Dec. 7, 1965 H. F. LANGTON 3,222,064

POLE VAULT AND HIGH JUMP STANDARD

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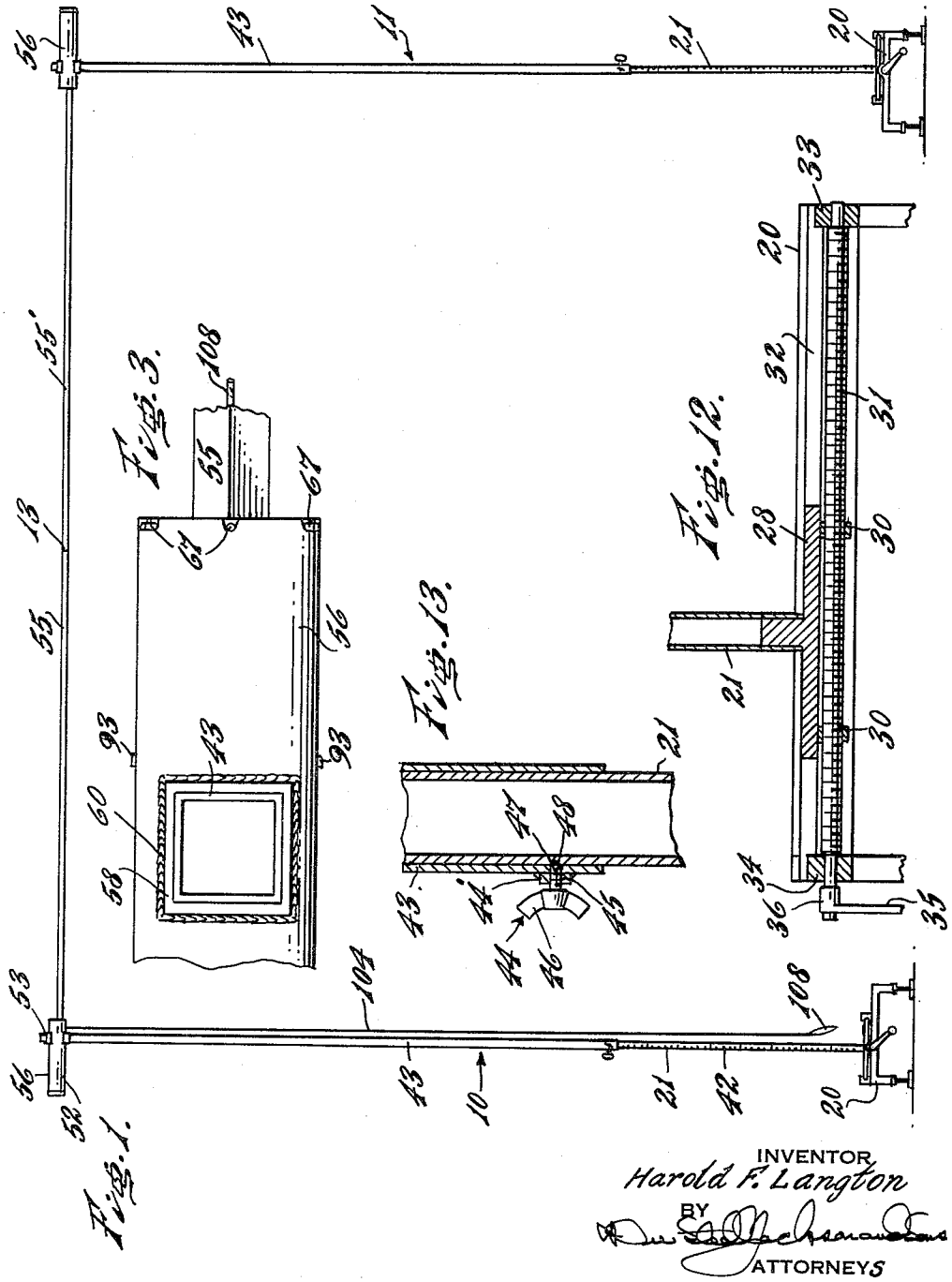


Fig. 1.

Fig. 3.

Fig. 12.

Fig. 13.

