Nov. 16, 1971 H. A. ADAM 3,619,957

INFLATABLE CANOPY FOR OUTDOOR AREAS

Original Filed Feb. 16, 1968 4 Sheets-Sheet 1

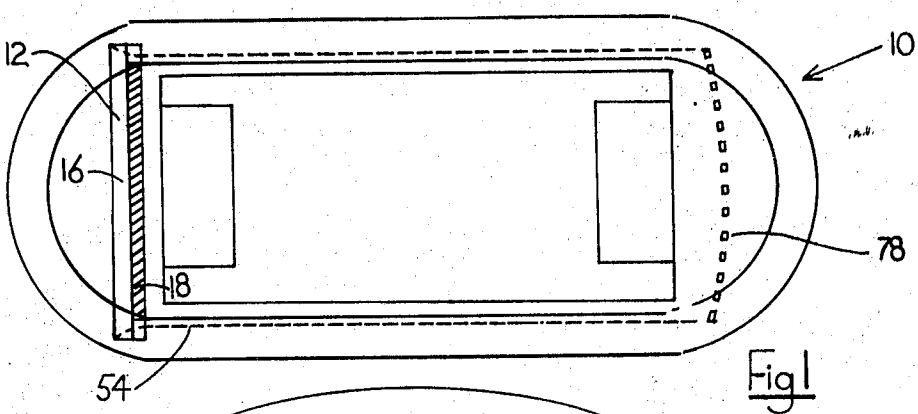



Fig 1

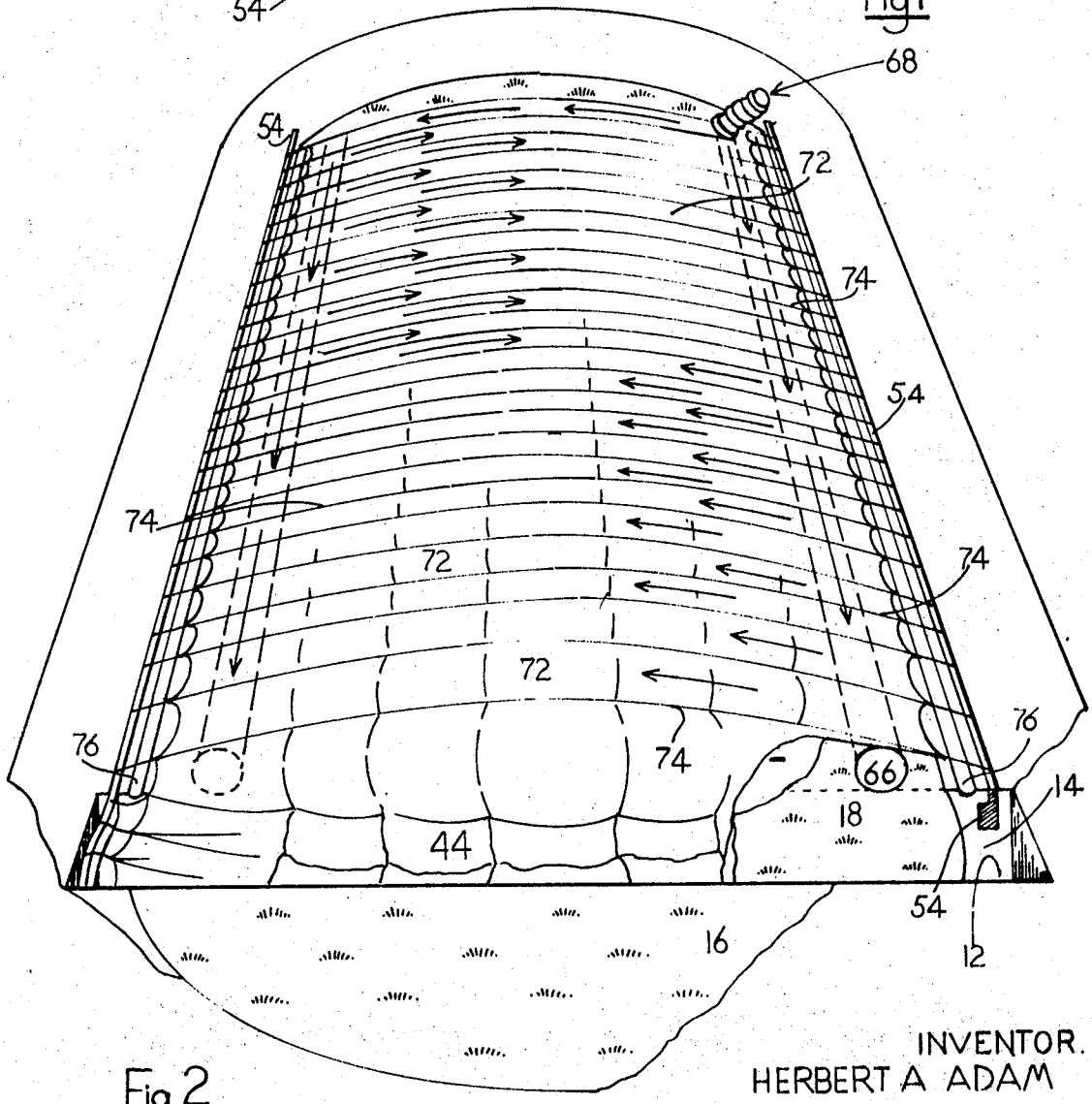



