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(54) **PROTECTIVE BARRIER FOR WINDS CARRYING SNOW OR SAND**

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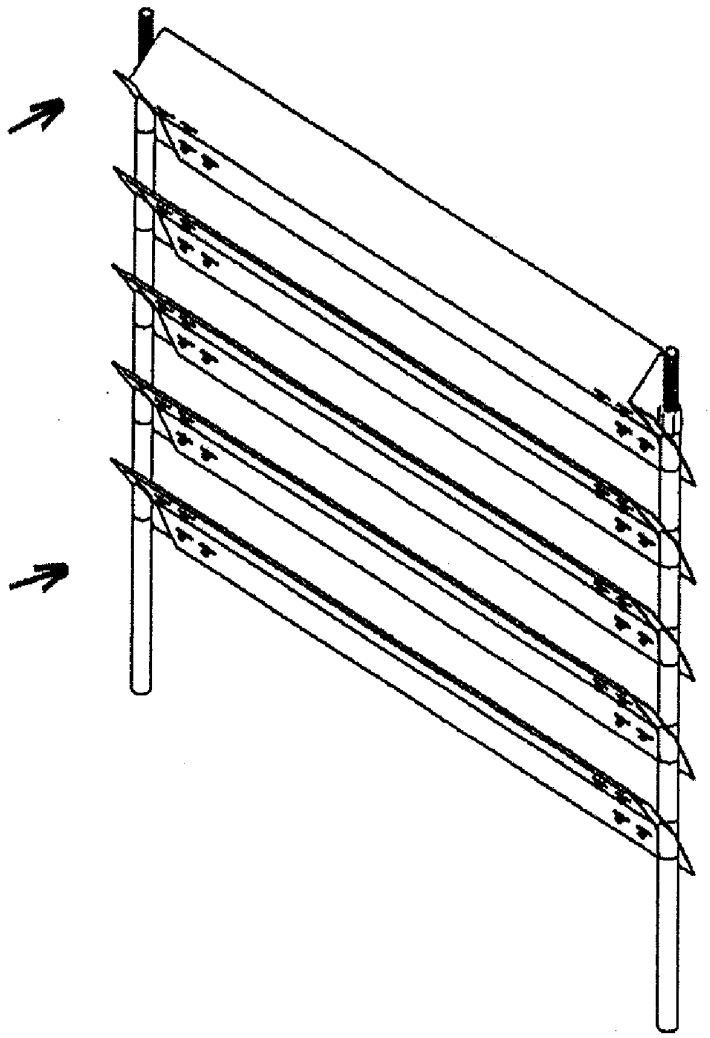
(57) **ABSTRACT**

Protective barrier for snowstorms, for installation near communication routes in order to prevent the accumulation of snow or sand on the road. The barrier is formed by joining several screens made of a set of blades that are arranged horizontally, superposed on one another at regular distances, joined with vertical posts by anchoring their ends to several rectangular plates that are inserted in the vertical post using a ring on the plate.