INVENTOR
Harold F. Langton
BY
ATTORNEYS

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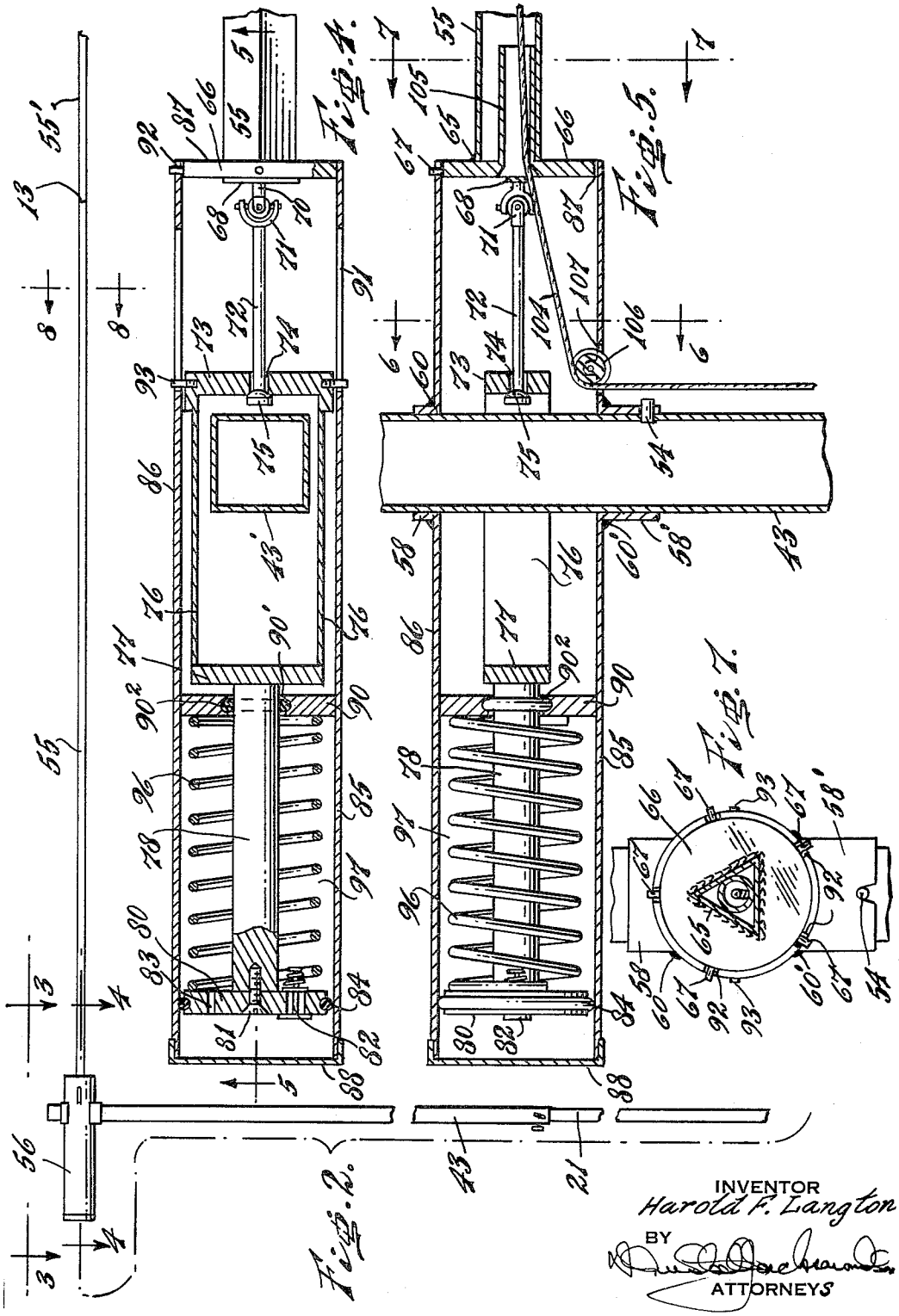


