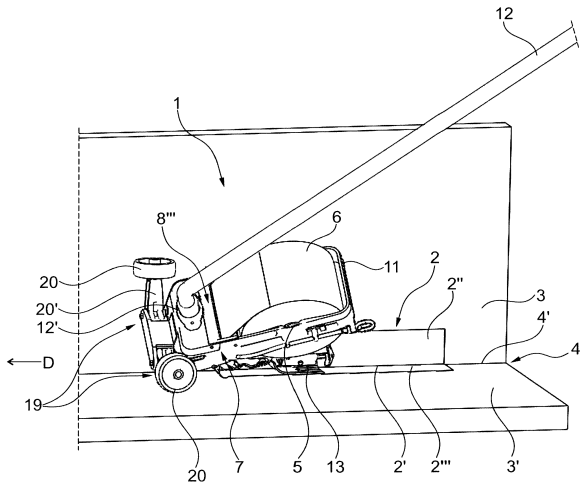


Fig. 2

EP 3 896 020 A1

Description

[0001] The present invention relates to a device, preferably hand-operated, for the application and adhesion of flexible material, preferably thin sheet or foil material, accurately along profiled corners. The foil band to be applied may have a width which could typically range from 3 cm to 20 cm and a length which could reach 10 m or more.

[0002] The application of thin, narrow foil or sheet material, in the form of bands, along inner or inside corners is a common practice in the construction industry and building field. For example, fleece material is applied along corners between a floor surface and a vertical wall surface on flat roofs for waterproofing. Another example of application of thin narrow foil, is the application of tape on wall corners at the adjoining edges of drywall panels.

[0003] Various types of foil may be used. For example, one type of foil may be fleece or non-woven material that has the behaviour and texture of fabric. Another example of foil is tape material that has the texture and behaviour of paper.

[0004] Regardless of the nature of the substrate, foil material generally needs to adhere onto the surfaces about the corner edge. This can happen either when there is some adhesive material onto the surfaces or when the foil itself has adhesive properties, as for example, when the underside of the foil that comes into contact with the corner substrate surfaces is coated with some adhesive material.

[0005] Regardless of the method of adhesion and the substrate, for the foil material to adhere, there needs to be some pressure exerted onto the foil material and against the substrate surface.

[0006] Several devices used for application of tape generally known as "automatic tapers" are already known in the prior art.

[0007] For example, US4406730 discloses a tape applicator for applying drywall tape into corners that comprises two roller wheels for forming an edge, positioning and pressing the tape to the corner.

[0008] Another example is shown in US4775442 which discloses a V-shaped longitudinal guide within which a tape passes to be bent into a 90 degrees profile, paste is deposited upon the tape which is then pressed to the corner with another V-shaped profile.

[0009] One of the problems of existing devices is that they work well with a tape that is made of paper-like material and has some stiffness but cannot work properly with a fleece that is made of fabric-like material that has very little stiffness and cannot hold shape.

[0010] Another problem with existing tape application devices is that post-application processing is required to press the tape onto the substrate to ensure good adhesion.

[0011] Furthermore, existing tape application devices are satisfactory for applying tape to drywall or other substrates with a smooth surface but have difficulty with rough and uneven surfaces as frequently encountered on flat roofs when for example foil material needs to be applied at the corner between floors and vertical walls.

[0012] A still other problem with existing devices is the difficulty to apply foil-like material, either tape or fleece of more than 6 cm in width. Indeed, the greater the width, the greater the difficulty in terms of securement of the material onto the substrate of the corner surfaces. At the same time, the greater the width, the greater the risk is that the foil material will not be applied at the desired ratio of the crease line from one edge of the foil material to the other edge of the foil material.

[0013] It is a purpose of this invention to solve at least the main of the above mentioned problems by providing a device that can accommodate more or less any type of foil material, including fleece material up to widths of 20 cm or even more, provided in rolls of length of up to 10 m or even more. This inventive device should provide a compact combined delivering, shaping, positioning and guidance mechanism able to ensure that the foil material is pre-shaped and placed precisely and reliably onto the two surfaces along a corner, advantageously at the desirable and constant ratio of the crease line from one end and to the other, preferably regardless of imperfections of the surfaces.

[0014] This purpose is achieved by the invention through an applicator device for applying a band or strip of foil or sheet material, in particular of fleece or non-woven fabric material, simultaneously onto two abutting support surfaces defining together a profiled interior or inner corner, said device comprising at least the following functional means:

- roll holding means for holding a band supply roll of foil or sheet material, in a rotary manner,
- band guiding means comprising at least two mutually cooperating rolls,
- band shaping means for at least initiating the folding of said band along a longitudinal folding line to form two longitudinal band parts,
- band positioning means for positioning said folding line into the bottom line of said profiled interior corner,

all said functional means being mounted onto a support frame provided with a handle and/or a handle fixing site, applicator device characterized

in that it comprises displacement guidance means configured to rest on both support surfaces, at a distance from the corner,

in that said band shaping means comprise at least one shaping element on which the band rolls or slides against during its travel path from the supply roll towards the band positioning means,

in that band pressing means, for pressing each of the two longitudinal band parts against one of the two support surfaces, are associated with the band positioning means to constitute together band applying means, and,

in that said band applying means comprise a frontal po-

sitioner and applicator means and a subsequent substantially profiled side press slider, having preferably a V-shaped profile in cross-section, wherein said shaping element, said positioner and applicator means and said side press slider have the same bisector plane.

[0015] The invention will be better understood using the description below, which relates to at least one preferred embodiment of the invention, given by way of non-limiting example and explained with reference to the accompanying drawings, wherein:

FIG. 1 is a schematic front view of the applicator device according to an embodiment of the invention when used by a worker for applying foil material at the corner between a floor surface and a vertical wall surface;
FIG. 2 is an isometric view of the applicator device of figure 1, also when applying foil material at the corner between a floor surface and a vertical wall surface;
FIG. 3 and 4 are isometric views at an other scale of the applicator device shown in figures 1 and 2;
FIG.5 is a partial top view of the frontal part of the applicator devices shown on figures 1 to 4;
FIG. 6 is an isometric view similar to the view of figure 2, but showing only the elements for positioning and pressing the foil material, represented without the other constitutive elements of the applicator device;
FIG. 7A is an isometric view of only the constitutive elements of the device that guide, shape and apply the band in flat form (after it unrolls from the rolls);
FIG. 7B is an isometric view of only the constitutive elements of the device that receive and guide the band in flat form (after it unrolls from the roll), as the user would pull the flat foil through the guide mechanism;
FIG. 8A and 8B show isometric views of the applicator device of figures 1 to 4 in two different positions, before commencement and during operation;
FIG. 9A and 9B are cross-sectional side views of the applicator device shown in figures 8A and 8B respectively;
FIG. 10 and 11 are partial schematic isometric views of two possible alternative embodiments of the cutting means belonging to an applicator device according to the invention;
FIG. 12A and 12B are respectively an isometric view and an exploded view of a support shaft of the band supply roll belonging to the applicator device as shown on figures 1 to 4;
FIG. 13 is a partial isometric view, at an other scale, of the band positioning and band pressing means of the applicator device shown on figures 1 to 4;
FIG. 14 is an exploded view of the band pressing means shown on figure 13;
FIG. 15 is an isometric view of an applicator device according to the invention, having an alternative short handle, and,
FIG. 16 is a partial isometric view of an alternative embodiment of the band pressing means.

[0016] Figures 1 to 4, 8 and 15 show an applicator device 1 for applying a band or strip 2 of foil or sheet material, in particular of fleece or non-woven fabric material, simultaneously onto two abutting support surfaces 3, 3' defining together a profiled interior or inner corner 4, said device 1 comprising at least the following functional means:

- roll holding means 5 for holding a band supply roll 6 of foil or sheet material, in a rotary manner,
- band guiding means 7 comprising at least two mutually cooperating rolls 8, 8',
- band shaping means 9 for at least initiating the folding of said band 2 along a longitudinal folding line 2' to form two longitudinal band parts 2", 2"',
- band positioning means 10 for positioning said folding line 2' into the bottom line 4' of said profiled interior corner 4,

all said functional means being mounted onto a support frame 11 (forming also chassis of said device 1) provided with a handle 12 and/or a handle fixing site 12'.

[0017] According to the invention, said applicator device 1 is characterized
in that it comprises displacement guidance means 19 configured to rest on both support surfaces 3, 3', at a distance from the corner 4,
in that said band shaping means 9 comprise at least one shaping element on which the band 2 rolls or slides against during its travel path from the supply roll 6 towards the band positioning means 10,
in that band pressing means 13, for pressing each of the two longitudinal band parts 2", 2"' against one of the two support surfaces 3, 3', are associated with the band positioning means 10 to constitute together band applying means 10, 13, and,
in that said band applying means 10, 13 comprise a frontal positioner and applicator means 10 and a subsequent substantially profiled side press slider 13, having preferably a V-shaped profile in cross-section, wherein said shaping element 9, said positioner and applicator means 10 and said side press slider 13 have the same bisector plane BP.

[0018] The specific arrangement of cooperating technical means 5, 9, 10, 13, 19 provided by the invention allows to achieve the set goal and to overcome at least the main limitations of the state of the art.

[0019] Indeed, said means allow a precise positioning of the device 1 during its displacement along the profiled corner 4 and a precise positioning and guidance of the band 2 within the device 1, resulting in a precise application of the band 2 with regards to said corner 4, combined with an aligned and progressive folding of said band 2 and an application under pressure on both surfaces 3 and 3'.

[0020] The means 10 not only positions precisely device 1, by following the corner 4 and by cooperating with the guidance means 19 (three contact points), but also the pre-folded band 2 with said corner 4.

[0021] Advantageously and as illustrated in figures 7A, 10 and 11 in particular, the at least two rolls 8, 8' of the band guiding means 7 cooperate to pinch the running band 2 between them and are subject to an at least limited resistive torque, said band guiding means 7 inducing a change in the direction of travel or movement DM of the running band 2 and the two cooperating rolls 8, 8' comprising advantageously a deflecting roll 8' and a pressing roll 8.

[0022] Preferably, the at least two rolls 8, 8' of the band guiding means 7 are mutually rotationally linked, for example by meshing gear means 16, a hand-operated organ 17 which allows (by means of in intermeshing associated gear) to drive said rolls 8, 8' being advantageously arranged on the support frame 11 (to manually unwind the roll 6 at the beginning of an application sequence).

[0023] Thus, the delivering of the band 2 is well controlled, towards the supply roll 6 and towards the band applying means 10, 13, both upwardly and downwardly. In particular, the inertia of the sole roll 6 may guarantee that the band 2 remains under positive tension after leaving said roll 6, even when said band 2 is not pulled due to its progressive application along the corner 4.

[0024] In order to achieve a regular application of the band 2 under constant pressure along the corner 4, despite possible deformations or unevennesses of the surfaces 3, 3', the side press slider 13 may be fastened through a pivoting link 14 with a corner applicator carrier 10' and biased, advantageously by a spring force or an elastic deformation force, towards the bottom line 4' of the interior corner 4 to be covered with the band 2 of foil or sheet material when the applicator device 1 is in use and pushed by the operator under pressure along the corner 4 (figures 4, 9, 13).

[0025] In accordance with a preferred embodiment of the invention, shown in particular in figures 1, 3, 4, 6 to 9, 13 and 15, the positioner and applicator means 10 consists of a freely rotating roller, located underneath the band shaping means 9 and in front of the side press slider 13 and having a V-shaped profile in cross-section, preferably with a rounded running edge, said roller 10 forming advantageously a frontal device positioning means and a mobile angular deflection means for the band 2 between said shaping means 9 and said slider 13.

[0026] Preferably, and as illustrated for example on figures 3, 4, 7 and 9, the shaping element 9 consists of a shaping surface element changing progressively its sectional profile, along the direction of movement DM of the running band 2, from being substantially flat at one upstream end 9" to having an angular shape 9' at the opposite downstream end, and defining there a prominent ridge or edge.

[0027] Nevertheless, alternately said shaping element 9 may also consist:

- of at least one ball or bead, preferably mounted to rotate freely and advantageously in the form of several balls arranged in the bisector plane BP (not shown), or,
- of at least one double cone roll or roller, preferably mounted to rotate freely about its axis and having a prominent ridge located in the bisector plane BP (not shown).

[0028] In order to control in particular the lateral positioning of the passing band 2 before its shaping stage, the shaping element 9 may comprise or be associated with a slot-like passage 15 through which the band 2 is passing before rolling on or sliding over said shaping element 9, said slot 15 being aligned with the band guiding means 7, which are themselves aligned with the roll holding means 5.