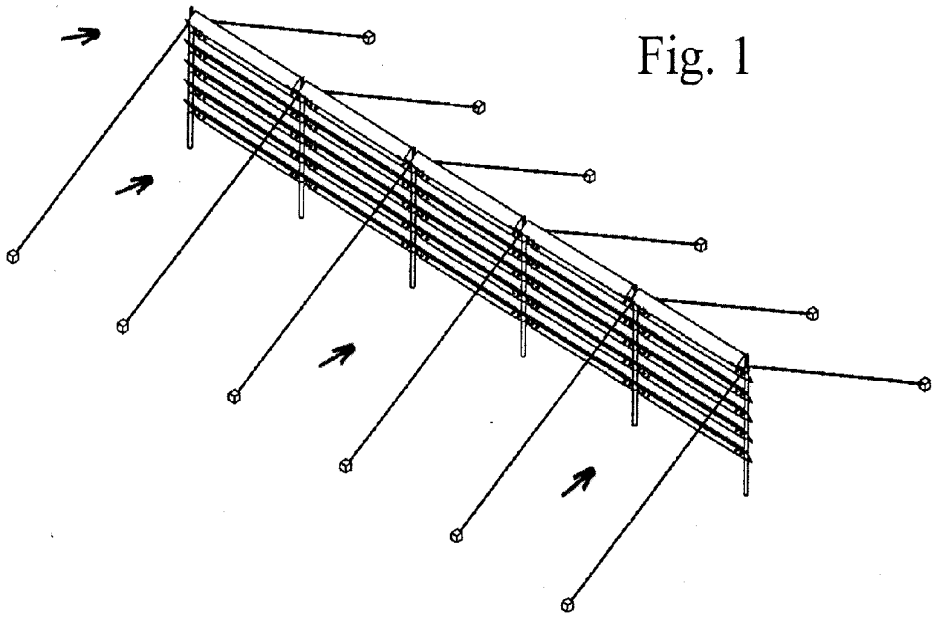


Fig. 1

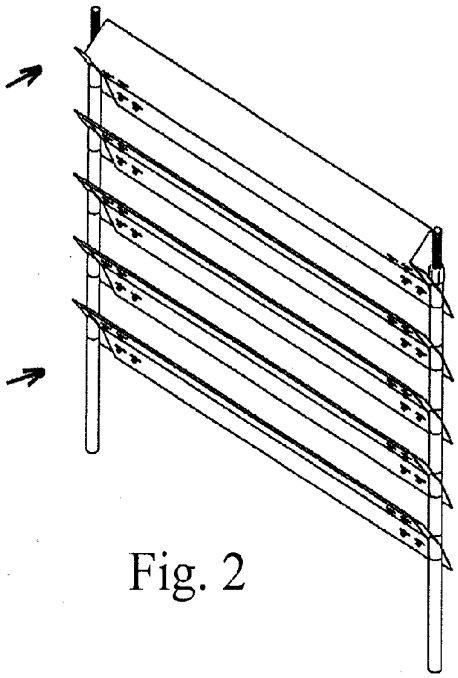


Fig. 2

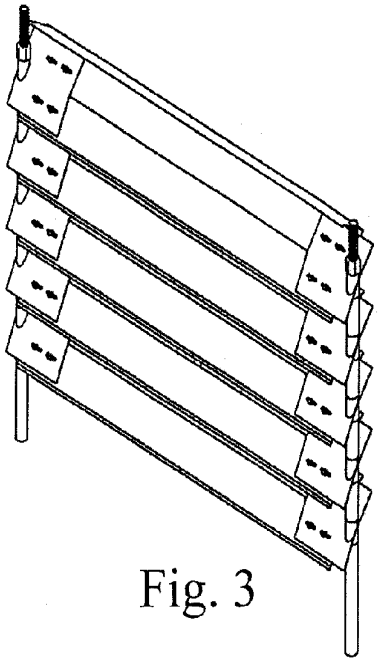


Fig. 3

Fig. 4

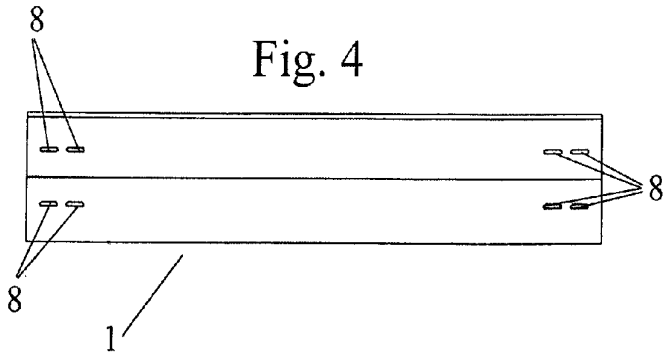


Fig. 5