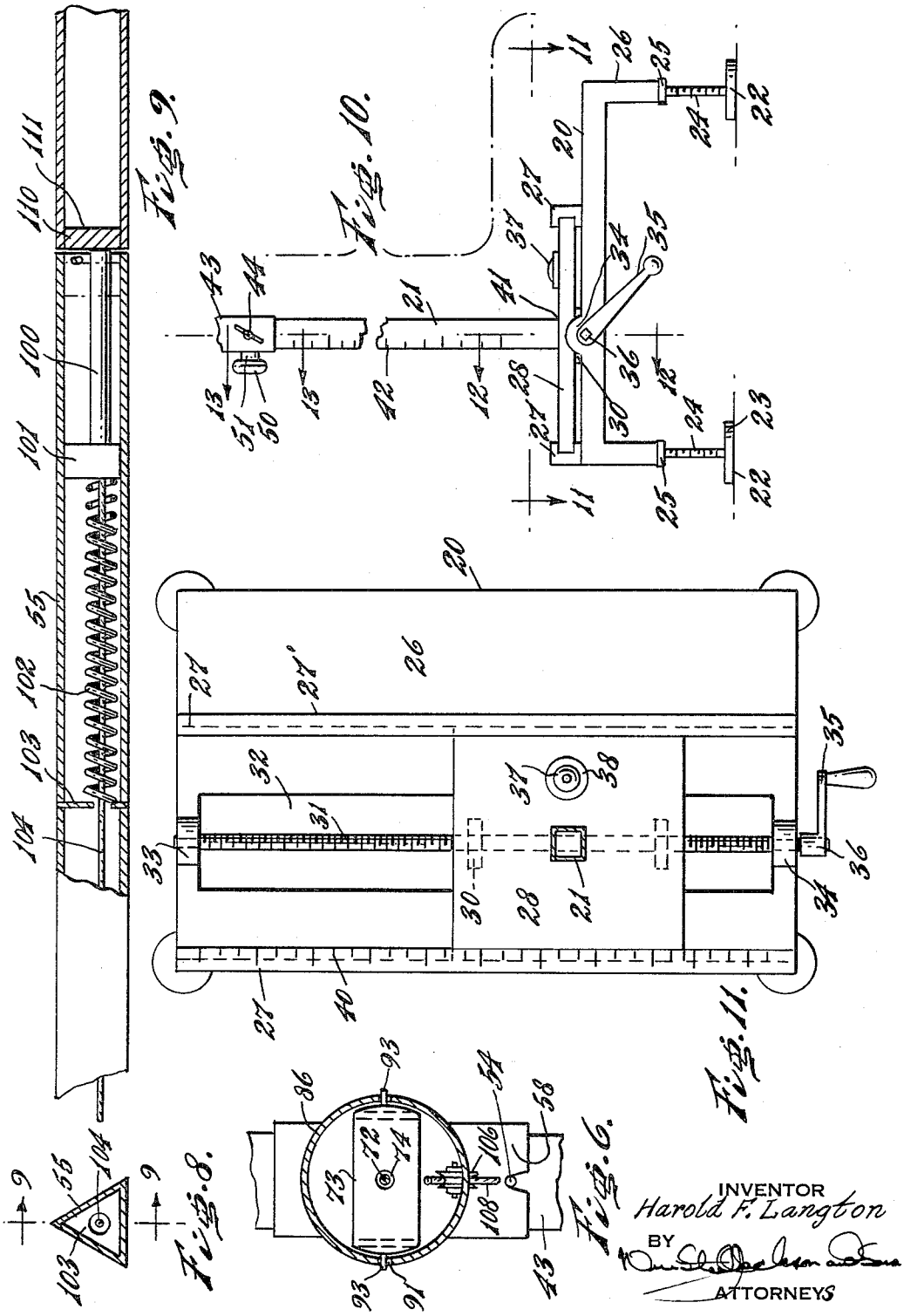
Fig. 2.

INVENTOR
Harold F. Langton
BY
ATTORNEYS

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POLE VAULT AND HIGH JUMP STANDARD

Harold F. Langton, 307 N. Main St., Pleasantville, N.J.

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This invention relates to a standard for establishing a height for jumping and more particularly a height for a pole vault or a high jump.

A purpose of the invention is to automatically establish a height for jumping and to return the bar to the height after contact by a jumper.