[0029] In order to guide the band 2 from the feeding roll 6 towards the control and guiding rolls 8, 8' pinching said passing band 2 between them, the band guiding means 7 may also comprise a funnel body 8'" forming a passage with a slot-like cross-section, arranged upstream the at least two mutually cooperating rolls 8, 8' along the direction of movement DM of the running band 2, aligned with said rolls 8, 8' and with the roll holding means 5 and tapering towards said rolls 8, 8'.

[0030] As shown on figures 2, 8 and 12, the supply roll holding means 5 comprise a support shaft 18 for holding the supply roll 6 in a rotational manner towards the support frame 11, the rotation of the roll 6 advantageously occurring against a resistant torque, preferably a resistant frictional torque, said shaft 18 preferably comprising a mandrel 18' mounted on a axle 18" rigidly fixed on the support frame 11.

[0031] According to a very beneficial feature of the invention, illustrated on figures 1 to 6, 8 and 15, the displacement guidance means 19 are arranged and configured to roll on a respective one of the abutting surfaces 3, 3' defining the corner 4, said guidance means 19 cooperating with the frontal corner applicator 10 to position the device 1 adequately with reference to the bottom line 4' of the profiled corner 4.

[0032] Advantageously, the displacement guidance means 19 comprise at least two lateral guide wheels 20 mounted onto the support frame 11, each through an arm 20' pivotally secured to said support frame 11; the pivot joint 20" being biased by spring or elastic means 20'" so as to force said wheels 20 outwardly, laterally away from the support frame 11, thus forming a suspension system.

[0033] To avoid the use of an additional tool and also facilitate a precise and secured dimensioning of the band 2 at the end of the application phase, the device 1 may also incorporate band cutting means 21, arranged (at a specific predetermined location) between the guiding means 7 and the shaping means 9 and manually operable to severe the band 2 by means of a corresponding pulling or pushing organ 21' (figures 10 and 11).

[0034] Said cutting means 21 can be in the form of

scissors (figure 10) or of a guillotine (figure 11), for example.

[0035] According to a preferred practical construction of the device 1, illustrated on figures 3, 4, 6, 7, 13 and 15, the profiled side press slider 13, with a substantially V-shaped section, comprises an outside wall 13' forming a gliding shoe, substantially in the shape of the front part of a boat hull, with a curved frontal end 13" and comprising a linking arm 22 which is pivotally connected to the corner applicator carrier 10' and equipped with a holder 23 for attaching the gliding shoe 13'.

[0036] Advantageously, the outside wall 13' of V-shaped profile of the side press slider 13 is partly formed by superposed coplanar strips or lamellas 13'" extending longitudinally towards the near end of the slider 13 and elastically deformable, preferably while progressively projecting outwardly in the same direction.

[0037] Preferably, the side press slider 13 may also comprise, at its rear end, a band end retainer 24, possibly incorporating a clamping member 24" which may advantageously liberate the end of the band 2 when sufficient tension is applied on said band 2.

[0038] The handle 12 may be a stick handle (figure 1) or an arched handle (figure 15).

[0039] Said handle 12 is preferably connected to the support frame 11 at a location or site 12' situated between the displacement guidance wheels 20'" and the applicator roller 10.

[0040] Thus, in one preferred embodiment, the present invention provides a foil band applicator device with two guide wheels 20 (that come into contact with each of the intersecting surfaces 3, 3'along a corner 4) and with a corner positioner and applicator 10 (rolling along the bottom line 4' of the profiled corner 4) which act together as a three point positioning system to guide the foil material band at the corner 4 so that the foil material is placed at a fixed and desired width ratio of its width on the first corner surface 3 over the width on the second corner surface 3' Provided that the guide wheels 20 are always in contact with the first and second corner surface respectively, and the corner positioner is always pressed into a corner, the foil material band 2 will always be placed correctly at a desired and constant width ratio of the width from the crease to the one edge and over the width of the crease to the other edge. When this ratio is 1, the foil material is placed perfectly in a centered way along the corned, and equidistant from the corner to the edges at either side of the corner.

[0041] The device 1 further comprises a support frame 11 forming chassis, means 5 to secure the foil roll 6 onto the frame, means 13 for pressing the foil material against said surfaces about a corner so that the foil material can adhere to each of these surfaces, means 8, 8' to maintaining the foil material under tension, means 21 for cutting the foil material at the desired length, and a push handle 12 for pushing the device forward. As a user pushes the device forward and the device moves along the direction of travel, and foil material is applied onto the first and second surfaces about a corner.

[0042] A possible practical structure and the operation of the device 1 will now be described in more detail with reference to the figures. It is to be understood that the drawings are diagrammatic and schematic representations of various embodiments of the invention and are not to be construed as limiting the present invention, nor are the drawings necessarily drawn to scale.

[0043] Referring to figure 1 and figure 2, the device 1 is shown in a preferred mode of use where it is used to apply foil material (band 2) along the corner 4 between a floor surface 3' and a wall surface 3. In a preferred mode of use the user can push the device 1 along the direction of the corner 4, while being in a standing position and pushing the device via a long handle 12. A possible alternate or auxiliary handle 12 enables the user to get a better grip with both hands, exercise some and press sideways into the corner 4 (figure 15). Two guide wheels 20 help to keep the device 1 in the correct aligned position, as the device 1 is being pushed forward.

[0044] The band of foil material 2 is generally supplied in the form of a roll 6 and it is guided through the device 1 to be placed and adhered at the first and second surfaces 3 and 3' about the corner 4.

[0045] In one embodiment the push handle 12 is connected to the support frame 11 of the device 1 at the front part of the support frame, substantially above the means 10.

[0046] The connection site 12' of the handle 12, in the form of a short tubular body or the arched push handle 12 can be used when the device is implemented in a close use position as for example when applying foil material along a corner 4 while the user is in a kneeling position.

[0047] The roll 6 of the foil material band 2 is secured to a rotating axle (support shaft 18) and placed onto the device 1 in slots 11' in the side walls 6 of the support frame 11 of the device. As the foil band 2 unfolds from the roll6, it is guided to pass to the underside of the device where it is first pushed into the corner 4 by a corner positioner and applicator 10 and then pushed against the first and second surfaces about the corner by a foil band pressing member 13.

[0048] An alternative embodiment of a handle 12 is shown in figure 15, wherein the handle comprises a curved section that can pivot about a handle pivot axis. The curved structure of the handle 12 enables the user to hold it from any position he finds most comfortable. The pivoting of the handle enables it to move from a closed position to an open position in order to clear the way for the foil roll 6 to be removed from the device support frame 11.

[0049] The symbolic functional view of figure 6 shows the means for positioning and pressing the foil material of the device 1. The positioning of the device 1 is acquired by three contact points, namely the two guide wheels 20 and the corner positioner and applicator 10. The corner applicator 10 is in a preferred embodiment a V-shaped

wheel.

[0050] Once the device 1 is positioned correctly with respect to the corner4, the band of foil material 2 is then guaranteed also to be positioned correctly with respect to the corner 4. Correct positioning of the foil material is defined by the ratio w1/w2. When w1/w2 =1, the foil material is placed equidistantly about the corner 4 (see figure 6). An objective of the device 1 is to keep a constant ratio w1/w2 so that the foil material is consistently applied about the corner 4. In a preferred embodiment this ratio w1/w2 is 1 and the foil material band 2 is placed equidistantly to the first and second surface 3 and 3' of the corner 4. The foil material band 2, once in correct position, is pressed onto both surfaces by a foil press slider or shoe forming the main component of the band pressing means 13. A minimum amount of pressure is necessary for the foil material to adhere onto the first and second surfaces 3 and 3'.

[0051] In one preferred application which is the waterproofing of flat roofs, adhesive flashing material can be first applied to the two surfaces before a foil material in the form of fleece band 2 is applied. The flashing material which is generally of bituminous composition, acts as an adhesive for the fleece. Whatever the application, an adhesive substance may be first applied to the first and second surfaces 3, 3' about a corner 4 before a foil material is pressed against it. Alternatively, adhesive material may be pre-deposited onto the band 2 of foil material and be activated after its placement onto the first and second surfaces about a corner.

[0052] As it is shown on figures 2, 4, 8 12 and 15, the foil material band 2 in roll form 6 is placed onto the device 1. An axle 18 is placed into the hole of the roll 6 and the roll with the axle in it, is then slided into the opposite slots 11, of the two side walls of the support frame 11.

[0053] Figures 12A and 12B show the structure of the foil roll axle 18. A central axle 18" is surrounded by two axle shells 18'. The axle shells make an interference fit into the central hole of the foil roll 6 to hold it in place. The axle shells 18' then rotate about the central axle 18". Friction between the shells 18' and the central axle 18" prevents the foil roll 6 from free-rolling and helps to maintain the foil material band 2in tension between the roll 6 and the cooperating pinching rolls 8, 8', as the device 1 is being pushed forward.

[0054] The central shaft 18" may be provided with formations (grooves) which come into engagement with complementary sites (ribs) of the slots 11' to hold said support shaft 18 in place. A locking mechanism (for example spring biased) with a manually operated unlocking organ 11' may also be provided.

[0055] Figure 5 is a top view of the front part of the device 1, showing the guide wheels and their suspension. The two lateral guide wheels 20 are connected to the support frame 11 of the device 1 through guide-wheel-arms 20'. Each guide-wheel-arm 20' can pivot about each corresponding guide wheel pivot axis 20". Each guide wheel is biased by a suspension. This suspension can be a torsional spring 20'" or a rubber. This enables movement of the wheels 20 to accommodate surface imperfections or variations of the angle between the first surface 3 and the second surface 3' about a corner 4. This ability of the wheels 20 to pivot and accommodate angle variations or surface imperfections is beneficial for the device 1 to be maintained at correct position during its travelling along the corner 4.

[0056] Figures 10 and 11 illustrate alternative embodiments for means 21 for cutting the foil material band 2. Said band 2, after being unrolled from the foil roll 6, is being guided through a pair of adjacent rolls 8 and 8'. Downstream these rolls, in the direction of travel DM of the foil material band 2 from the foil roll 6 towards its contact with the corner surfaces 3 and 3', there is a severing device forming cutting means 21.

[0057] In one preferred embodiment (figure 10), the severing device 21 is in the form of a pair of scissors wherein the two arms of the scissors pivot about an axis and are pulled towards the closed position so as to shear and sever the foil material band 2 by a pulling means 21' which is acted upon by a pulling tab by the user. One preferred embodiment for a pulling means is a "Bowden cable".

[0058] In another preferred embodiment (figure 11), the severing device 21 is in the form of a guillotine, wherein a blade moves perpendicularly to the surface of the foil material and towards a mating edge.

[0059] Figure 7A shows, with the support frame 11 and chassis being removed, the elements of the device 1 that receive and guide the fleece band 2 in flat form (after in unrolls from the roll 6). The foil material band 2 is engaged between two adjacent guide rolls 8 and 8'. In one preferred embodiment, these rolls 8 and 8' are engaged through mating gears 16 connected to the rolls. Said gears 16 are in turn connected to an idle gear and through that to a driving gear. The driving gear can be enacted upon to drive the set of gears, through a knob 17 that the user grabs and rotates.

[0060] Figure 7B shows (again with the support frame and chassis removed) the elements of the device 1 that receive and guide the fleece band 2 in flat form (after it unrolls from the roll 6), as the user would pull the flat foil band 2 through the guiding means 7. As the foil material band 2 passes through the guide and control rolls 8, 8', it passes over a guide and shaping surface 9 which transforms it from a two-dimensional flat shape into a folded shape. When a new foil roll 6 is first placed into the device 1, the user can insert the beginning of the band 2 through the foil receptor slot of the funnel body 8"'.

[0061] The foil receptor slot, the guide rolls, the associated set of gears and the turning knob mentioned previously can be considered as a subsystem, and in one preferred embodiment are integrated together as a band guide subsystem 7 as shown in figure 7B.

[0062] Once the foil material band 2 has been guided through the pair of guide rolls 8 and 8' and over the guide and shaping surface 9, it is then passed over the corner

positioner and applicator 10 and directed to the foil band pressing means 13.

[0063] The corner positioner and applicator 10 performs two functions. The first function is to position the device 1 correctly with reference to a corner 4: this is advantageously done in collaboration with the two guide wheels 20. The second function is to press the foil material band 2 into the corner 4.

