Dec. 28, 1965 V. N. ROOT 3,226,091

WIND BREAK

Filed Feb. 14, 1963

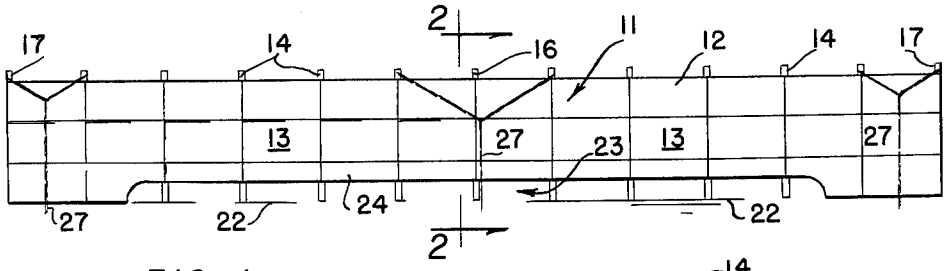


FIG. 1

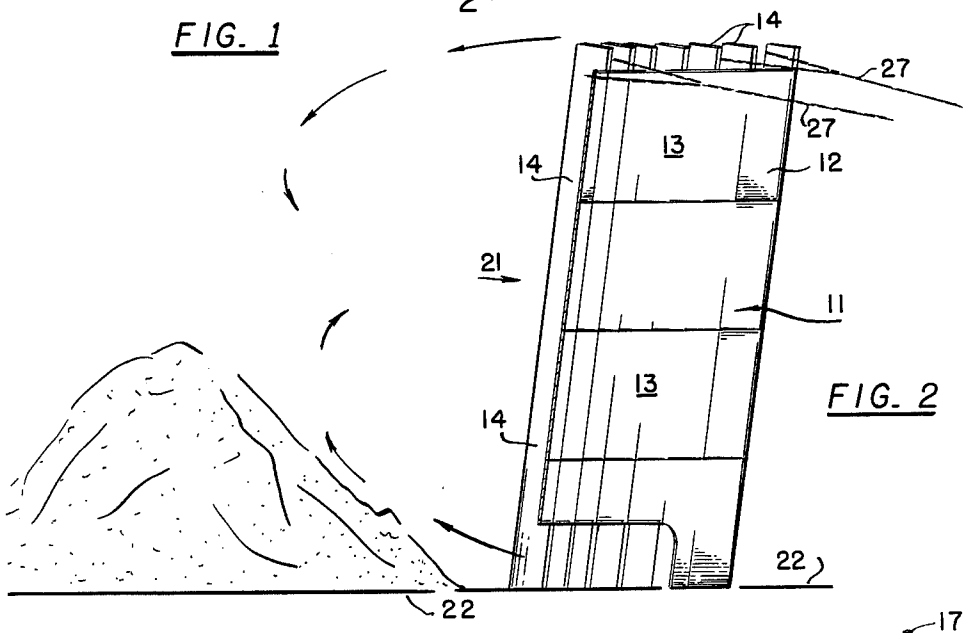


FIG. 2

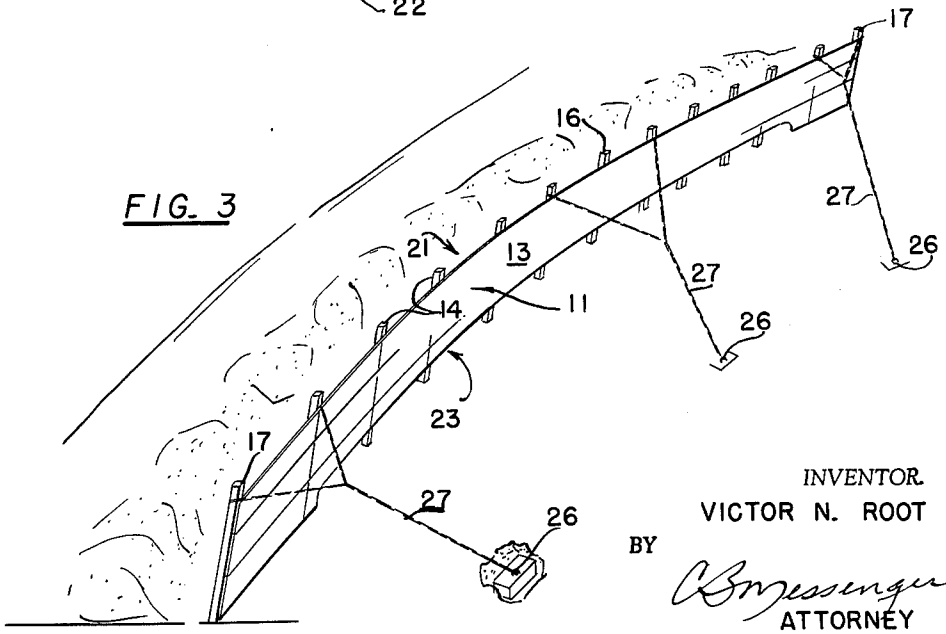


FIG. 3

INVENTOR.
VICTOR N. ROOT

BY

ATTORNEY

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WIND BREAK

Victor N. Root, Wheat Ridge, Colo.
(5830 E. 16th Ave., Denver, Colo. 80220)

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The present invention relates to a windbreak and, more particularly, to a fence that is designed to collect sand, dust and snow so that such materials may be prevented from clogging roadways and fields.