A further purpose is to eliminate the need for a solid horizontal bar which is placed in position by hand.

A further purpose is to eliminate the pegs on an upright for the purpose of supporting a horizontal bar.

A further purpose is to prevent the bar from falling to the ground.

A further purpose is to indicate that the bar has been touched upon slightest contact with the bar.

A further purpose is to eliminate the sag in the middle of a horizontal bar.

A further purpose is to eliminate the need for measuring the height of the horizontal bar from the ground after each jump.

A further purpose is to eliminate the need for painstakingly replacing the bar on the pegs of an upright every time the bar has been hit.

A further purpose is to eliminate the need for a forklift type of truck or any other elevator mechanism for replacing the horizontal bar on the uprights.

A further purpose is to hasten the speed with which a high jump is conducted.

A further purpose is to prevent the bar from being blown off the peg supports by the wind.

A further purpose is to indicate when the bar has been struck.

Further purposes appear in the specification and in the claims.

In the drawings I have chosen to illustrate a few only of the numerous embodiments in which my invention may appear, selecting the forms shown from the standpoints of convenience in illustration, satisfactory operation and clear demonstration of the principles involved.

FIGURE 1 is an elevational view of the complete assembly of the invention.

FIGURE 2 is a partial slightly enlarged elevational view of one side of the assembly of FIGURE 1 with the parts broken away.

FIGURE 3 is an enlarged fragmentary plan view taken on line 3—3 of FIGURE 2.

FIGURE 4 is an enlarged fragmentary section taken on line 4—4 of FIGURE 2.

FIGURE 5 is a section taken on line 5—5 of FIGURE 4.

FIGURE 6 is a section taken on line 6—6 of FIGURE 5.

FIGURE 7 is a section taken on line 7—7 of FIGURE 5.

FIGURE 8 is an enlarged section taken on line 8—8 of FIGURE 2.

FIGURE 9 is a fragmentary section taken on line 9—9 of FIGURE 8.

FIGURE 10 is an enlarged elevational view of one base of an upright.

FIGURE 11 is a sectional view taken on line 11—11 of FIGURE 10.

FIGURE 12 is a sectional view taken on line 12—12 of FIGURE 10.

FIGURE 13 is an enlarged sectional view taken on line 13—13 of FIGURE 10.

In the prior art in track and field events, a standard

for establishing a height for jumping consists of two uprights with pegs spaced along the uprights for supporting a horizontal bar. The pegs are directed in a direction away from the approach of the runner so that if the runner comes into contact with the bar, the bar normally falls off the pegs. Occasionally, the bar remains in place after contact so that the jump must be counted as a valid one, even though the jumper has not really cleared the set height.

Where the bar has been knocked to the ground the officials have had to painstakingly replace the bar on the pegs. This has ofttimes taken a considerable amount of time in between jumps in view of the fact that the pole vault for instance is now being jumped at a height of 15 to 16 feet. Officials have often used an operator riding the lift of a forklift truck in an attempt to speed up the event. Even so, the pole vault is ordinarily the first to get started and the last to finish at the track and field meets, often running past the time when the remainder of the events are completed.

Furthermore, even where the bar has not been knocked from the uprights, the horizontal bar, which is supported at the regulation 16 feet spacing has to be measured after the jumper has cleared the bar, since a sag normally results from the bending moments created in the long span.

Furthermore, in many instances the wind blows the bar off the uprights without contact by any of the participants and this often happens just as the runner approaches the bar. This is enormously frustrating to a runner who is all primed physically and psychologically to make the jump.

Furthermore, there have been instances in the past where the jumper has knocked the bar off the uprights and has tangled with the bar on the way down with a resultant serious injury.

The present invention eliminates all these disadvantages and provides a vault or jump standard which is automatic in operation, accurate in indication, and perfectly safe to the jumper. In accordance with the invention, a horizontal bar is cantilevered from each of the uprights and spring biased and pneumatically throttled to return to a standard position after contact by a participant. Furthermore, there is an indicator which simply and reliably indicates that the bar has been struck.