Fig 2

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INFLATABLE CANOPY FOR OUTDOOR AREAS

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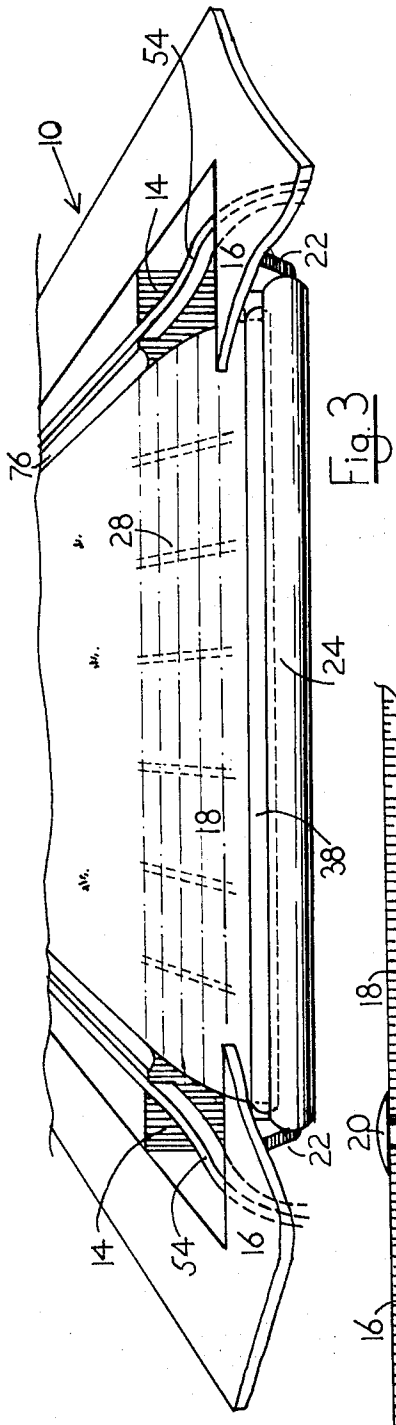