[0064] Once the foil material band 2 is pressed in a corner by the positioner or applicator 10, the contact is, in essence, along a line (i.e. the corner bottom line 4'): the foil material needs to be pressed onto the first and second surfaces 3, 3' about the corner 4 at the full width of the foil material band 2 so that it can adhere onto the corner surfaces 3 and 3'. The function of the foil band pressing means 13 is to press the foil material onto surfaces 3 and 3' and ensure that enough pressure is exerted to guarantee good adhesion. For example, in the preferred application field of waterproofing, where the foil material is in the form of fabric material, namely fleece, and is placed on the floor and wall surfaces about a corner, it is critical that sufficient pressure is exerted on the fleece against the vertical wall surface 3, otherwise the fleece is likely to fall off said wall surface.

[0065] The passage of the foil material through the guide rolls 8 and 8', contributes to maintain the foil material band 2 under tension. As the device 1 is pushed forward when the foil material band 2 is adhered to the surfaces 3, 3' about a corner, the foil material band 2 is pulled to move and through its movement turns the pair of guide rolls 8 and 8'. The resistance against movement of the gear linked rolls 8, 8'maintains the foil material band 2 under tension.

[0066] Figures 3, 4, 7, 9 and 13 to 15 show an embodiment of the band pressing means 13, in the form of a foil press mechanism.

[0067] With reference to these figures, the press mechanism 13 comprises an angle-press slider or shoe that is secured onto a press or linking arm 22. In turn, the press arm 22 is pivotally connected to the device support frame 11 at a pivoting axis 14. The press arm 22, in one embodiment, is connected pivotally to the support frame 11 via a drum body. The press arm 22 may be biased to exercise pressure onto the corner surfaces 3, 3' via a biasing spring 14'. In a preferred embodiment the biasing would cause the press slider 13 with its wall 13' to move towards the corner direction.

[0068] The angle-press slider or shoe 13, in one preferred embodiment, is pivotally connected to the press arm 22 about an angle-press pivot axis 22'. The pivotal connection of the angle-press slider 13 to the press arm 22 may be free moving or as an alternative embodiment may be spring biased.

[0069] As an alternative embodiment of the foil press mechanism 13, the angle-press slider may comprise a set of press fingers in the form of elastic strips 13'" that act as leaf springs which are exerting pressure onto the foil band 2 and against the corner surfaces 3 and 3'.

[0070] The angle-press slider or shoe 13 may be detachable from the press and arm 22 and can be attached onto an angle-press-holder by screws.

[0071] As partly shown in figure 7B, the foil material band 2, prior to placement at a corner 4, i.e. before the device 1 is used against a corner, is passed through the pair of guide rolls 8 and 8', over the guide and shaping surface 9, over the corner positioner and applicator 10, is secured onto the foil press slider 13 at a foil-end-retainer 24. The foil-end-retainer 24, in one embodiment, comprises a triangular fold-retainer member 24'. The attachment of the foil band 2 to the triangular fold-retainer 24' is at its side surfaces which may comprise Velcro® -type hooks that can weakly hold the foil band 2 as shown in figure 8A.

[0072] An alternative embodiment for holding the end of the foil material band 2 at the foil press mechanism 13 is shown in figure 16. The foil-end-retainer 24, in this embodiment, comprises a clamp 24' that is pivotable about an axis and biased by a spring to be able to hold the band end.

[0073] Figures 9A and 9B show the foil press mechanism 13 in 2-dimensional side views the foil-press mechanism at two positions wherein at the first position (shown in figure 9A) there is an angle Φ formed to the horizontal that is between zero and 45 degrees. In the second position of the foil-press mechanism 13, the angle Φ formed to the horizontal that is at zero degrees, i.e. horizontal (figure 9B). When the device 1 is used in waterproofing applications and the foil material, in the form of fleece band, is placed at a corner between a floor surface and a vertical wall surface, the placement of the device 1 against the floor causes a movement of the foil-press mechanism 13 from the first position to the second position. The movement from the first position to the second, causes the foil band 2 to get detached from the foil-end-retainer 24' and be available to be adhered to the corner surfaces.

[0074] The present invention also encompasses a method for affixing a band or strip 2 of foil or sheet material, in particular of fleece or non-woven fabric material, simultaneously onto two abutting support surfaces 3, 3' defining together a profiled interior corner 4.

[0075] Said method comprises a first step of preparing said first and second corner surfaces 3 and 3' for receiving said band or strip 2, in particular by applying at least one layer of an adhesive and/or sealing substance on them, and then a second step of applying said band or strip 2 onto said pretreated support surfaces 3, 3.

[0076] Said method is characterized in that said band or strip 2 is applied progressively onto said surfaces 3, 3' by using an applicator device 1 as described before and which comprises at least means 5 to hold and unroll a supply roll 6 of foil or sheet material, means 7, 9 to guide and shape said unrolled travelling band 2, and band positioning and pressing means 10, 13 to apply said preshaped band 2 under pressure onto the pretreated support surfaces 3, 3', said device 1 being pushed or guided

by an operator along said corner 4 over the length of the corner to be covered by said band or strip 2.

[0077] Advantageously, and prior to a band or strip 2 application phase, the free end portion 25 of the band or strip 2 is pulled over the shaping means 9, the frontal application 10 and the pressing means 13 and affixed, by clamping or pinching, at the rear end of the pressing means 13 by a band end retainer 24.

[0078] Preferably, when the applicator device 1 is brought into contact under pressure with the corner 4, the pressing means 13 pass from a first configuration wherein the free end portion 25 of the band or strip 2 is clamped or pinched into a second configuration wherein the free end portion is released.

[0079] Finally, according to another aspect, the invention also provides a watertight or waterproof area formed by two abutting support surfaces 3, 3' and comprising a band or strip 2 of foil or sheet material, in particular of fleece or non-woven fabric material, affixed to it, as well as at least one layer of a sealing substance applied in liquid form, wherein said band or strip 2 has been applied according to the method described herein before, using an aforementioned applicator device 1.

[0080] The invention is of course not limited to the examples described before and illustrated on the attached drawings, and encompasses all embodiments and alternatives which can be derived from the following claims.

Claims

1. An applicator device (1) for applying a band or strip (2) of foil or sheet material, in particular of fleece or non-woven fabric material, simultaneously onto two abutting support surfaces (3, 3') defining together a profiled interior or inner corner (4),
said device (1) comprising at least the following functional means:

    - roll holding means (5) for holding a band supply roll (6) of foil or sheet material, in a rotary manner,
    - band guiding means (7) comprising at least two mutually cooperating rolls (8, 8'),
    - band shaping means (9) for at least initiating the folding of said band (2) along a longitudinal folding line (2') to form two longitudinal band parts (2",2"'),
    - band positioning means (10) for positioning said folding line (2') into the bottom line (4') of said profiled interior corner (4),

    all said functional means being mounted onto a support frame (11) provided with a handle (12) and/or a handle fixing site (12'),
    applicator device (1) **characterized**
    in that it comprises displacement guidance means (19) configured to rest on both support surfaces (3, 3'), at a distance from the corner (4),
    in that said band shaping means (9) comprise at least one shaping element on which the band (2) rolls or slides against during its travel path from the supply roll (6) towards the band positioning means (10),
    in that band pressing means (13), for pressing each of the two longitudinal band parts (2", 2"') against one of the two support surfaces (3, 3'), are associated with the band positioning means (10) to constitute together band applying means (10, 13), and,
    in that said band applying means (10, 13) comprise a frontal positioner and applicator means (10) and a subsequent substantially profiled side press slider (13), having preferably a V-shaped profile in cross-section, wherein said shaping element (9), said positioner and applicator means (10) and said side press slider (13) have the same bisector plane (BP).

2. Applicator device according to claim 1, **characterized in that** the at least two rolls (8, 8') of the band guiding means (7) cooperate to pinch the running band (2) between them and are subject to an at least limited resistive torque, said band guiding means (7) inducing a change in the direction of travel or movement (DM) of the running band (2) and the two cooperating rolls (8, 8') comprising advantageously a deflecting roll (8') and a pressing roll (8).

3. Applicator device according to claim 2, **characterized in that** the at least two rolls (8, 8') of the band guiding means (7) are mutually rotationally linked, for example by meshing gear means (16), a hand-operated organ (17) which allows to drive said rolls (8, 8') being advantageously arranged on the support frame (11).

4. Applicator device according to anyone of claims 1 to 3, **characterized in that** said side press slider (13) is fastened through a pivoting link (14) with a corner applicator carrier (10') and biased, advantageously by a spring force or an elastic deformation force, towards the bottom line (4') of the interior corner (4) to be covered with the band (2) of foil or sheet material when the applicator device (1) is in use and pushed by the operator under pressure along the corner (4).

5. Application device according to anyone of claims 1 to 4, **characterized in that** the positioner and applicator means (10) consists of a freely rotating roller, located underneath the band shaping means (9) and in front of the side press slider (13) and having a V-shaped profile in cross-section, preferably with a rounded running edge, said roller (10) forming advantageously a frontal device positioning means and a mobile angular deflection means for the band (2) between said shaping means (9) and said slider (13).

6. Applicator device according to anyone of claims 1 to 5, **characterized in that** the shaping element (9) consists of a shaping surface element changing progressively its sectional profile, along the direction of movement (DM) of the running band (2), from being substantially flat at one upstream end (9") to having an angular shape (9') at the opposite downstream end, and defining there a prominent ridge or edge.

7. Applicator device according to anyone of claims 1 to 5, **characterized in that** the shaping element (9) consists of at least one ball or bead, preferably mounted to rotate freely and advantageously in the form of several balls arranged in the bisector plane (BP).

8. Applicator device according to anyone of claims 1 to 5, **characterized in that** the shaping element (9) consists of at least one double cone roll or roller, preferably mounted to rotate freely about its axis and having a prominent ridge located in the bisector plane (BP).

9. Applicator device according to anyone of claims 1 to 8, **characterized in that** the shaping element (9) comprises or is associated with a slot-like passage (15) through which the band (2) is passing before rolling on or sliding over said shaping element (9), said slot (15) being aligned with the band guiding means (7), which are themselves aligned with the roll holding means (5).

10. Applicator device according to anyone of claims 1 to 9, **characterized in that** the band guiding means (7) also comprise a funnel body (8"') forming a passage with a slot-like cross-section, arranged upstream the at least two mutually cooperating rolls (8, 8') along the direction of movement (DM) of the running band (2), aligned with said rolls (8, 8') and with the roll holding means (5) and tapering towards said rolls (8, 8').

11. Applicator device according to anyone of claims 1 to 10, **characterized in that** the supply roll holding means (5) comprise a support shaft (18) for holding the supply roll (6) in a rotational manner towards the support frame (11), the rotation of the roll (6) advantageously occurring against a resistant torque, preferably a resistant frictional torque, said shaft (18) preferably comprising a mandrel (18') mounted on a axle (18") rigidly fixed on the support frame (11).

12. Applicator device according to anyone of claims 1 to 11, **characterized in that** the displacement guidance means are (19) arranged and configured to roll on a respective one of the abutting surfaces (3, 3') defining the corner (4), said guidance means (19) cooperating with the frontal corner applicator (10) to position the device (1) adequately with reference to the bottom line (4') of the profiled corner (4).

13. Applicator device according to claim 12, **characterized in that** the displacement guidance means (19) comprise at least two lateral guide wheels (20) mounted onto the support frame (11), each through an arm (20') pivotally secured to said support frame (11), the pivot joint (20") being biased by spring or elastic means (20'") so as to force said wheels (20) outwardly, laterally away from the support frame (11), thus forming a suspension system.

14. Applicator device according to anyone of claims 1 to 13, **characterized in that** it also incorporates band cutting means (21), arranged between the guiding means (7) and the shaping means (9) and manually operable to severe the band (2) by means of a corresponding pulling or pushing organ (21').

15. Applicator device according to anyone of claims 1 to 14, **characterized in that** the profiled side press slider (13), with a substantially V-shaped section, comprises an outside wall (13') forming a gliding shoe, substantially in the shape of the front part of a boat hull, with a curved frontal end (13") and comprising a linking arm (22) which is pivotally connected to the corner applicator carrier (10') and equipped with a holder (23) for attaching the gliding shoe (13').

16. Applicator device according to anyone of claims 1 to 15, **characterized in that** the outside wall (13') of V-shaped profile of the side press slider (13) is partly formed by superposed coplanar strips or lamellas (13"') extending longitudinally towards the near end of the slider (13) and elastically deformable, preferably while progressively projecting outwardly in the same direction.

17. Applicator device according to anyone of claims 1 to 16, **characterized in that** the side press slider (13) comprises also, at its rear end, a band end retainer (24), preferably incorporating a clamping member (24") which may advantageously liberate the end of the band (2) when sufficient tension is applied on said band (2).

18. Applicator device according to anyone of claims 1 to 17, **characterized in that** the handle (12) is connected to the support frame (11) at a location or site (12') situated between the displacement guidance wheels (20'") and the applicator roller (10).