Describing in illustration but not in limitation and referring to the drawings:

FIGURE 1 shows the complete assembly. The complete assembly consists of two sub-assemblies **10** and **11** which are in contact at location **13**. The sub-assemblies are practically identical in construction, except for the differences as later explained. One of the sub-assemblies will first be described, and then the differences cited.

In the sub-assembly **10**, there is a table or base support **20** supporting an inner telescoping member **21**. The base **20** as seen in FIGURES 10, 11 and 12 comprises four legs **22** having a flat disc portion **23** and a perpendicular threaded stud portion **24**. A travelling nut **25** adjustably secures a bed **26** to the legs **22**. The bed **26** has thereon suitably attached or integral therewith tracks **27** supporting sled **28**. Abutments **30** extend from sled **28** and have threads tapped therein. A screw **31** extends through an opening **32** in bed **26** and is suitably journalled in bed **26** by bearings **33** and **34**. A hand crank **35** is keyed to screw **31** at **36**. A bubble level **37** is fixed to sled **28** at **38**. The track **27** has graduations **40** on its upper surface suitably marked in inches or other linear units.

The inner telescoping upright **21** suitably square in cross section and of a hollow construction is fixed to sled **28** and extends normal thereto at location **41**. The inner telescoping member **21** has markings **42** desirably in inches and marked accordingly. The inner upright member **21**

can be of any suitable height as, for instance, 8 feet where a jump is made to 16 feet.

Surrounding the member **21** and of a similar cross section and telescoping therewith is an outer telescoping member **43**. A locking clamp **44**, best seen in FIGURE 13, comprises a collar **44'** fixed to member **43** as by welding and having a tapped hole **45**. A thumb screw **46** carrying a set screw **47** has a point **48** which engages member **21** at any desired height. A knob **50** is attached to the member **43** at **51** to provide means for raising and lowering the member **43**.

Near the top of member **43**, pin **54** is fixed to the upright and extends normal thereto. A cantilevered horizontal bar **55** and cantilever suspension housing **56** rest on pin **54** and are suspended from the top of member **43** in the following manner. The housing **56** has square tubular sections **58** and **58'** which extend completely through the cylinder and square sections **58** and **58'** are secured to the housing at **60** and **60'** by welding or the like. The inner contour of these square sections **58** and **58'** conform to the outer perimeter of upright **43** and are adapted to surround the upright **43** in a sliding relationship.

The horizontal bar **55** and housing **56** are best seen in FIGURES 4 and 5. The bar **55** is fixed as by welding at **65** to a disc **66**. The disc **66** has integral radially extending tangs **67** circumferentially spaced about the disc. Rigidly connected to the end of the bar **55** at **68** is a universal coupling extension **70**. A universal coupling **71** is connected to extension **70** and extension **72** extends to and through straddle strap **73** at opening **74**. An enlarged head **75** prevents extension **72** from being drawn through opening **74**.

Straddle strap **73** is suitably rectangular in form and extends around upright **43** when the housing **56** is in place on the upright **43**. Straddle strap **73** has parallel extending portions **76** which unite with transverse portion **77** to form an enclosure which permits movement of the straddle strap **73** with respect to the member **43**. Integral with and extending from strap **73** is piston arm **78**. A piston **80** is attached to arm **78** by bolt **81** as shown. Piston **81** has one way valve **82** and throttling orifice **83** in the piston head. A suitable piston ring **84** surrounds the piston.

Surrounding the universal coupling **71**, straddle strap **73**, piston **80**, and piston rod **78**, is housing cylinder **85**. This housing cylinder comprises cylindrical portion **86**, an open end at **87** and a closure cap **88** at the other end. An integral partition **90** extends across and divides the cylinder into longitudinal portions. Longitudinal slots **91** extend longitudinally in the cylindrical portion **86**.

The cylindrical portion **86** has at its open end **87** tang receiving slots **92** circumferentially spaced at positions corresponding to the circumferential positions of the tangs **67**. The bar **55** is assembled to the housing **56** by engaging the tangs **67** into the tang receiving slots **92** and then extending the universal coupling **71** and extension **72** into the interior of the cylinder. Abutments **93** on strap **73** extend into slots **91** and piston arm **78** extends through opening **90'** in partition **90**. A sealing ring **90²** extends around the piston arm and is journalled in the partition **90**.