Fig. 3

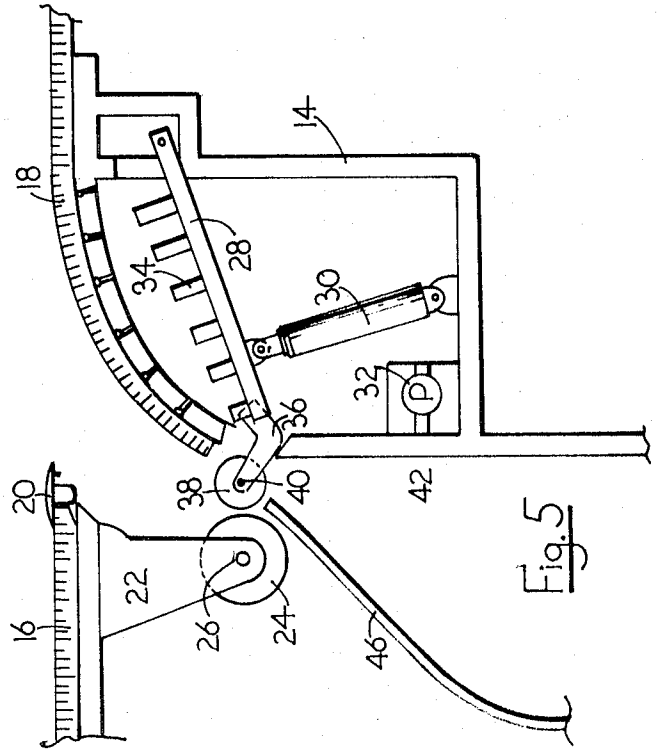



Fig. 5

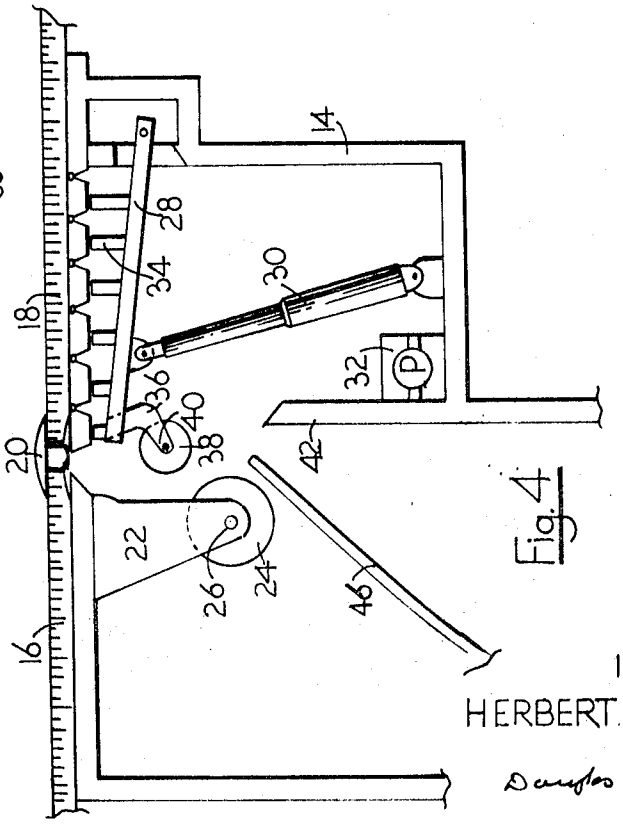



Fig. 4

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INFLATABLE CANOPY FOR OUTDOOR AREAS

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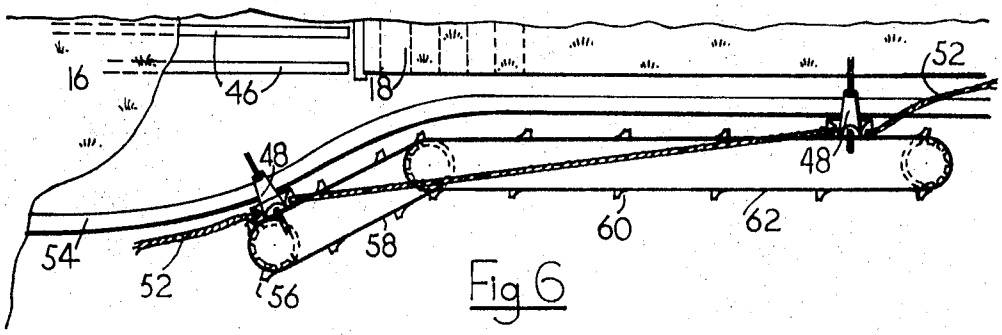