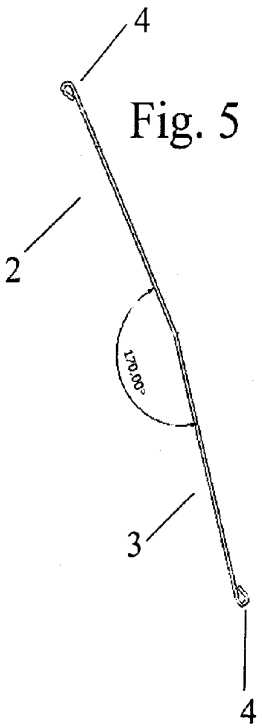


Fig. 6

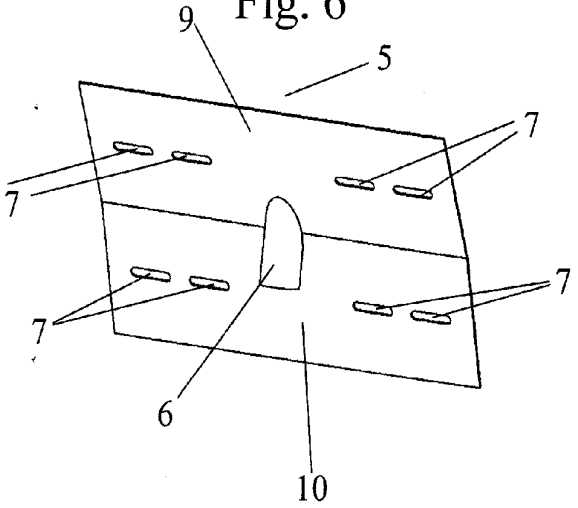


Fig. 7

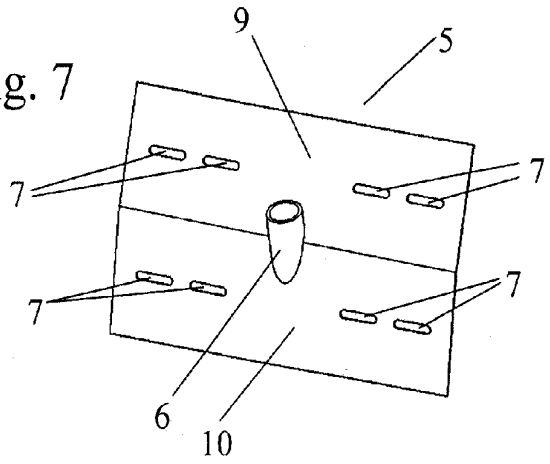


Fig. 8

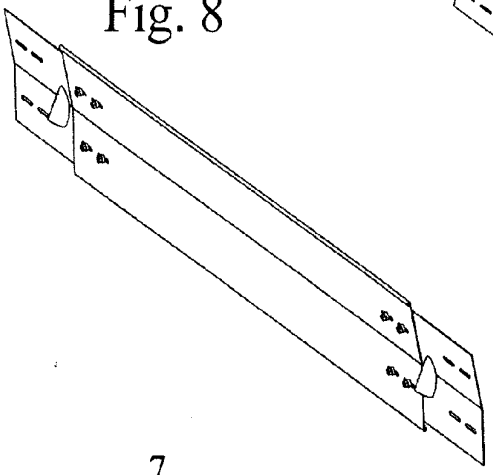
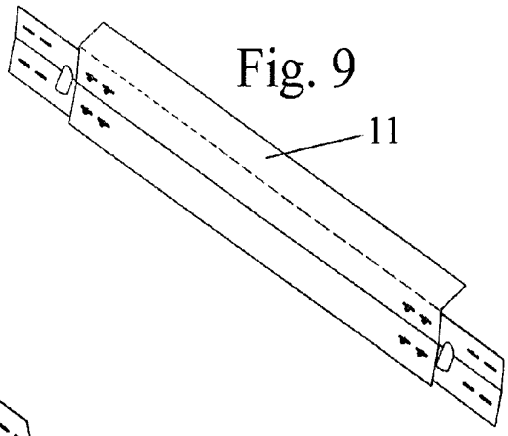


