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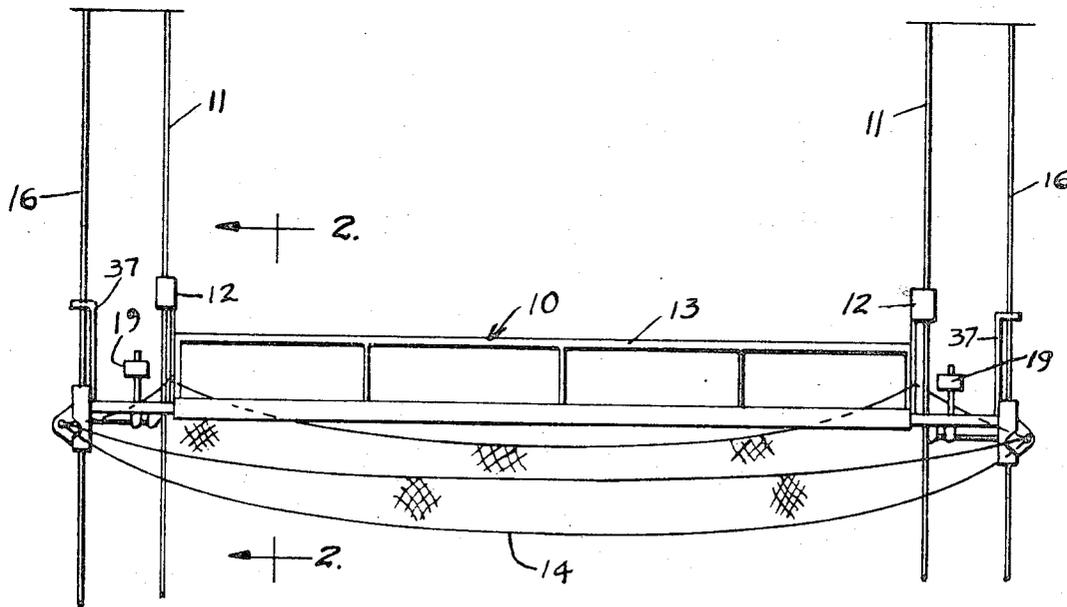
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[54] **SCAFFOLD SAFETY SUSPENSION SYSTEM**
 16 Claims, 9 Drawing Figs.

[52] U.S. Cl. **182, 19,**
 182/112, 182/138
 [51] Int. Cl. **E04g 3/10**
 [50] Field of Search 182/19,
 112, 138, 139, 137, 142, 143

ABSTRACT: Safety cables are employed in combination with the usual scaffold hoisting cables, and tilt-responsive members in the scaffold trigger clamping blocks engaging the safety cables when tilting occurs while a suspended safety net is automatically guided to contain a person or object falling from the scaffold.