Fig 6

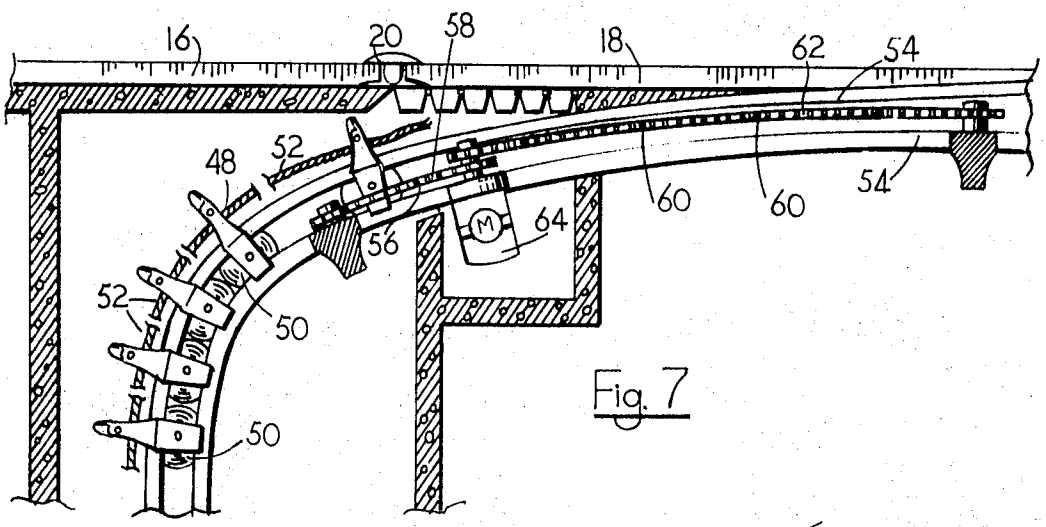



Fig. 7

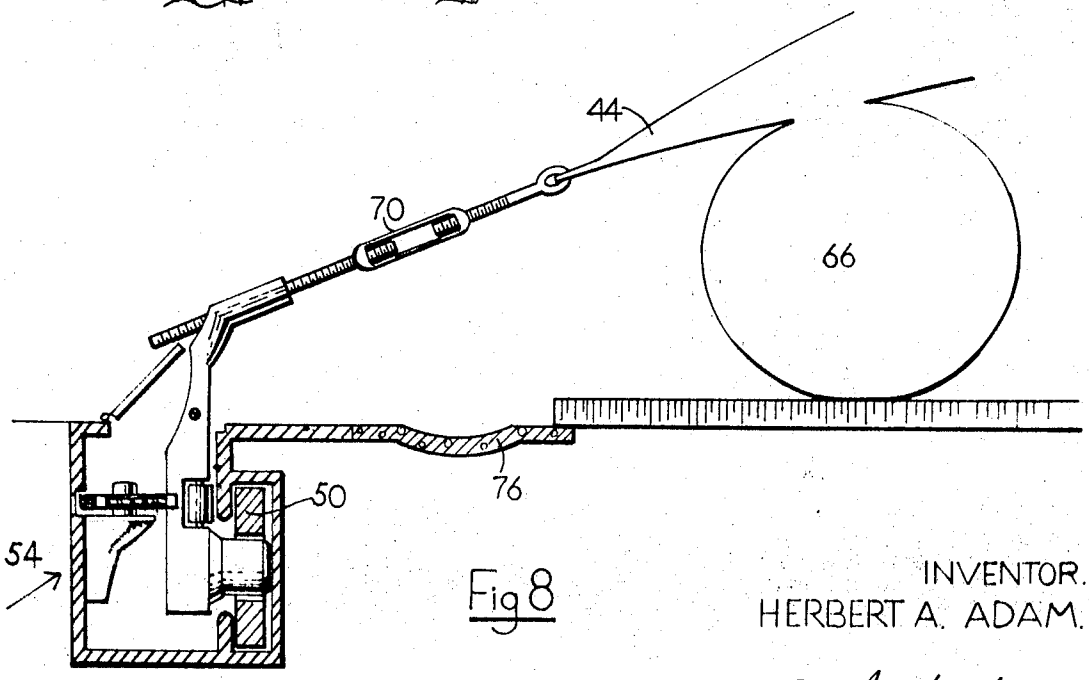



Fig 8

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INFLATABLE CANOPY FOR OUTDOOR AREAS