Fig. 9



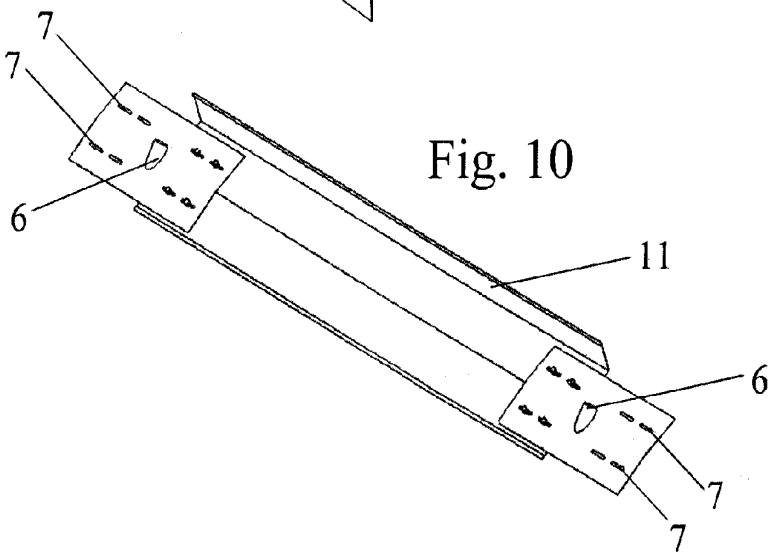
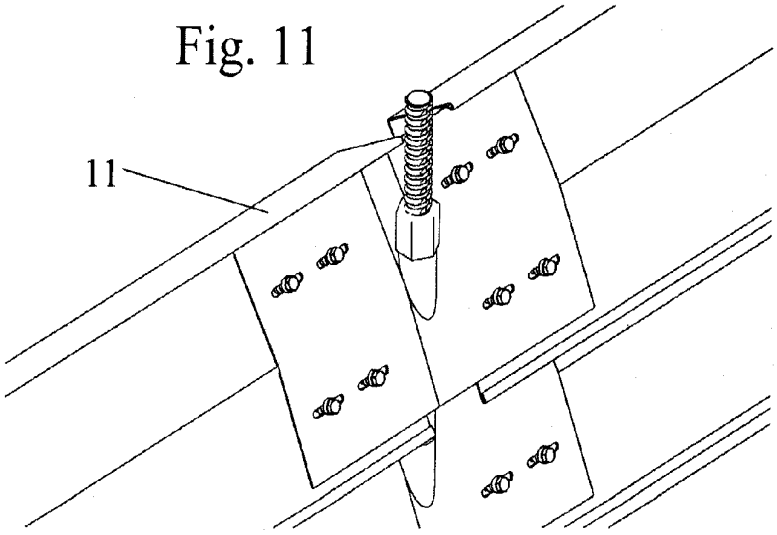