A helically wound compression spring **96** surrounds piston arm **78** and bears at one end against partition **90** and the other end against the piston **80**. The compartment **97** formed by piston **80**, cylindrical portion **86** and partition **90** is filled with oil and will act on piston **80** as later explained.

Up to this point the base **20**, member **21**, member **43**, housing **56** and horizontal bars **55** and **55'** are exactly similar on both the sub-assemblies **10** and **11** of the standard. The only difference that exists is that horizontal bar **55** has an indicating mechanism **100** and horizontal bar **55'** does not. This indicating mechanism is in the form of a rod which is attached to a piston **101** which rides in the interior of bar **55**. Bar **55** is shown constructed of a triangular cross section tube, but it should be understood

that any cross section tube may be used. A helically wound compression spring **102** abuts at one end against the piston **101** and at the other end against fixed spring stop **103**. A flexible cord **104** extends from piston **101** through spring **102** through stop **103**, through guide tube **105**, through disc **66** and over fixed pulley wheel **106**. The cord emerges from cylinder **56** at **107**. A suitable handle **108** is formed at the end of the cord.

A further difference between bars **55** and **55'** is that **55'** has at position **110** a fixed plug **111**.

In operation, the high jump of the invention is first assembled by placing the base **20** of one of the uprights at a location and then placing another of the bases **20** at a position, for instance 16 feet away in the case of a pole vault standard, or at any other distance which is equal to the sum of the distances of the horizontal bars **55** and **55'**. The base is then leveled by means of bubble level **37** by raising and lowering the respective legs **22** to get an absolutely horizontal sled **28**.

The housing **56** with square sections **58** and **58'** are placed over the end of outer telescoping element **43** and allowed to descend until notch **54'** in box structure **58** engages pin **54**. The corresponding housing **56** on the companion standard is assembled in like manner. The horizontal bars **55** and **55'** are then brought into alignment by the use of the screw **31** which upon being turned by crank **35** engages abutments **30** causing sled **28** to slide in tracks **27** to an alignment position. Horizontal travel of the sleds is gauged by the marks **40** along the track **27**. The indicating rod **100** is withdrawn into the horizontal bar **55** by pulling on cord **104** at the end to retract the indicating rod **100** against the bias of spring **102** which is held by stop **103**. When the indicator **100** is retracted the bars **55** and **55'** are aligned and indicating rod **100** abuts against plug **111** on the end of horizontal bar **55'**, holding the rod in the bar **55**.

The horizontal bars **55** and **55'** are held in position by the action of the helical compression spring **96** in the cylinder. The spring exerts a force against piston **80** at the end of piston arm **78** so that a force is exerted through straddle strap **73** on extension **72** and against disc **66**. The force exerted by the helical spring is such as to draw the disc **66** into the housing **56**. The disc is prevented from passing into the housing **56** by the tangs **67** which abut against the open end of the housing **56** at **87**. The tangs **67** fit into the tang receiving slots **92** and rest therein. The spring **96** seats the tangs **67** against each tang receiving slots **92** so that the plane of the disc **66** is normal to the longitudinal axis of the housing **56**. The housing **56** is perpendicular to the member **43** and hence the longitudinal axis of the housing **56** is in a horizontal plane. Thus, the bar **55** which projects normally to the plane of the disc **66** is also in a perpendicular plane when the tangs **67** are all seated in the tang receiving slots **92**. The tangs **67** will always seat in the tang receiving slots **92** in the equilibrium position which is that position at which the disc **66** comes to a position of rest under the bias of the helical compression spring **96**.

When the horizontal bar **55** and/or **55'** is touched or struck, the bar will move in the direction of the force striking, and the disc **66** will be unseated from its equilibrium position. The disc will rotate on a pivot created by the two tangs which are opposite to the direction of force on the bar. The remaining tangs will leave their slots and the universal coupling **71** will transmit the pull exerted by the movement of the disc **66** out of the housing **56** through extension **72** to the straddle strap **73** and the piston arm **78** and piston **81**. This will cause movement of the piston toward partition **90**, causing the spring **96** to compress. Since the cylinder portion **97** is filled with oil, the oil will pass through one way valve **82** as the spring **96** is compressed. In this position, the horizontal bar **55** or **55'** will be displaced from the horizontal, and the spring **96** will be compressed.