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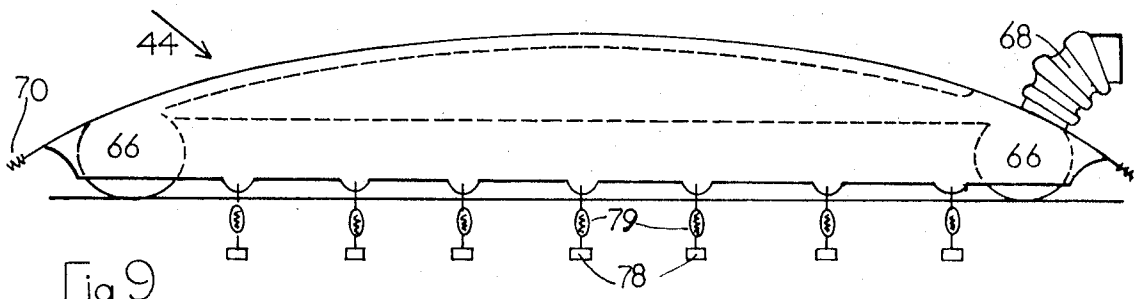



Fig 9

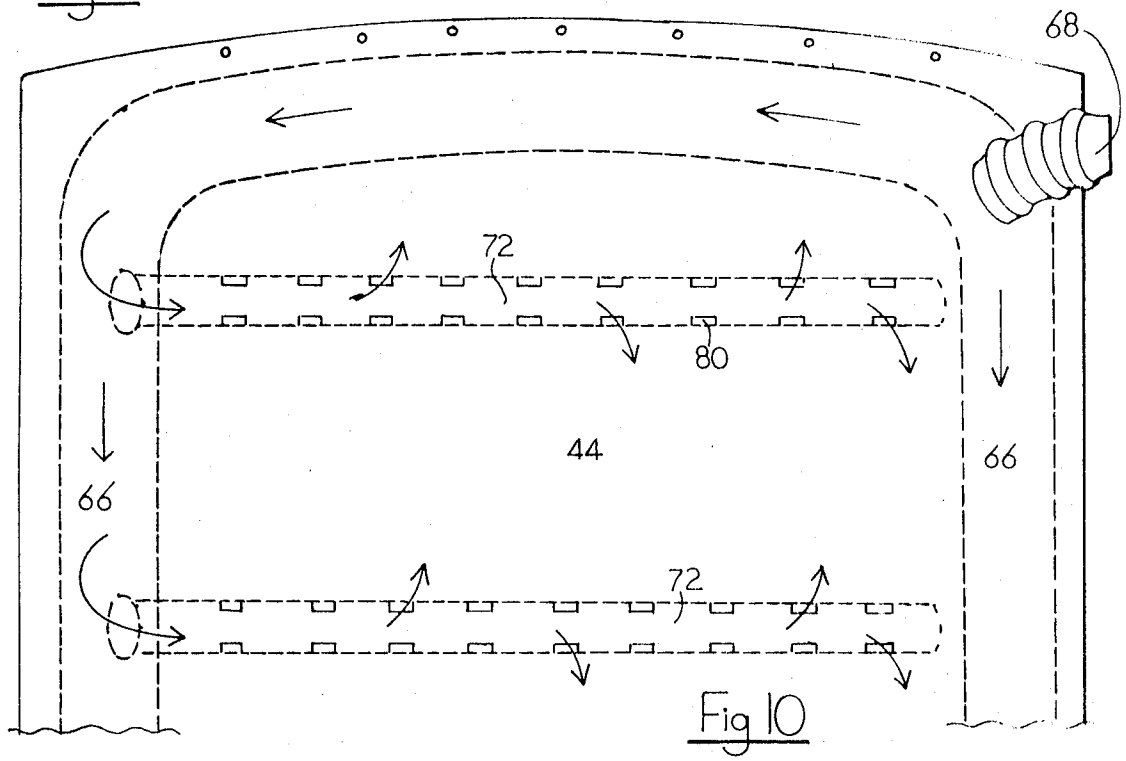
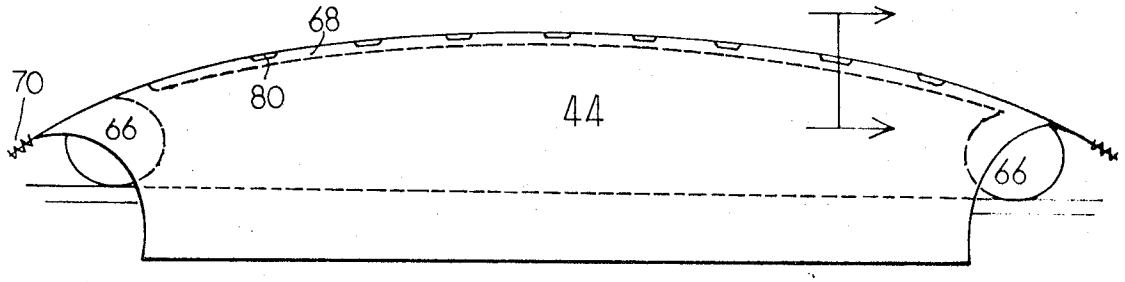