Fig. 10

Fig. 11



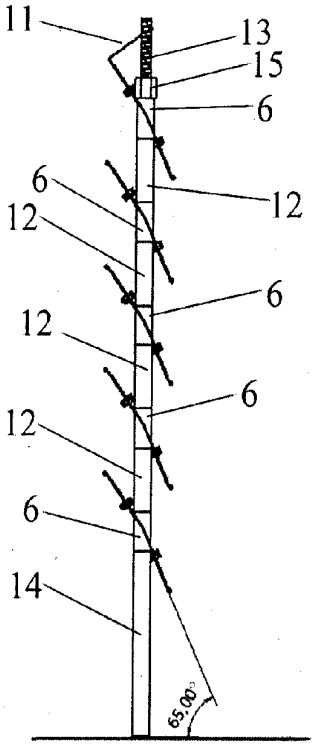


Fig. 12

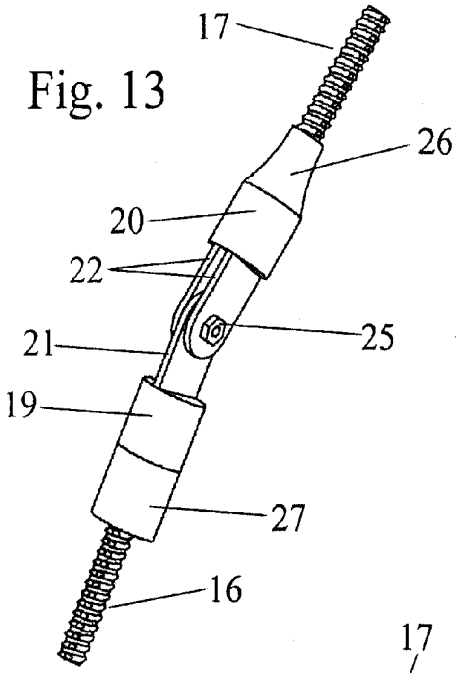


Fig. 13

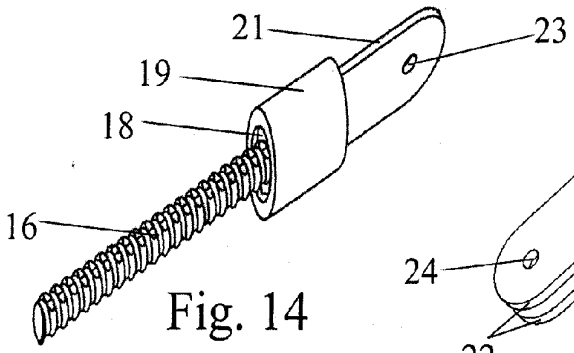


Fig. 14

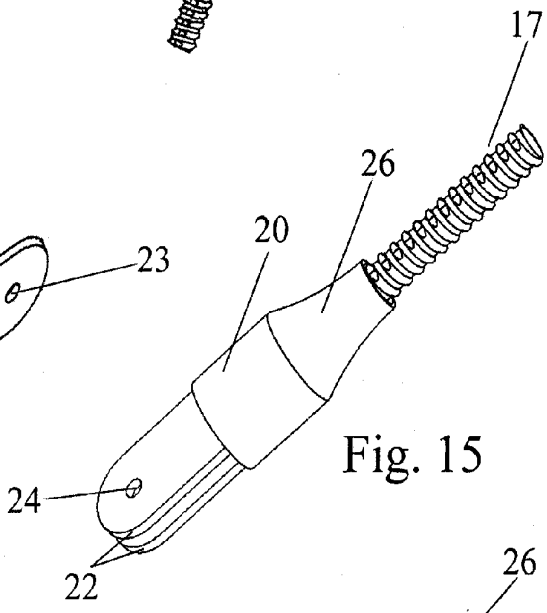


Fig. 15

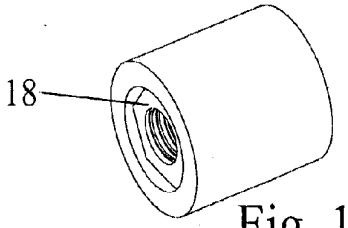


Fig. 16

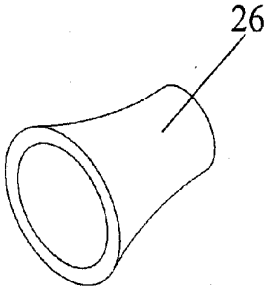


Fig. 17

PROTECTIVE BARRIER FOR WINDS CARRYING SNOW OR SAND

FIELD OF INVENTION

[0001] As stated in the declaration of this descriptive report, the present invention refers to a barrier intended to protect transportation routes, such as train tracks, roads and highways from accumulations of snow or sand carried by winds, by preventing the wind from directly lashing the route, thereby depositing and accumulating the storm's materials outside the transportation route.

BACKGROUND OF THE INVENTION

[0002] Different methods are known for protecting routes from winds carrying snow or sand. The most traditional methods are wooden barriers with panels arranged horizontally equidistant from each other, attached to vertical posts to form a barrier.

[0003] Other barriers incorporate metallic posts positioned vertically into the ground together with plastic or synthetic materials as its horizontal elements. There are also mixed barriers built with wooden boards and steel posts. U.S. Design Pat. No. D353.206 claims for the ornamental design of a fibreglass snow fence; this barrier is inclined leeward with additional supports on this side.

[0004] U.S. Pat. No. 3,966,172 presents a protective device on the windward and leeward sides, consisting of two A-frame barriers, and composed of a number of horizontal boards or strips with vertical posts, anchored to the ground with cables.

[0005] Plant protection from winds carrying snow or sand is also used, achieved by planting trees, bushes or plants arranged in one or more lines forming a barrier. The disadvantage of this system is that the vegetation is useful when it reaches a certain height, and not when it is taller or shorter.