19. Method for affixing a band or strip (2) of foil or sheet material, in particular of fleece or non-woven fabric material, simultaneously onto two abutting support surfaces (3, 3') defining together a profiled interior corner (4), said method comprising a first step of

preparing said first and second corner surfaces (3 and 3') for receiving said band or strip (2), in particular by applying at least one layer of an adhesive and/or sealing substance on them, and then a second step of applying said band or strip (2) onto said pretreated support surfaces (3, 3'),
method **characterized in that**
said band or strip (2) is applied progressively onto said surfaces (3, 3') by using an applicator device (1) according to anyone of claims 1 to 18 and which comprises at least means (5) to hold and unroll a supply roll (6) of foil or sheet material, means (7, 9) to guide and shape said unrolled travelling band (2), and band positioning and pressing means (10, 13) to apply said pre-shaped band (2) under pressure onto the pretreated support surfaces (3, 3'), said device (1) being pushed or guided by an operator along said corner (4) over the length of the corner to be covered by said band or strip (2).

20. Method according to claim 19, **characterized in that** prior to a band or strip (2) application phase, the free end portion (25) of the band or strip (2) is pulled over the shaping means (9), the frontal application (10) and the pressing means (13) and affixed, by clamping or pinching, at the rear end of the pressing means (13) by a band end retainer (24).

21. Method according to anyone of claims 19 and 20, **characterized in that** when the applicator device (1) is brought into contact under pressure with the corner (4), the pressing means (13) pass from a first configuration wherein the free end portion (25) of the band or strip (2) is clamped or pinched into a second configuration wherein the free end portion is released.

22. Watertight corner area formed by two abutting support surfaces (3, 3') and comprising a band or strip (2) of foil or sheet material, in particular of fleece or non-woven fabric material, affixed to it, as well as at least one layer of a sealing substance applied in liquid form, wherein said band or strip (2) has been applied according to the method of anyone of claims 19 to 21, using an applicator device according to anyone of claims 1 to 18.