Fig 10



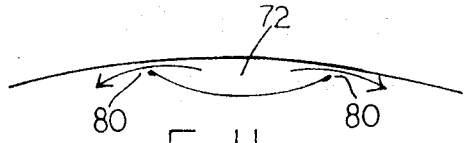




Fig. 11

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# INFLATABLE CANOPY FOR OUTDOOR AREAS

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Continuation of application Ser. No. 706,047, Feb. 16, 1968. This application Dec. 11, 1969, Ser. No. 888,211
Int. Cl. E04b 1/34
U.S. Cl. 52—2 5 Claims

## ABSTRACT OF THE DISCLOSURE

A canopy is constructed of inflatable tubular side walls which rest on the field; the tubular side walls are connected to transverse tubular blisters which are inflated through the tubular side walls. The canopy is carried along a pair if tracks and is container in a trench which is parallel to the track; rollers are provided in the trench which squeeze the canopy so that it can be stored below the rollers, the rollers also providing a seal at that end of the canopy for the air in the tubular side walls which are positioned in the track.

This application is a continuation of application No. 706,047 filed Feb. 16, 1968 and now abandoned.

## BACKGROUND OF THE INVENTION

### (1) Field of the invention

This invention relates to devices for covering outdoor areas, in particular playing fields.

### (2) Description of the prior art

In the playing of outdoor games it is highly important to maintain the playing field in a dry condition and in the event of rain it is common practice to bring out a tarpaulin in which is then spread manually over the field. Frequently, however, the playing field is well soaked by the time this operation has been effected.

Various mechanical arrangements have been devised to effect a rapid covering of the playing field with a tarpaulin but if the field has been well soaked it will take a long time to dry because the tarpaulin prevents evaporation of the moisture.

This invention has for its primary purpose the provision of a canopy which is not only easy to handle but is also inflatable so as to provide an air space between the underside of the canopy and the playing field over which it is positioned.

## SUMMARY OF THE INVENTION

The invention consists in providing a canopy which is carried over the playing field by means of an opposed pair of tracks attached to the edges of the canopy, the arrangement being such that the canopy has opposed inflatable tubular walls which rest on the playing field, the tubular walls being connected to transverse blister formations which are thereby also inflated. A trench is provided at one end of at playing field to store the canopy and a pair of squeeze rollers are located in the trench which bear on the canopy and provide a seal so that a canopy below the rollers does not contain any air and is thereby easily stored. The rollers also provide a seal at the trench end for the inflated tubular walls which extend over the playing field. It is further arranged that heated air may be derived from the tubular blisters on the underside of the inflated canopy.



## BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described in relation to the accompanying drawings, wherein:

FIG. 1 is a plan view of a sports field showing the location of a trench for housing the canopy and also the track on which the canopy is extended over the playing field;

FIG. 2 is a perspective drawing of the fully extended canopy attached to the roller track and looking from the trench end on the playing field;

FIG. 3 is a perspective drawing of the mechanism in the trench for accommodating the canopy;

FIGS. 4 and 5 are cross sectional views of the trench in the open and closed position respectively;

FIG. 6 is a plan view of the chain drive for lifting the canopy out of the trench;

FIG. 7 is a side view showing the chain drive and connected rollers;

FIG. 8 is a cross sectional view through the roller track;

FIG. 9 is an elevational view of the erected canopy from the end of the field opposed to the trench;

FIG. 10 is a diagrammatic view showing the air circulation in the canopy;

FIG. 11 is an elevational view of the erected canopy from the trench end of the playing field.

## DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

Referring to the drawings and more particularly to FIG. 1 there is illustrated a sports field, generally denoted by the numeral **10**. At one end is a trench **12** which is provided to house the apparatus shown more particularly in FIGS. 3, 4 and 5. The trench **12** is provided with concrete walls **14** as shown in FIG. 4, and is closed by a top wall comprising a fixed portion **16** and an articulated portion **18**. The top wall of the trench **12** is covered with sod and the junction of the portions **16** and **18** is sealed by a molded sealing strip **20** which is attached to the fixed portion **16**. Secured to the underside of the fixed portion **16** of the top of the trench **12** and adjacent to the rubber strip **20** are opposed arms **22** which carries a spring loaded roller **24** supported on a spindle **26**.

As illustrated in FIG. 4 the articulated portion **18** is supported by a series of pivoted arms **28** which are hinged to the wall **14** of the trench **12**. Each arm **28** is hingeably connected intermediate of its ends to an individual piston and cylinder structure **30** which extends downwards into the trench **12**, being supported by the base thereof. A master electric oil pump **32** provides even lift through the series of hydraulic piston cylinder structures **30** for the articulated portion **18**. Each arm **28** has normally disposed spaced apart upstanding bars **34** which provide the requisite rigidity for the surface of the articulated portion **18**.

The free end of each arm **28** carries a freely pivotable angularly shaped yoke **36**, the free end of which, in turn, supports a roller **38** carried on a spindle **40**. The downward movement of the arm **28** is terminated by contact between the lower side of the yoke **36** and the top of an intermediate wall **42** which is provided in the trench **12**. The top of the wall **42** is tapered downwards in a direc-

tion towards the piston cylinder structure **30** so that the yoke **36** is pivoted outwards and upwards, as illustrated in FIG. 5, on contact with the top of the intermediate wall **42**, thereby bringing the roller **38** into pressurized contact with the roller **24**. However, on downward movement of the articulated portion **18** the roller **38** clears the roller **24** because the yoke **36** is freely pivotable and depends downwards.

A canopy **44** which is to be extended over the sports field **10** is stored in the trench **12** on a series of upwardly extending curved rails **46**, the canopy **44** being gripped between the roller **38** and the spring loaded roller **24** when the articulated portion **18** in the trench **12** is lowered.

The trench **12** also carries the mechanism to propel the canopy **44** after the downward movement of the articulated portion **18** has been completed and this propulsion mechanism is illustrated in FIGS. 6 and 7.

The opposed side edges of the canopy **44** are secured to the individual arms **48** of an opposed series of roller members **50**. The arms **48** of the opposed series of roller members **50** are joined together by an individual steel cable **52**. The roller members **50** on each side are located in an individual track **54** which extends outwards of the trench **12**, the opposed tracks **54** running in parallel relationship along the respective opposed sides of the field **10**. The roller members **50** are propelled at each side by the lugs **56** of a first chain drive **58** after which each is picked up by the lugs **60** of a second chain drive **62**. An electric motor **64** propels both chain drives **58** and **62**.

It will be noticed that the second chain drive **62** extends only to the immedaite underside of the trench **12** after which the opposed series of roller members **50** enter into the individual extension of the traversing tracks **54** disposed along the sides of the field **10**. The subsequent movement of the canopy **44** along each track **54** is achieved by utilizing the unique inflatable construction of the canopy **44** together with the tension developed in the steel cables **52**.

The inflatable construction of the canopy **44** is illustrated more particularly in FIGS. 2 and 8, from which it will be observed that the edges of the canopy **44** which run along the side of the playing field **10** parallel to the tracks **54** are each provided with an inflatable tube side wall **66**. A fan truck, not shown, provides pressurization of the tube wall **66** by means of flexible air tubes **68** connected thereto. The operation is such that as the canopy **44** is released from the action of the second chain drive **62** the fan truck will be operated and the tube wall **66** will be inflated, but only as far as the point where the canopy **44** is held between the squeeze rollers **24** and **38**. As a result the tube wall **66** will be extended and become rigid so that the force being applied by the respective second chain drive **62** is transmitted to the leading edge of the canopy **44** with resulting forward motion which, of course, is complemented by the action of successive roller members **50** as they are propelled upwards by the chain drives **58** and **62**.