DESCRIPTION OF THE INVENTION

[0006] The proposed invention consists of a protective barrier against winds carrying snow or sand composed of a set of easily transportable parts to the site in order to form a barrier by arranging a number of screens in a line. The structure of the invention's elements facilitates a quick and simple on-site installation and replacement of worn parts during repair and maintenance work.

[0007] Each screen consists of a group of strips to be positioned horizontally, superimposed at regular distances, bound to the vertical posts by fastening their ends to rectangular fastening plates that are inserted into the vertical post using a tubular ring found in the plate's structure.

[0008] The line of screens that forms the barrier will force the wind to pass through its structure, dissipating its velocity and avoiding eddies in the protected zone, eddies that cause accidents since they impede the drivers' view of the roadway.

[0009] The screen will have a wind deflector in its upper part that will favor the channelling of the wind's trajectory causing the precipitation of the materials carried by the wind to occur once the protected zone has been passed.

[0010] In this manner, the installation of the invention on the ground will eliminate the depositing of snow or sand on the route, causing the accumulation of these materials onto first, the zone previous to the barrier, windward, and second, outside of the route, in the leeward part.

[0011] The lower part of the screen will not have strips, to minimise the snow deposits in the area immediately after the screen, in the leeward zone.

[0012] In addition, the screen may have a joint in its lower part that allows the screen to face one side or the other, or toward both sides, so as to lower it completely over the surface in seasons when this protection is not needed and it is desirable to eliminate the visual impact that these barriers have on the landscape; moreover, the joints will facilitate repair work.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] In order to complement the present description, and to aid in the better understanding of the invention's characteristics, the present descriptive report of the drawings is included, which demonstrates the preferred construction method. These illustrations, which are not all encompassing, illustrate the following:

[0014] FIG. **1**.—View of the protective barrier for winds carrying snow or sand created by the joining of various screens, illustrating the placement method with respect to the wind.

[0015] FIG. **2**.—An individual screen from a windward perspective, the side that is lashed by the wind.

[0016] FIG. **3**.—An individual screen, leeward view.

[0017] FIG. **4**.—View of a strip.

[0018] FIG. **5**.—Profile view of a strip.

[0019] FIG. **6**.—The fastening plate from a windward view.

[0020] FIG. **7**.—The fastening plate from a leeward view.

[0021] FIG. **8**.—Detail of the union of the strips with the fastening plate, windward view.

[0022] FIG. **9**.—View of the upper strip with the deflector in its windward position; the union to the fastening plates is visible.

[0023] FIG. **10**.—The detail of the union of the upper strip to the fastening plates.

[0024] FIG. **11**.—Detail of the end of the screen, with the vertical post's threaded bar and the union of the strips to the fastening plate, leeward view.

[0025] FIG. **12**.—Profile view of the screen.

[0026] FIG. **13**.—Complete illustration of the vertical element's joint.

[0027] FIG. **14**.—View of the joint's lower bar.

[0028] FIG. **15**.—The joint's upper bar.

[0029] FIG. **16**.—The part that allows screwing the bars into the joint.

[0030] FIG. **17**.—The joint's upper bar's protective part.

PREFERRED CONSTRUCTION OF THE INVENTION

[0031] With reference to the figures shown, we see how the barrier, the invention, FIG. **1**, is composed of the union of various screens that are positioned into the ground using vertical posts. Each screen is composed of a number of strips (**1**), arranged in a rectangular configuration, positioned horizontally, one on top of the other and with some overlapping among them, in order to form the screen by fastening its ends to each vertical posts that are positioned into the ground (FIGS. **2** and **3**).

[0032] The strip's profile displays a longitudinal fold in its central portion with two identical segments (**2**, **3**) of 191.77 mm, forming a 170° angle; this arrangement is advantageous in that it endows the invention with wind resistance. The

screen will be arranged on site with all strips in the same position, with its concave portion windward; the side of the barrier that receives the wind is represented by the arrows (FIGS. **1** and **2**).

[0033] All strips have a fold (**4**) on the edges of its larger sides that will protect the edges of the strip from oxidation, and also protect the workmen from cuts during installation or repair work.