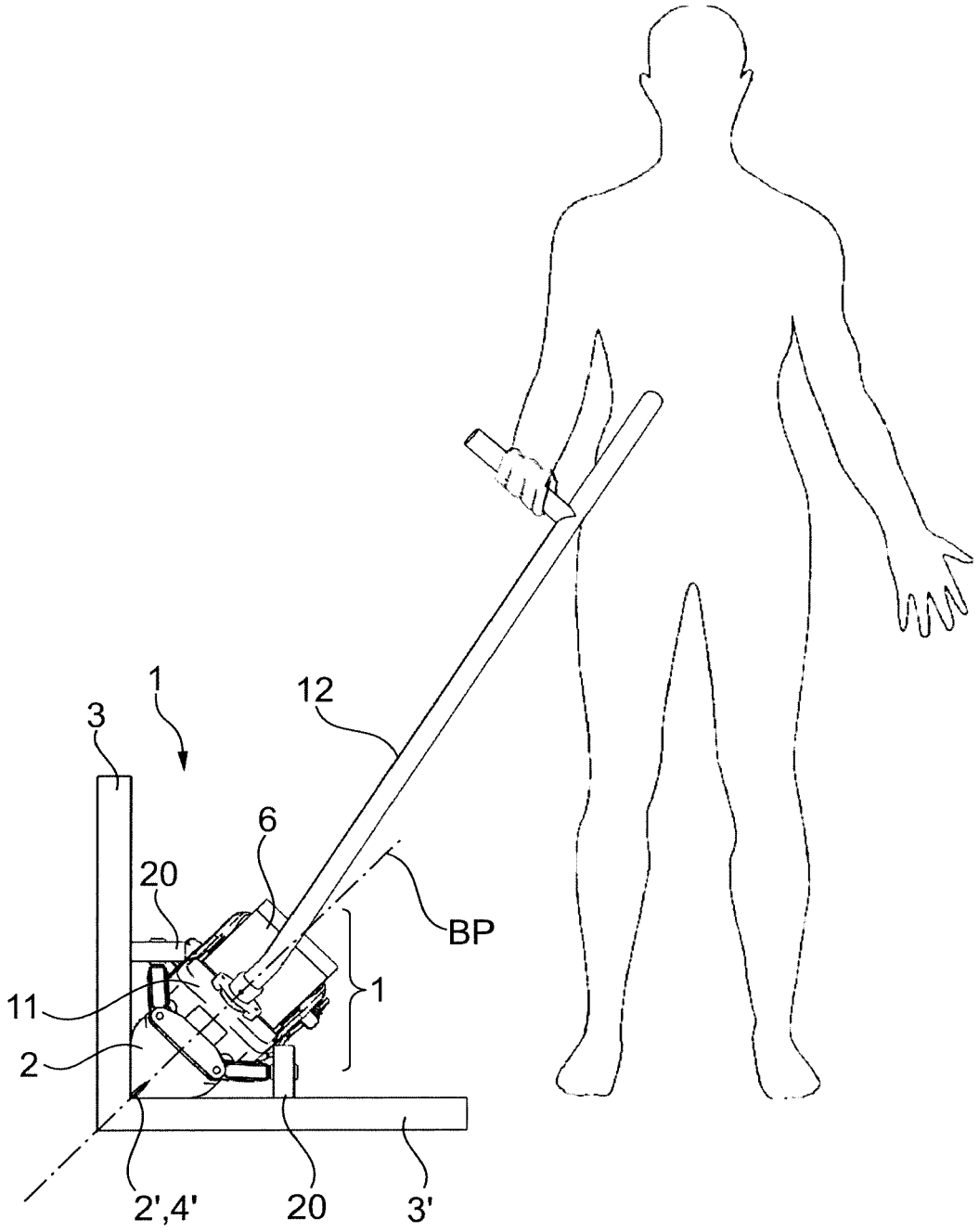


Fig. 1

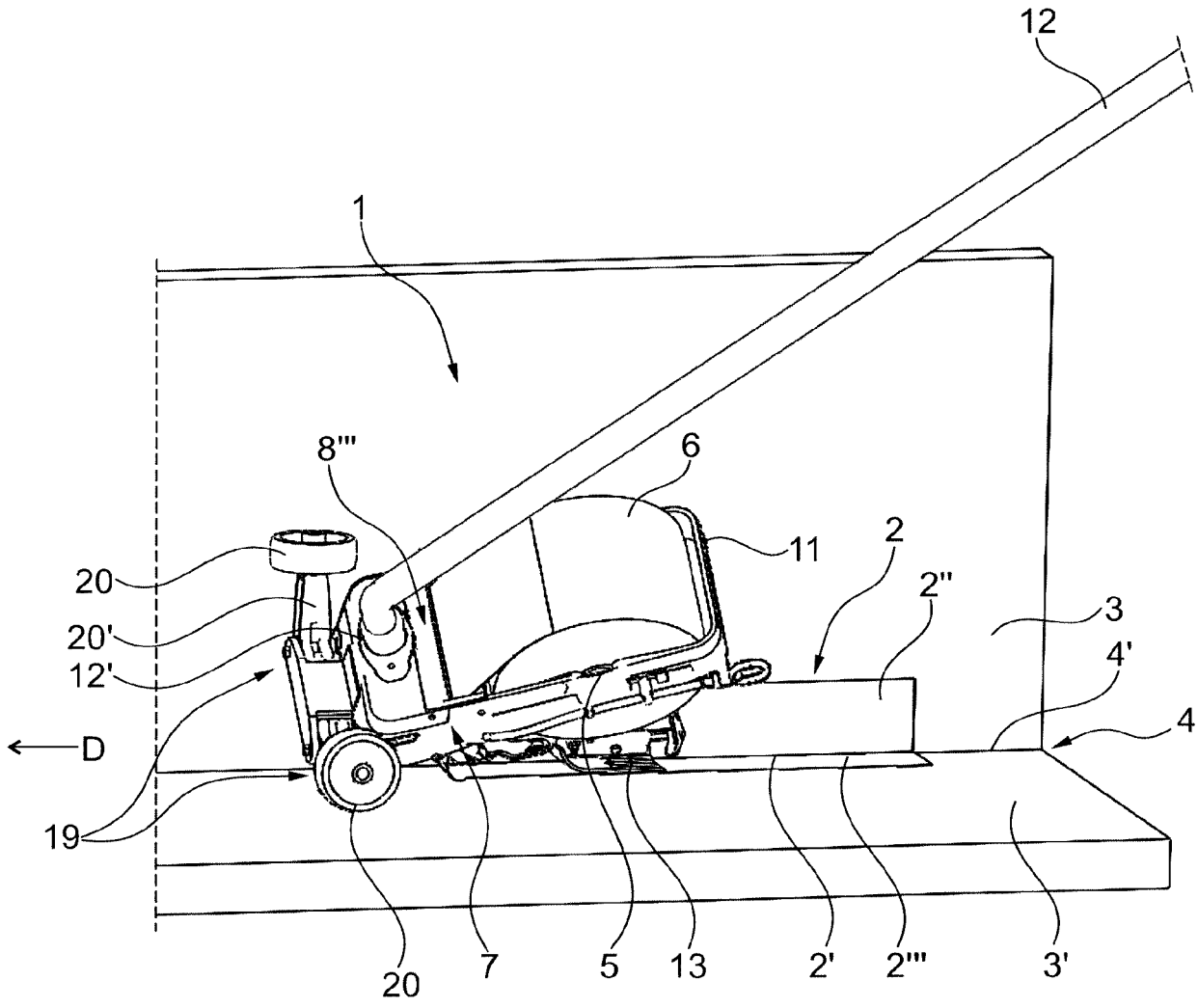


Fig. 2

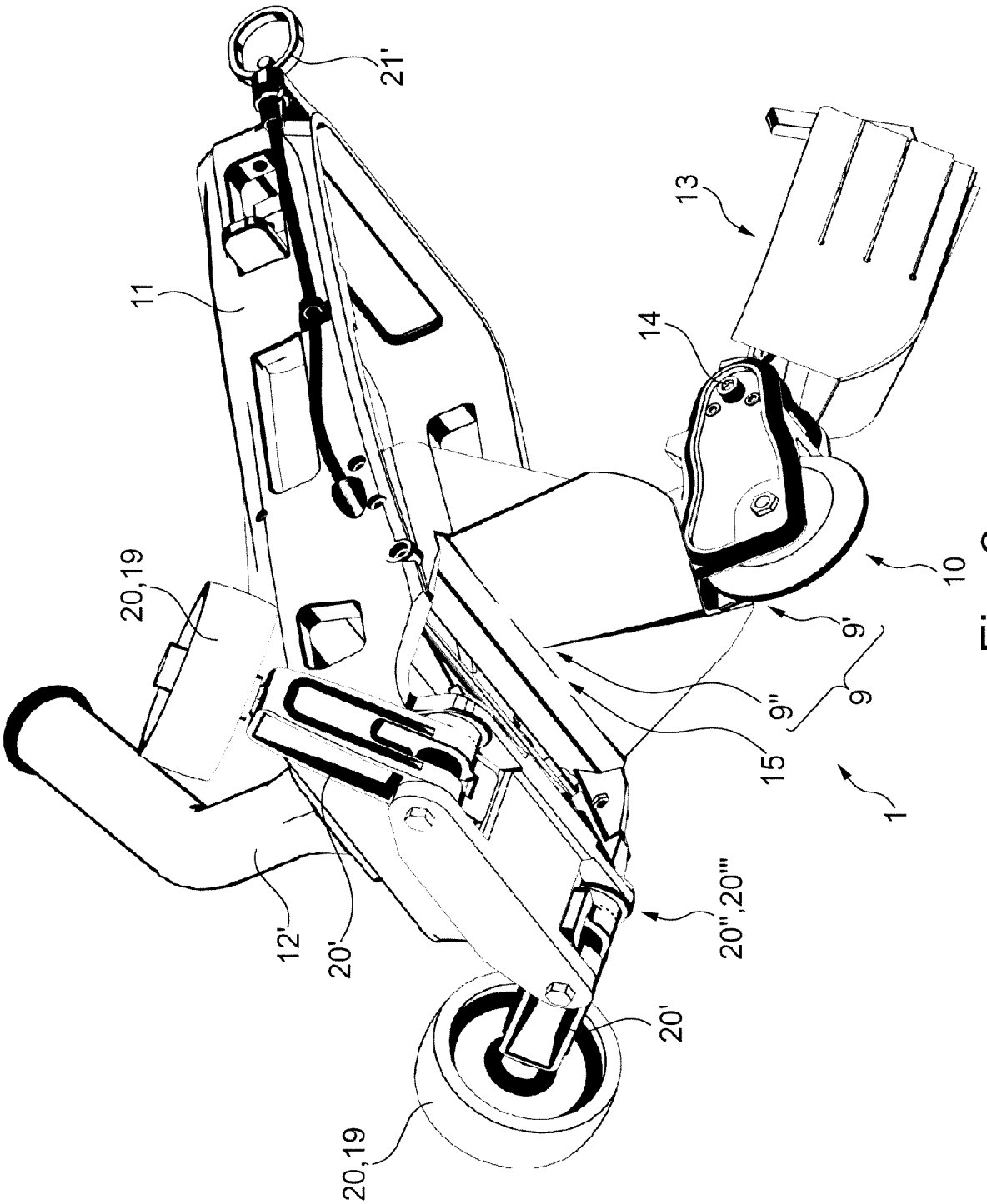
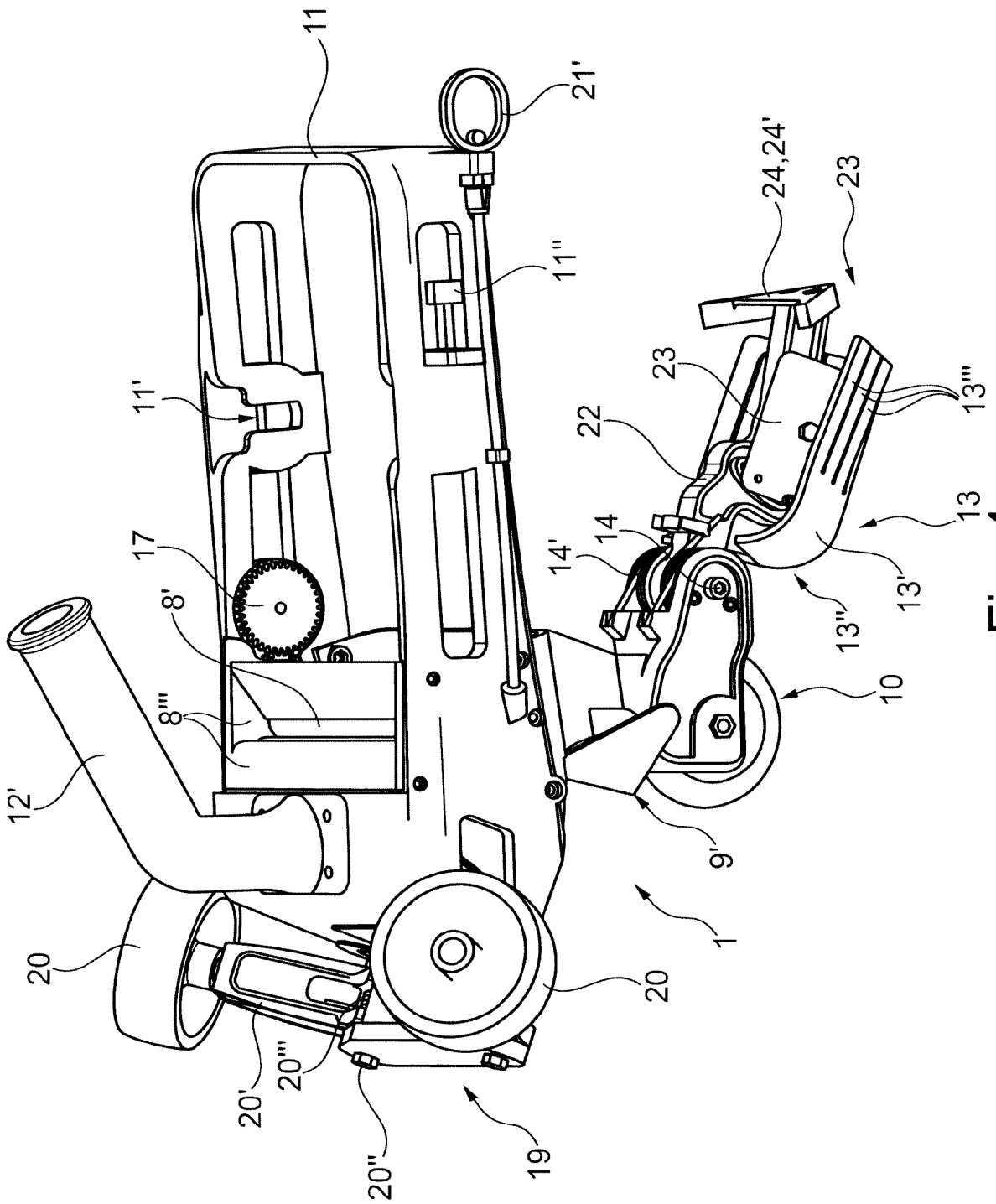


Fig. 3


11
21'
24,24'
23
11''
23
11'
22
13'''
17
14
13
14'
8'
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13''
8'''
10
12'
9'
1
20
20
20'
20'''
20''
19