As soon as the bars **55** and **55'** have been misaligned,

one with respect to the other, the restraining action of plug **111** no longer acts on indicating rod **100** and indicating rod **100** emerges from the end of bar **55** under the action of helical compression spring **102**. This indicates that there has been contact with the bar **55** or the bar **55'**.

The piston **80** is now urged away from partition **90** by the compressed helical spring **96**. The one way valve prevents movement of oil back toward partition **90** and the oil is trapped between the cap **88** and the piston **80**. This trapped oil prevents the spring **96** from slamming the piston **80** back into equilibrium position. The oil passes through orifice **83** and is throttled thereby so that the movement of the piston **80** back into equilibrium position is a slow one. The force exerted on the piston by spring **96** is transmitted through piston arm **78** and strap **73** to the disc **66** until the disc **66** is seated again in the equilibrium position with all the tangs **67** resting in all the tang receiving slots **92**.

The extensions **93** ride in the slots **91** and prevent any rotation of the straddle strap **73** with respect to the cylinder.

The bars **55** and **55'** are prevented from returning into the position of exact alignment, however, by the extension of the indicating rod **100**. Thus any contact with the bars **55** or **55'** is recorded even though there may not be substantial displacement of the bars from their equilibrium position in the horizontal. When it is desired to finally align the bars, it is only necessary to pull on cord **104** to withdraw the indicating rod **100** wholly within bar **55** until the bar springs into alignment with bar **55'**. Tension on cord **104** is then released and rod **100** is prevented from extending out of the end by the plug **111**. The standard is now ready for another jump.

The vertical height of the standard is adjusted by releasing clamp **44** and sliding outer telescoping element **43** over inner telescoping element **21** with the aid of raising and lowering knob **50** until the desired height is reached. This height is measured by the indications on the inner bar **21**. When the desired height is established, clamp **44** is tightened to fix the outer element **43** with respect to the inner elemet **21**, thus establishing the height of the horizontal bar **55**.

In view of my invention and disclosure, variations and modifications to meet individual whim or particular need will doubtless become evident to others skilled in the art, to obtain all or part of the benefits of my invention without copying the structure shown, and I, therefore, claim all such insofar as they fall within the reasonable spirit and scope of my claims.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a pole vault or high jump standard, an upright, a horizontal member supported by said upright comprising an arm, disc means on said arm, tangs extending from said disc means, a piston rod and piston pivotally attached to said disc means, a cylinder having slots normally receiving said tangs and a cylinder opening, said piston and rod slidably disposed in said cylinder, and a helical spring biasing said piston away from said cylinder opening.

2. A pole vault and high jump assembly having a first vertical upright; a first horizontal bar cantilevered from said first upright; a second vertical upright; a second horizontal bar cantilevered from said second upright; adjusting means on said first and second vertical uprights for aligning said first horizontal bar in abutting relationship with said second horizontal bar one disc means on each of said horizontal bars; tangs extending from said disc means; one housing means slidably positioned on each of said vertical uprights, said housing means having slots therein normally receiving said tangs and having an opening at one end thereof normally receiving said disc means; one piston means being connected to each of said disc means and being extended into each of said housing means; one helical spring means surrounding each of said piston means for biasing said piston means away from the open end of said housing means; one universal coupling means attached between each of said piston means and each of said disc means for transmitting pivotal movement of a said horizontal bar into displacement of said piston means toward the open end of said housing means; one pneumatic means located in each of said housing means at the closed end thereof for throttling the return of the piston means to position; a rod located in one of said horizontal bars; abutment means in the other of said horizontal bars for holding said rod in a retracted position; spring means connected to said rod for extending said rod from said horizontal bar when the piston means are caused to be displaced toward the open end of said housing whereby misalignment of either of said horizontal bars with respect to each other is indicated.

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RICHARD C. PINKHAM, *Primary Examiner.*

JAMES W. LOVE, *Examiner.*