[0034] The strips are attached to the posts with a rectangular plate (**5**) slightly shorter than the strip and folded into two segments (**9**, **10**) with the same angle of inclination as the strips in the screen. This plate is inserted into the post using a tubular ring (**6**) that holds each plate welded in its middle area, with a cross-section that fits into the vertical post, with a ring height of 110.00 mm.

[0035] The plate (**5**) features four slanted horizontal perforations (**7**) on each side, in order to secure the strips, which likewise present four perforations (**8**) in each of their ends related in position and size with the perforations (**7**) of the plate. This attachment of the plate and the strip can be seen in FIGS. **8**, **9** and **10**.

[0036] The ends of the strips in contiguous screens will be attached to each side of the plate, in order to form a protective barrier in this form of union: the details are shown in FIG. **11**.

[0037] In FIG. **1**, we do not full see the fastening plates in the ends of the barrier, but rather only up to the ring (**6**) which is anchored into the vertical post. This is because these end fastening plates are placed for aesthetic reasons and for the safety of the passers-by who circulate through the zone, eliminating the projection that this plate would constitute without receiving any strip.

[0038] Likewise, in FIGS. **1** and **2**, an individual screen is shown, displaying the fastening plate (**5**) for the end of the barrier; it must be understood that in each screen, excepting at the ends of the barrier, the whole fastening plate (**5**) will be installed, which will allow for the anchoring of the following screen's strips.

[0039] The uppermost strip (**1**) of each screen will have an additional segment (**11**), folded and inclined leeward at a 90° angle, which will serve as a wind deflector. This deflector segment will be lower than those of the strip, 150.00 mm.

[0040] The strips (**1**) will be installed on the screen equidistant from each other on the vertical posts, maintaining this distance by the concurrence of separator pipes (**12**) that are inserted onto the posts between the tubular rings (**6**) in the strips, and the height of the pipes will determine the degree of overlapping among them: the less height the greater degree of overlapping amongst strips; in this manner the preferred construction will have a height of 177.34 mm.

[0041] The position of the fastening plate (**5**) with respect to the tubular ring (**6**) will determine the degree of inclination of the strips (**1**) in the screen. They will be manufactured, preferably, so that the segment of the strips positioned leeward will form a 65° angle with respect to the horizontal plane (FIG. **12**).

[0042] The internal structure of the vertical posts that support the screen will be threaded bars (**13**) driven into the ground. Preferably a Gewi bar 2000.00 mm in height.

[0043] The lower part of the screen will not have strips; they will be replaced by inserting pipes (**14**) onto the vertical posts with the height desired for this space. The optimal size for this space from the surface to the beginning of the screen is 10-15% of the screen's whole height.

[0044] The cross-section of these lower pipes (**14**) of the screen will be the same as that of the separator pipes (**12**) between the strips (**1**), and as that of the tubular ring in the strip's fastening plates (**6**).

[0045] The screen will be closed in its upper part using a nut (**15**) that screws into the bar that forms the vertical post.

[0046] The screen may have a joint in the post's lower area that permits it to be folded over the surface. In this case, each vertical element will be formed by two bars with a threaded structure (**16**, **17**), Gewi, connected to each other with a joint (FIG. **13**).

[0047] The lower bar (**16**) will be inserted into the ground, and the upper bar (**17**) will form the screen; the union will be joined by screwing the bars into nuts (**18**) welded into the inside of cylindrical pieces (**19**, **20**), as is shown in FIG. **16**, which have fastening elements at their other end to form the joint, one (**21**) will extend from the lower cylinder (**19**), to fit into the middle of the two receiving elements (**22**) that contain the end of the cylinder (**20**) of the upper joint. The lower fastening element (**21**) and its receptor elements (**22**) have perforations for position (**23**, **24**), intended to receive, once the lower fastening element (**21**) has been inserted in the receiving elements (**22**), a through piece, preferably a bolt, fastening the joint with a nut (**25**). The upper part of the joint will be additionally protected by a hyperbolic tubular element (**26**) inserted into the bar above the cylindrical part (**20**) that will serve for the change in sizes between this and the bar in the joint. The lower part of the joint will may also be protected by a pipe (**27**) which will have a welded nut.