Fig. 4

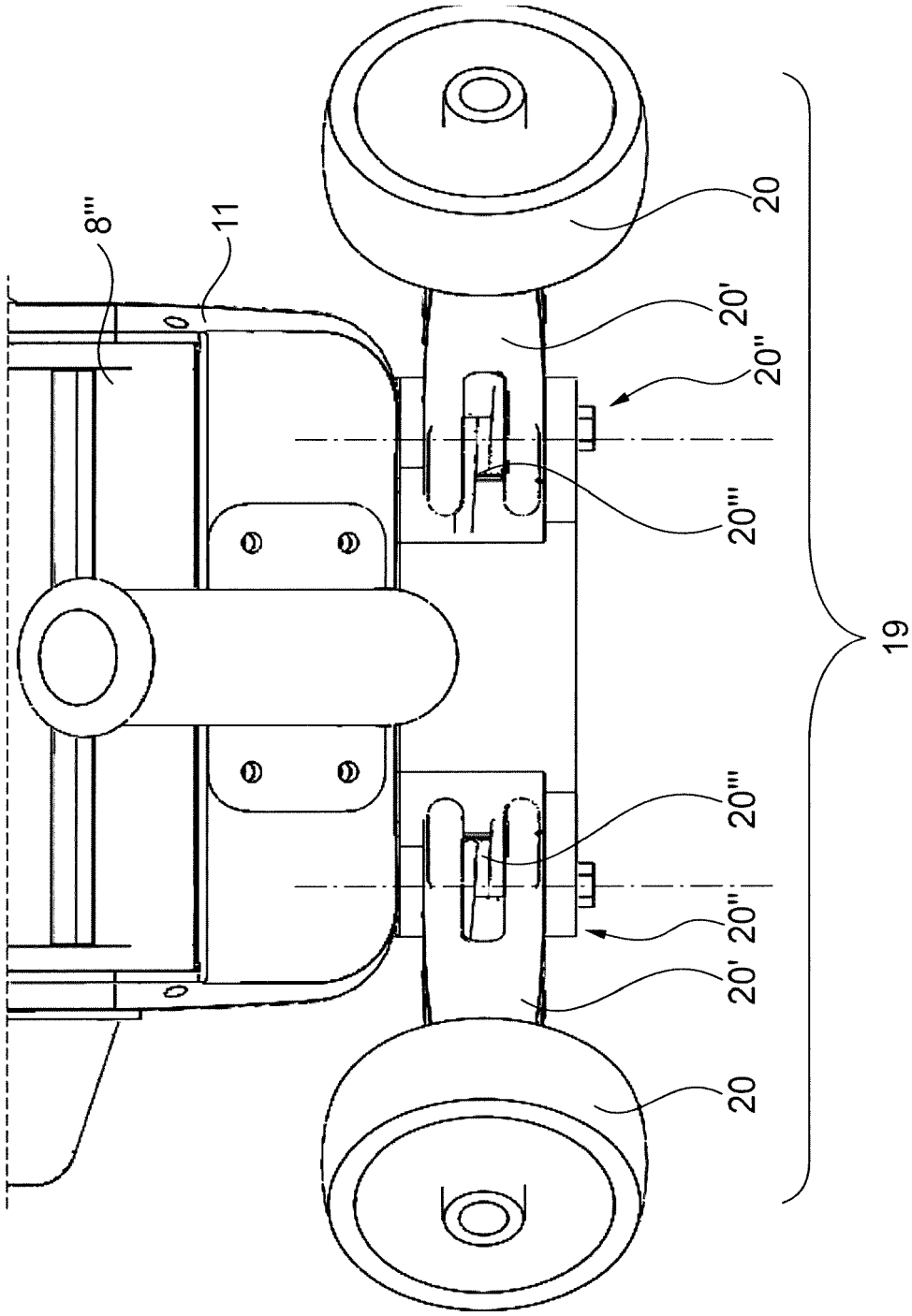

Fig. 5

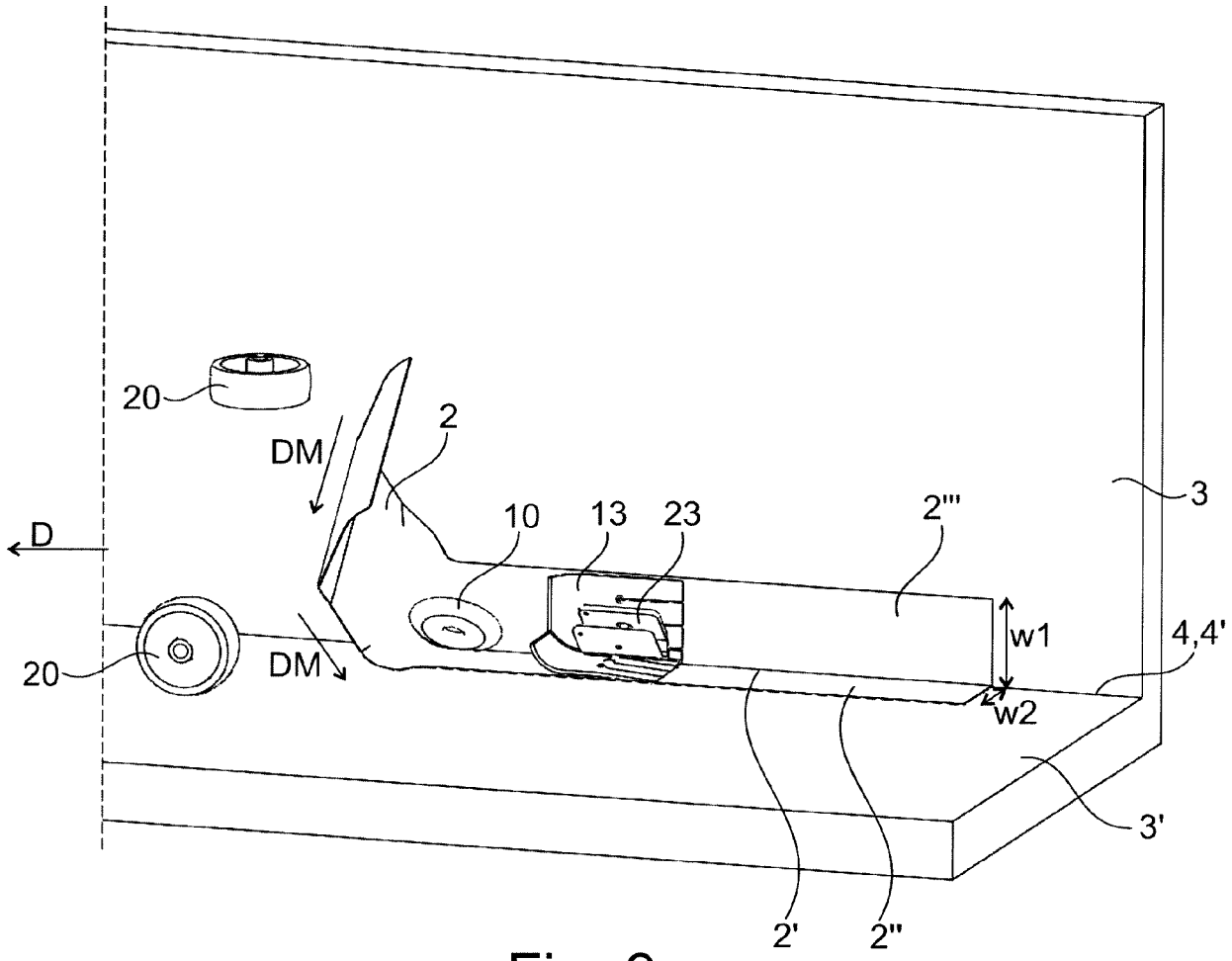

Fig. 6

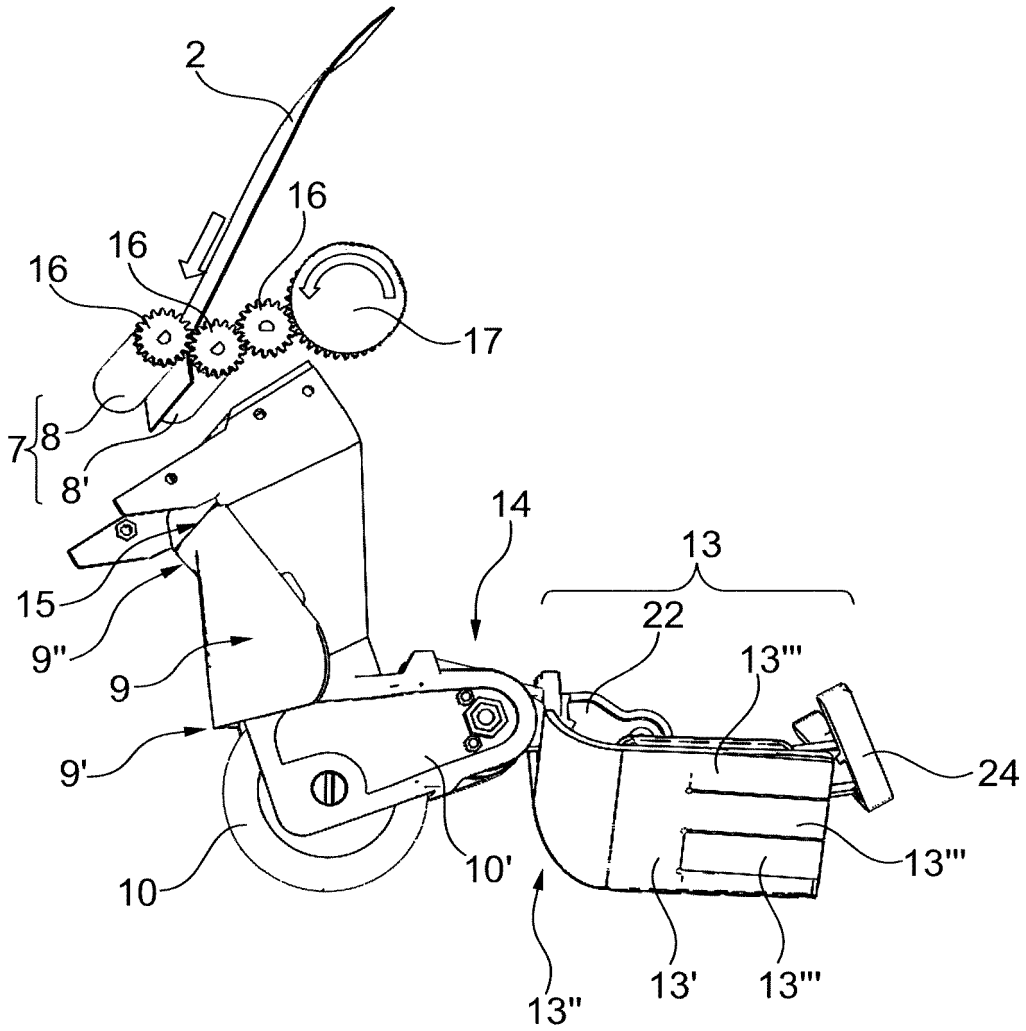

Fig. 7A

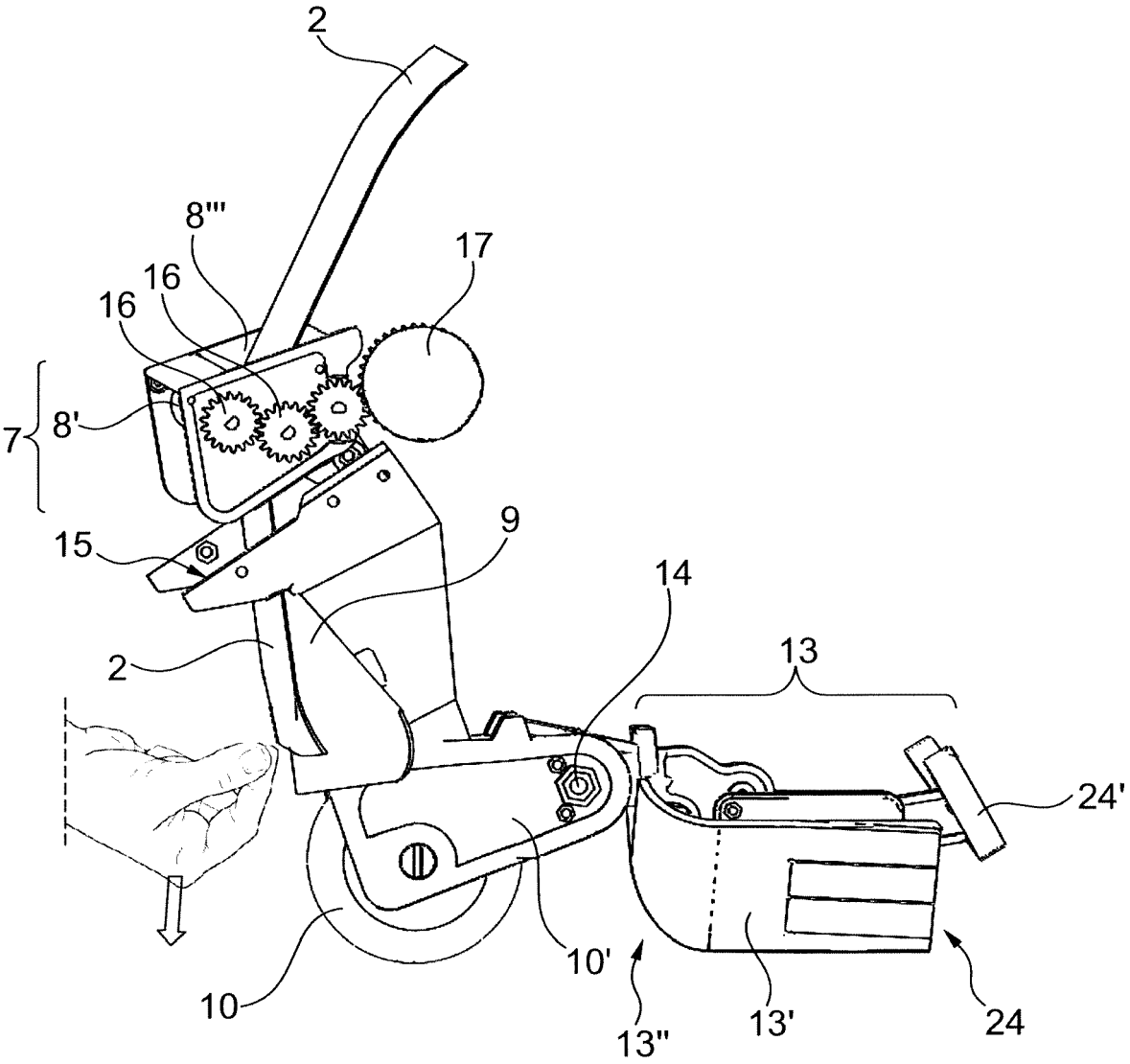

Fig. 7B

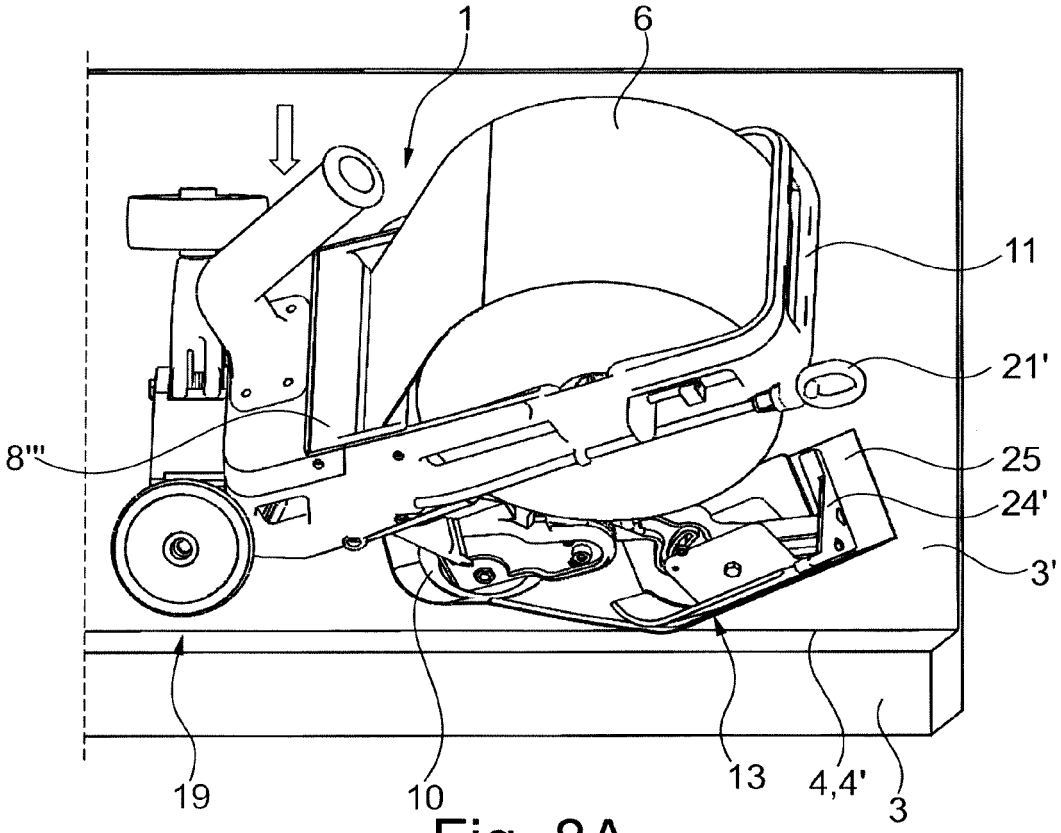

Fig. 8A

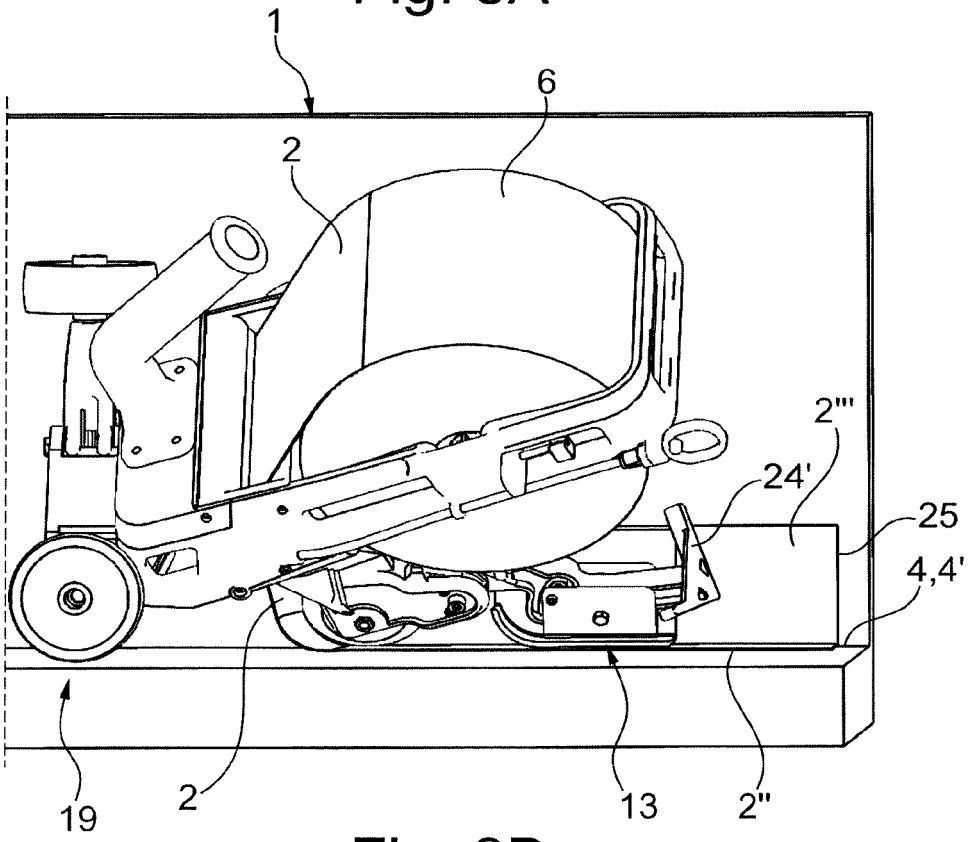

Fig. 8B

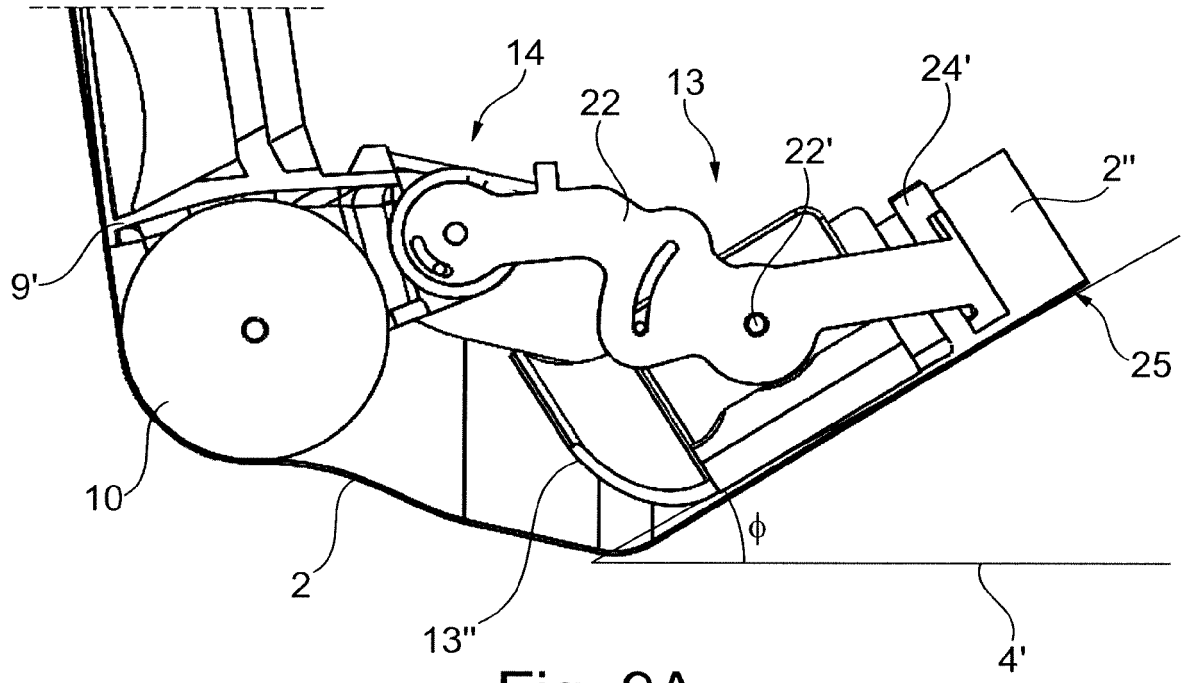

Fig. 9A

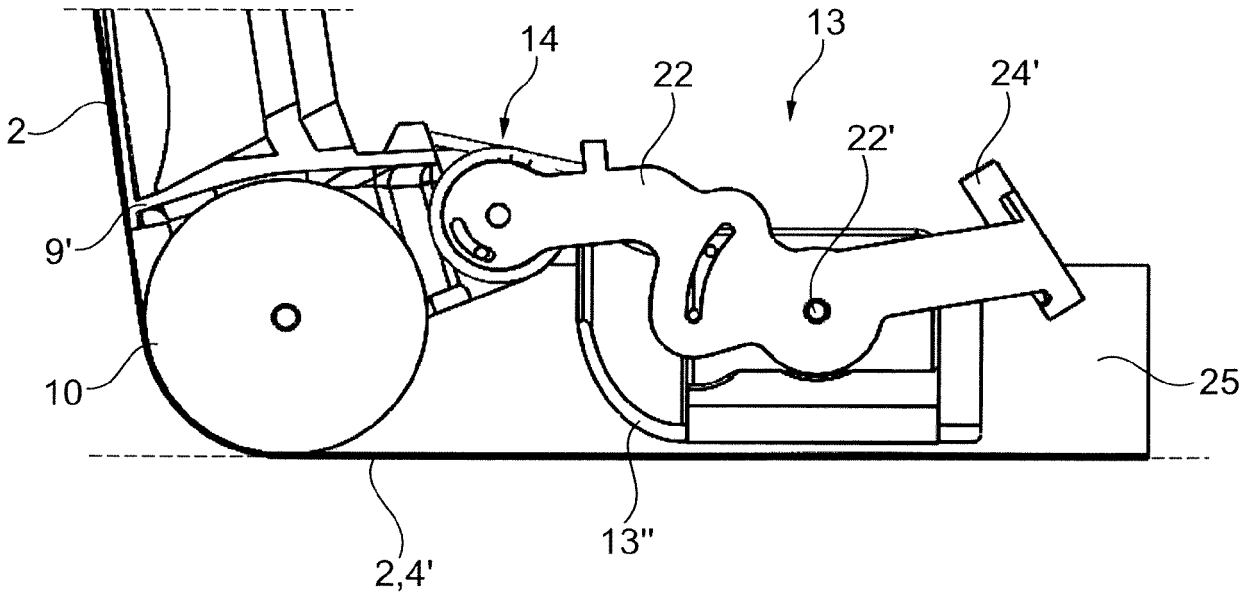

Fig. 9B

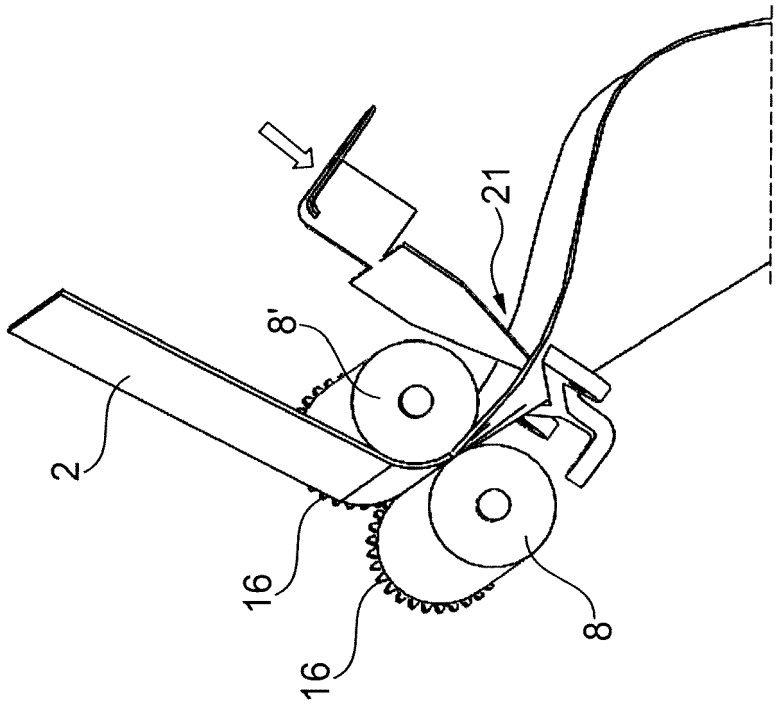

Fig. 11

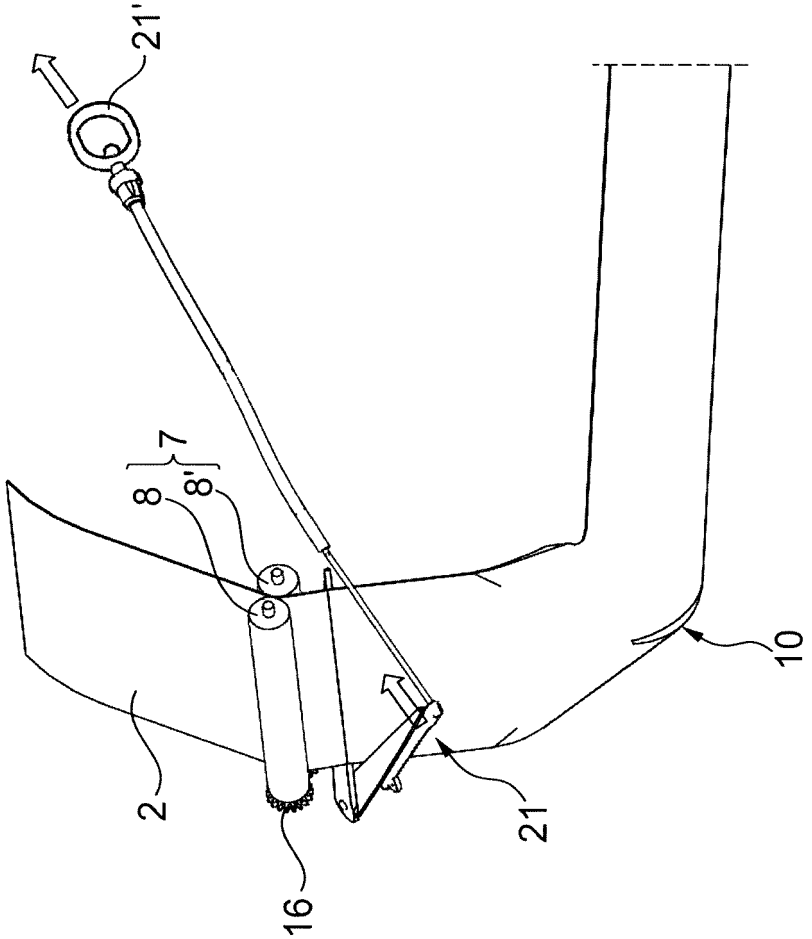

Fig. 10

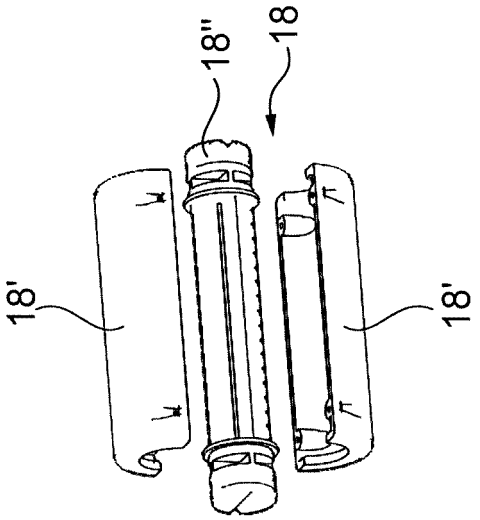

Fig. 12B

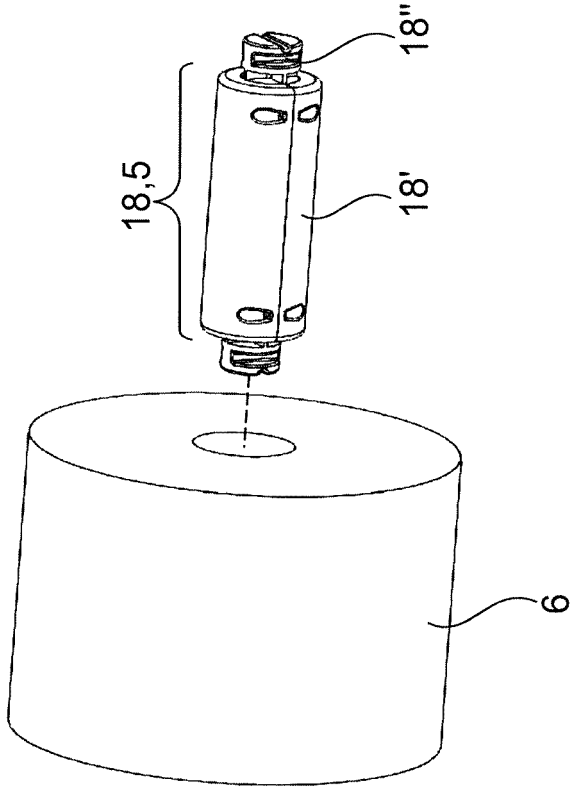

Fig. 12A

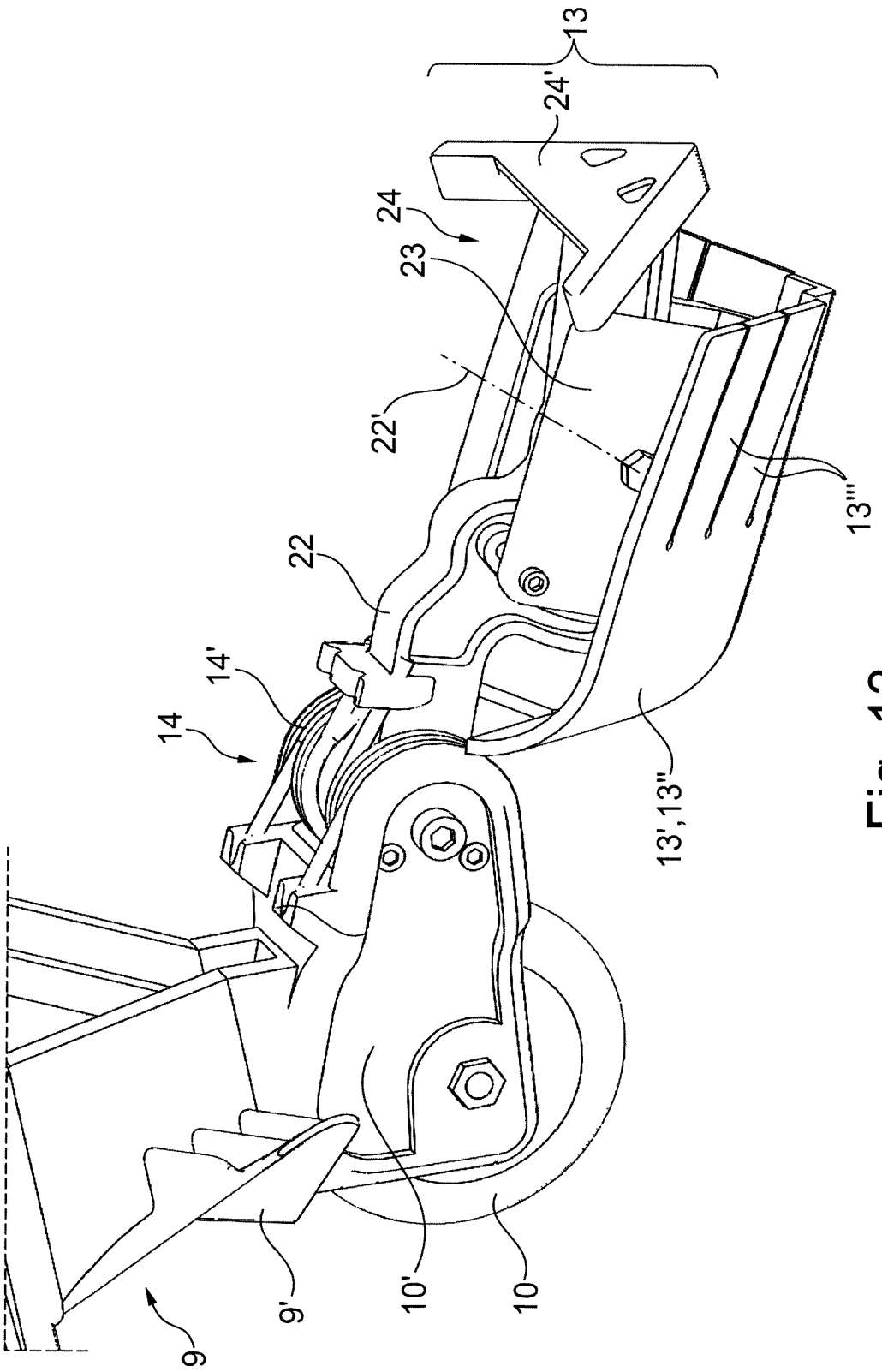

Fig. 13

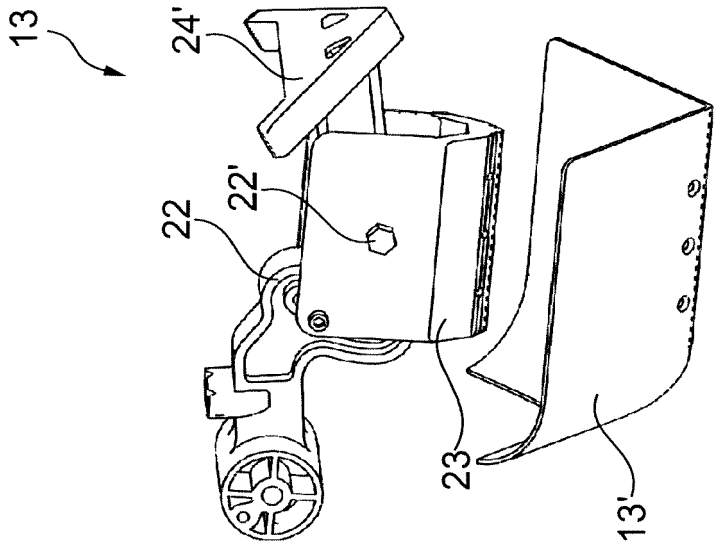