It will be observed from FIG. 8 that the roller members **50** located under the tracks **54** are connected to the adjacent edge of the canopy **44** by adjustable spring loaded turnbuckles **70**. This gives the canopy **44** a degree of flexibility which could not be obtained by a rigid structure.

It is a particular feature of the invention that the canopy **44** is provided with spaced apart transversely disposed tubes **72**, see FIG. 2, which are connected to the tube walls **66**, see FIG. 10, and are inflatable therefrom with the result that the canopy **44** presents the appearance of a series of spaced apart blisters separated by channels **74**. The resulting structure thereby facilitates the removal of rain water, a problem with a tarpaulin spread over the ground which flows down the channels **74** to run into a ditch **76**, see FIG. 8, suitably disposed adjacent the tubular walls **66**.



As illustrated in FIG. 9 the forward edge of the canopy **44** is anchored to the ground by a series of anchor points **78** set into the ground and connected to their points by tension cables **79**.

It is a further feature of the invention, as illustrated in FIGS. 10 and 11, that the surface of the blisters **72** disposed under the canopy **44** is provided with vents **80** which will distribute air into the space between the canopy **44** and the playing field **10**. As a result of the distribution of air through the vents **80** the rapid drying of the playing field **10** will be effected. Furthermore, this distribution of air together with the provision of spring tensioned turnbuckles **70** gives the canopy **44** a degree of flexibility which a rigid structure cannot add.

The spring tension in the turnbuckle **70** is a self-regulating force. Over pressurizing by the fan truck will lift the canopy **44** thereby decreasing the wall pressure on the ground and allowing the excess of air pressure to escape; likewise, a sudden upsurge of air caused by the wind will cause the canopy **44** to lift allowing air to escape under the sealing tube walls **66**, thus causing a partial deflation of the canopy **44**.

The canopy **44** may be made of polyester textile coated with butyl rubber. This material has extremely good low temperature flexing properties requisite to stand up to repeated folding and inflation without developing cracks.

I claim:

**1.** An extendible and retractable protective canopy for an outdoor area, said canopy having opposed inflatable tubular side walls adapted to rest on a portion of said area; a plurality of inflatable tubular members in said canopy and connected to said tubular side walls for inflation; means for storing said canopy in its retracted state at one end of said area; track means on each side of said area outward of each of said tubular side walls; spring means slidably secured in each said track means and secured to said canopy adjacent one of said tubular side walls respectively; means for extending said canopy over said area comprising driveable means within said means for storing said canopy to drive said inflatable tubular side walls away therefrom and means for inflating those portions of said tubular side walls which extend beyond said means for storing said canopy so that said tubular side walls become rigid and tend to advance forward away from said means for storing said canopy so long as there remains uninflated portions of said tubular side walls within said means for storing said canopy; said canopy being retractable from said area by deflating said tubular side walls and inflatable tubular members connected thereto, and returning said canopy to said means for storing the same.

**2.** A protective canopy according to claim **1** wherein a trench is provided along both sides of said area, said means for acting on said spring means being located in said trench and said track means extending along each said trench, respectively.

**3.** A canopy according to claim **1** wherein said means for storing said canopy comprises a further trench at one end of said area, and said means for securing said canopy intermediate of said tubular side walls includes a pair of pinch rollers in said further trench, each said trench along a side of said area communicating with said further trench.

**4.** A canopy according to claim **3** wherein said further trench has a hingeable articulated cover, and one of said pinch rollers is secured to the underside of said cover and is disposed so as to engage with said other roller when said cover is lowered.

**5.** A canopy according to claim **1** further comprising vents in said plurality is of inflatable tubular members, said vents being adapted to direct air flow from the underside of said canopy on to said area when said canopy is inflated.

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5

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