A main object of this invention is to provide a fence structure which can be erected in areas that are subject to serious wind erosion or along roads and railroads that are often subjected to drifts of snow, sand and dust to prevent the undesirable collection of such materials.

In satisfaction of the main object of this invention, it is an object to provide a windbreak that may be erected and placed at desired points so that loose and blown materials will be collected by such windbreak.

Another object of this invention is to provide a fence which creates a beneficial air flow pattern so that loose blown materials will be piled and collected behind such fence.

A further object of this invention is to provide a windbreak that can be economically built and erected so that the collection features of such windbreak will be easily available to farmers, ranchers, railroads, utilities and highway users.

Another object of this invention is to provide an efficient fence for general windbreak uses that will control soil erosion and which will conserve moisture.

Further objects and advantages of the present invention will be apparent from the appended description and drawings, in which

FIG. 1 is a front elevation showing the general pattern for an efficient embodiment of the structure,

FIG. 2 is a cross-sectional elevation in enlarged detail showing features of a portion of the fence as taken along the line 2—2 of FIG. 1, and

FIG. 3 is a perspective drawing illustrating the blown materials collecting functions of the curved and tilted fence.

Briefly stated, the present invention provides a fence or windbreak which may be used to stop and collect blown materials, such as sand, dust and snow, and which will slow the passage of wind across roadways and fields as necessary to prevent the blocking and erosion thereof. A preferred embodiment of the fence construction includes a generally solid fence or wall face made up of suitable structural materials and supported by spaced posts in which the face of the fence is inclined slightly into the wind with the line of the fence being disposed along a curve such that the face presents a concave surface engaging the wind. The substantially closed surface of the fence is disposed a slight distance above the ground at intermediate points along the length of the fence so that the fence will create a beneficial air or wind flow pattern about the fence which tends to deposit blown materials in piles behind the fence.

The detailed features of a preferred embodiment of the invention are shown in the accompanying figures, in which like components, such as the windbreak **11**, are given corresponding numbers for the purposes of identification. As seen in these figures, the fence or windbreak **11** may be made of lumber or similar materials with separate panels **12** of a wall face **13** being joined to spaced support posts **14** in such manner that the wall face **13** presents a generally closed surface disposed toward the wind and in front of the supporting posts **14**. The posts **14** may be set in post holes dug in the earth, and it is preferred that such posts be disposed along a longitudinally curved line so that the support post **16** at the center of a fence segment **11** will be downwind from the end posts **17** of such fence. It is also preferred that all the posts **14** lean into the wind at a slight angle so that the wall face **13** made up of the panels **12** will be slightly inclined into the wind.

When erected in this preferred manner, the fence **11** will present to the wind a forwardly inclined concave surface which tends to engage, hold and slow any wind flow directed thereagainst. While the wind is slowed by the fence, it is acknowledged that wind flow will spill over the top of the fence with a portion of such flow being drawn back toward the back side **21** of the fence due to the characteristic fluid flow pattern for a flat plate surface held transverse to a fluid stream flow.

In order to prevent excess accumulation of loose blown materials against the base of the windbreak fence **11** on the back side thereof, it is desirable to provide an alternate air flow path along at least a portion of the length of any fence segment. In the embodiment illustrated, a gap **23** is provided at the base of the fence structure by interrupting the wall face **13** at a position slightly elevated above the ground line **22**. This gap **23** permits a portion of the trapped wind to flow under the windbreak so that accumulated loose materials will be moved away from the base of the fence. A portion of the flow coursing through the lower gap **23** is itself directed back toward the back side **21** of the fence **11** by the mentioned flat plate flow characteristics. The resulting air flow pattern, as illustrated in FIG. 2, beneficially collects loose materials which fall out of the slowed air stream in piles behind the fence **11**. If the collected materials are dust or sand, the accumulated piles of such materials can be easily removed from their point of collection without damage to the fence or without the necessity of moving the fence. Collected snow provides a reservoir of soil moisture or an increased runoff that can be used beneficially.

Since the size relationships of an air flow control member can be of importance, a further description of the illustrated embodiment is advisable. The fence segment **11** shown is 96 feet in length, and the total height of the wall face **13** is 12 feet. The lower gap **23** providing a passage under the fence **11** can be on the order of 1 to 2 feet. In the preferred construction, the posts **14** are all approximately of 6 x 6 dimension and of adequate length so that they may be well secured in dug post holes. Each of the posts is inclined forwardly approximately 1 foot at the 12 foot elevation. For economy of construction the panels **12** are each made of 4 x 8 foot panels of plywood butted each to each and nailed to the fence supporting posts **14**. The lower panels **24** in positions adjacent to the gap **23** may be of lesser width to provide the desired wind gap **23**. The concave curvature of the assembled fence **11** is such that the center post **16** is disposed approximately 3 feet behind the end posts **17** with all of the intermediate posts **14** being arranged on an arc intersecting the center and end posts.