Fig. 14

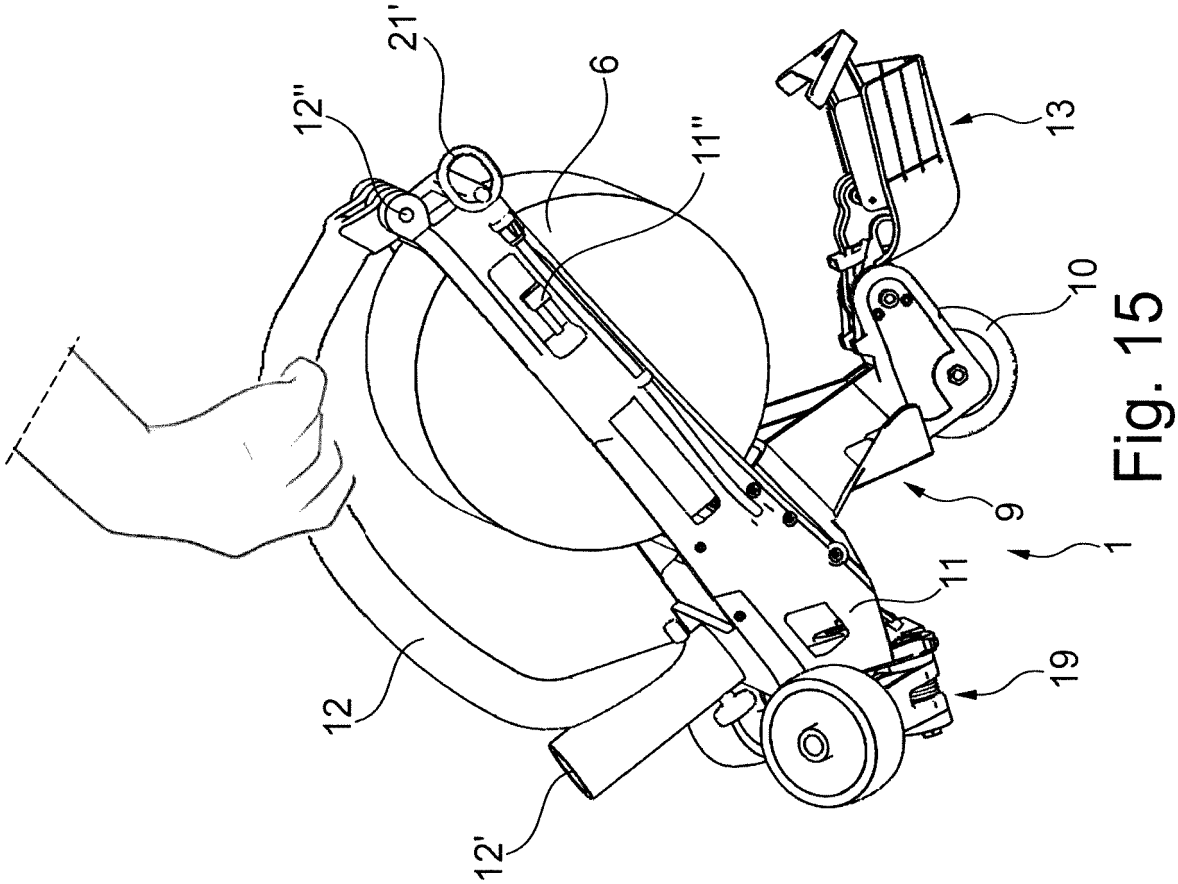

Fig. 15

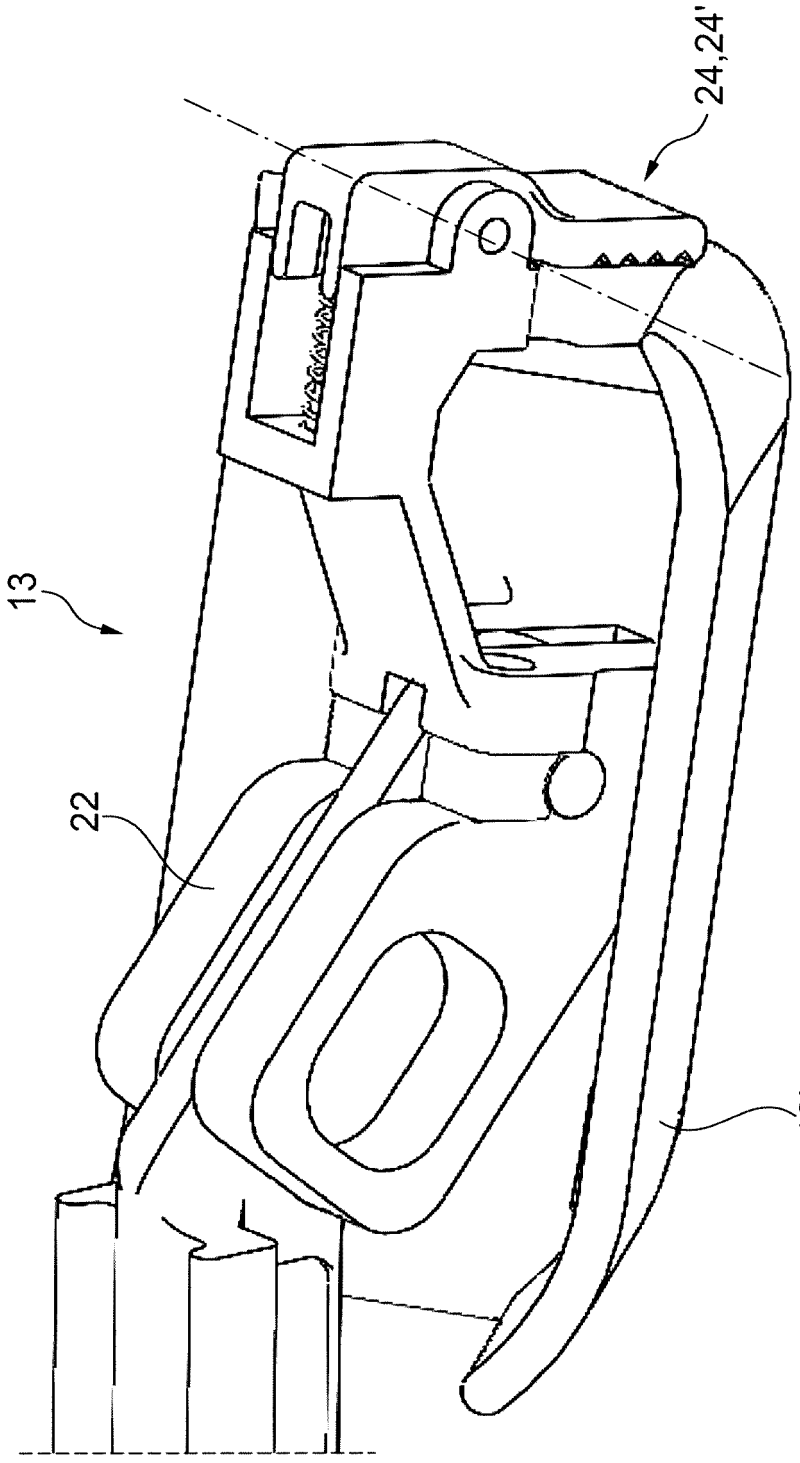

Fig. 16

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EUROPEAN SEARCH REPORT

Application Number
EP 20 31 5177

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	JP 2000 038251 A (ATOX CO LTD) 8 February 2000 (2000-02-08)	22	INV. B65H35/00
A	* abstract; figures 1-5 * * paragraph [0006] * * the whole document *	1-21	E04F21/165
X	US 3 925 145 A (AMES ROBERT G) 9 December 1975 (1975-12-09)	22	
A	* abstract; figures 1-5 * * column 1, lines 5-30 * * column 2, lines 1-21 * * the whole document *	1-21	
X	US 2 533 209 A (AMES ROBERT G) 12 December 1950 (1950-12-12)	22	
A	* abstract; figures 1-7 * * the whole document *	1-21	

TECHNICAL FIELDS SEARCHED (IPC)

B65H
E04F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	5 October 2020	Piekarski, Adam

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 20 31 5177

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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05-10-2020

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 2000038251 A	08-02-2000	NONE	
US 3925145 A	09-12-1975	NONE	
US 2533209 A	12-12-1950	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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Patent documents cited in the description

- US 4406730 A **[0007]**
- US 4775442 A **[0008]**