[0048] The screens will be anchored to the ground using cables that will be positioned in the upper part of the posts in order to be anchored to the ground both windward and leeward (FIG. **1**). Another alternative will be the placement of rigid pipes in the same position as the cables, but located only on one side of the barrier. This will be the preferred construction when the posts have a lower joint.

[0049] The barrier will be installed, preferably, parallel to the route to be protected, on the tops of hills, in windward areas of stream banks and other topographical depressions that allow the increase of snow deposits on the screens; a study must first be made of the predominant winds in the zone in a sufficient time period to obtain a suitable statistical value of the wind directions and which one or more are predominant over the rest.

[0050] The accumulation of sand or snow will be in the windward or leeward zone, outside of the zone protected by the invention.

[0051] The barrier will be arranged without openings in the line of protection; in cases where the arrangement with openings is inevitable, some screens must overlap with others along the same line, otherwise various lines of screen will be arranged.

[0052] It must be understood that the invention has been described in accordance to its preferred construction, and that hence it may be subject to alterations in form, size and materials, whenever said alterations do not substantially change the features of the invention that are claimed below.

1. Protective barrier for winds carrying snow or sand, formed by arranging in a line various screens composed by a number of strips (**1**) disposed horizontally and affixed to vertical posts, characterized by the fact that the strips (**1**) are rectangular, folded into two equal segments (**2**, **3**), and each end of the strips is connected to the vertical posts by a plate (**5**) that contains a tubular ring (**6**) in its middle area to be inserted

into the post, and the plate has perforations (**7**) at its ends in order to fasten the strips of contiguous screens, and the strips have perforations (**8**) in their ends arranged in position and related in structure with the perforations (**7**) of the plate (**5**).

2. Protective barrier for winds carrying snow or sand, according to claim **1**, characterized by the fact that the plate (**5**) will be formed by two equal segments (**9**, **10**) with an angle of inclination that coincides with that of the strip, such that the concave part is positioned in the vertical post windward in order to receive the strips in this position.

3. Protective barrier for winds carrying snow or sand, according to claim **1**, characterized by the fact that the structure of the final strip (**1**) of the upper part of each screen is composed of an additional segment (**11**) to the rest of the strips that folds inclining leeward.

4. Protective barrier for winds carrying snow or sand, according to claim **1**, characterized by the fact that separator pipes (**12**) will be inserted into the vertical posts between the tubular rings (**6**).

5. Protective barrier for winds carrying snow or sand, according to claim **1**, characterized by the fact that the lower part of the screen can be free of strips, which will instead be replaced by pipes (**14**) arranged in the lower part of the vertical posts.

6. Protective barrier for winds carrying snow or sand, according to claim **1**, characterized by the fact that the internal structure of each vertical post is a threaded bar, said post including a nut threaded onto the upper part of said threaded bar a lower pipe, said tubular rings of the plate, separator pipes, and said strips which are mounted on the post below the nut.

7. Protective barrier for winds carrying snow or sand, according to claim **1**, characterized by the fact that the screen can be collapsed, allowing for its folding, each vertical element being composed of two bars, a lower one that is inserted into the ground, and an upper one where the structure of the screen is placed, and a joint connecting both of these bars.

8. Protective barrier for winds carrying snow or sand, according to claim **7**, characterized by the fact that the upper end of the bar that is inserted into the ground, and the lower end of the bar that forms the screen are screwed with nuts (**18**) that are welded in the inside of cylinders (**19**, **20**) that contain in their other end fastening elements that form a joint; a fastening element (**21**) that protrudes from the lower cylinder (**19**), to fit into the middle of two receptor elements (**22**) that holds the end of the cylinder (**20**) of the upper joint, with the corresponding perforations in the lower fastening element and in the receptors (**23**, **24**) for placing a through part that allows for the joint function.

9. Protective barrier for winds carrying snow or sand, in accordance with claim **8**, characterized by the fact that the upper part of said joint includes a tubular element mounted on the upper bar above said cylinder, and the lower part of the joint includes a pipe having an interior welded nut screwed onto the lower bar.

10. (canceled)

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