A gap of approximately 1 to 2 feet is provided along the bottom of the fence and toward the center of the fence segment. This gap is, accordingly, from $\frac{1}{12}$ to $\frac{1}{6}$ the total height of the fence wall for the configuration illustrated. In order to hold the large flat surface represented by the fence wall **13** in its forwardly tilted position, dead-men or anchors **26** are disposed in front of the fence and cables **27** are used to interconnect such anchors and the tops of spaced posts **14**. Due to the relatively large closed surface presented to the wind by the fence wall **13**, the anchors and cable should be of considerable strength as necessary to hold the fence **11** in its desired forward leaning concave configuration.

The forward leaning aspect and the longitudinal concave curvature for the wall is provided so that the stream flow under the fence will be properly balanced with respect to the air flow over the top of the fence. Since terrain conditions at the point of desired use can modify the air flow pattern, minor variations in the forward leaning aspect or in the concave curvature for the windbreak may be made to properly balance the air flow pattern for any particular terrain installation. The main consideration is to establish an air flow pattern about the top and bottom edges of the flat plate structure so that a substantial reverse flow pattern directed toward the back side of the fence will be established.

The concave curvature might not be required in installations where the fence was of adequate length so that the escape of drifting materials past the end of the fence would be inconsequential. The main purpose of such concave curvature is to establish a flow pattern wherein the main air flow will be directed or urged toward the center of the fence. With some terrain conditions this configuration can be highly beneficial in confining damaging patterns to a controlled area.

In addition to the control of wind patterns and the further collection of blown materials, the windbreak or fence disclosed herein has inherent advantages over prior types of windbreaks. In dry land regions fences of the foregoing type may be used to prevent soil erosion in fields or to protect roads and farm yards. The constructed fence will, in many instances, be more suitable for use in such regions than the tree belts now used and recommended. The culture of trees requires a lot of ground moisture which might be more efficiently used for the culture of crops. The fence type windbreak herein disclosed does not consume moisture but can tend to provide increased soil moisture adjacent to the fence by the excess accumulation of driven snows along the back side of the fence line.

While use of permanently set posts is illustrated, it should be recognized that the entire fence structure could be mounted on a sled or skid type support so that the fence could be moved for more economical control of wind patterns that are seasonally or otherwise variable. With the sled construction, anchors would still be advisable.

While one embodiment of the invention has been shown and described, it should be apparent that the invention is adaptable to various modifications and changes. All such modifications and changes are considered to be a part of this invention where within the reasonable limits of the hereunto appended claims.

I claim:

1. A windbreak fence for the collection of air entrained loose blown materials through control of the air and wind stream flow patterns of prevailing winds comprising a plurality of spaced apart support posts disposed longitudinally along an arc of curvature that is concave with respect to the direction of prevailing wind travel,

said posts further having the top free ends inclined forwardly into the direction of prevailing winds, and a closed wall face fixed on said posts with at least a portion of the lower edge of said wall face being in position above the supporting ground to provide a gap for the passage of wind beneath said wall face and along the ground surface, said concave and forwardly inclined disposition for the posts and wall face providing an increased flow of air toward the central portions of said fence and downwardly through the gap at the lower edge of said wall face to in part balance the wind stream flow across the top and bottom edges of said wall face whereby said wall face acts in the manner of a flat plate surface disposed transversely to the direction of air flow to create eddy currents behind said wall face reducing the loose material carrying capacity of the wind stream flow and resulting in the accumulation of deposits of said loose materials downstream from said windbreak.

2. A windbreak fence for the collection of air entrained loose blown materials through control of the air and wind stream flow patterns of prevailing winds comprising a plurality of spaced apart support posts disposed longitudinally along an arc of curvature that is concave with respect to the direction of prevailing wind travel, said posts further having the top free ends inclined forwardly into the direction of prevailing winds, and a closed wall face fixed on said posts with at least a portion of the lower edge of said wall face intermediate the ends of said fence being in position above the supporting ground a distance corresponding to 1/12 to 1/6 of the total height of such wall face to provide a gap for the passage of wind beneath said wall face and along the ground surface, said concave and forwardly inclined disposition for the posts and wall face providing an increased flow of air toward the central portions of said fence and downwardly through the gap at the lower edge of said wall face to in part balance the wind stream flow across the top and bottom edges of said wall face whereby said wall face acts in the manner of a flat plate surface disposed transversely to the direction of air flow to create eddy currents behind said wall face reducing the loose material carrying capacity of the wind stream flow and resulting in the accumulation of deposits of said loose materials downstream from said windbreak.

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REINALDO P. MACHADO, *Primary Examiner.*

HARRISON R. MOSELEY, *Examiner.*