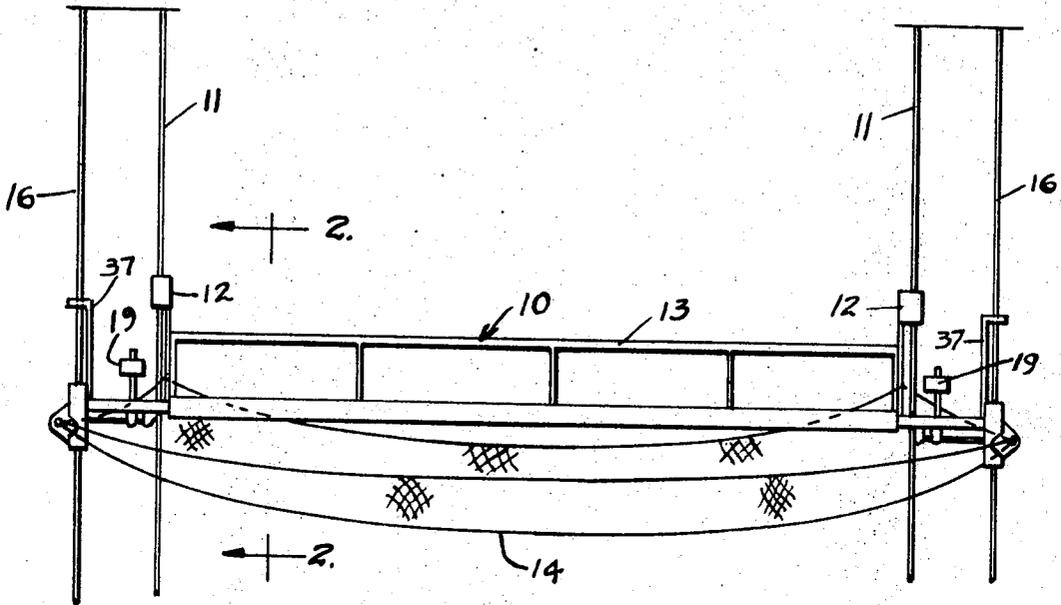


FIG. 1.

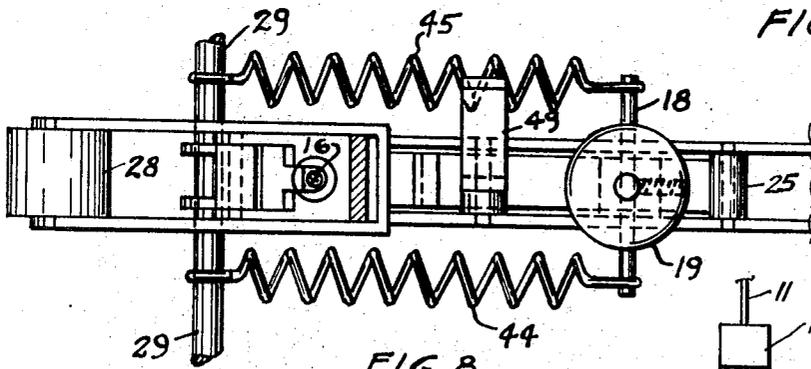


FIG. 8.

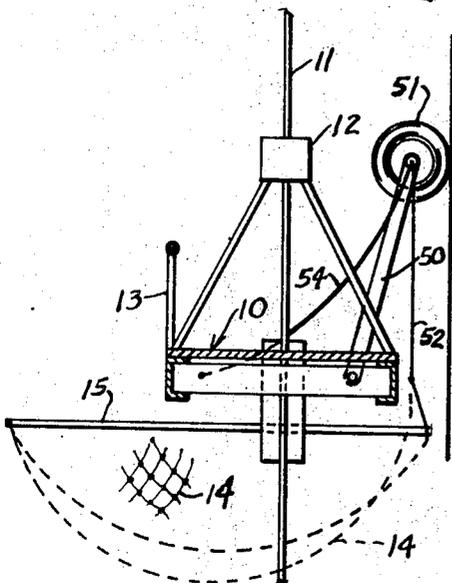


FIG. 2.

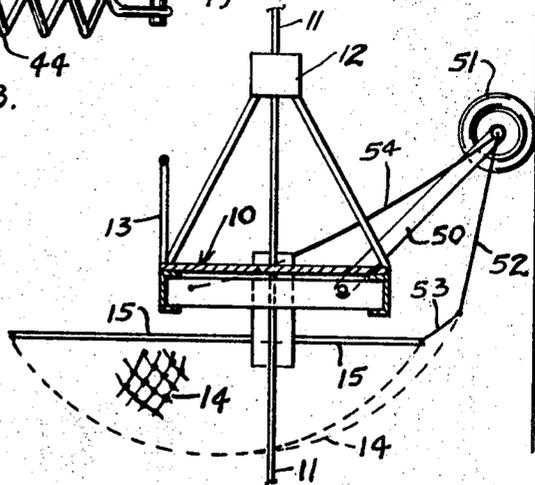


FIG. 3.

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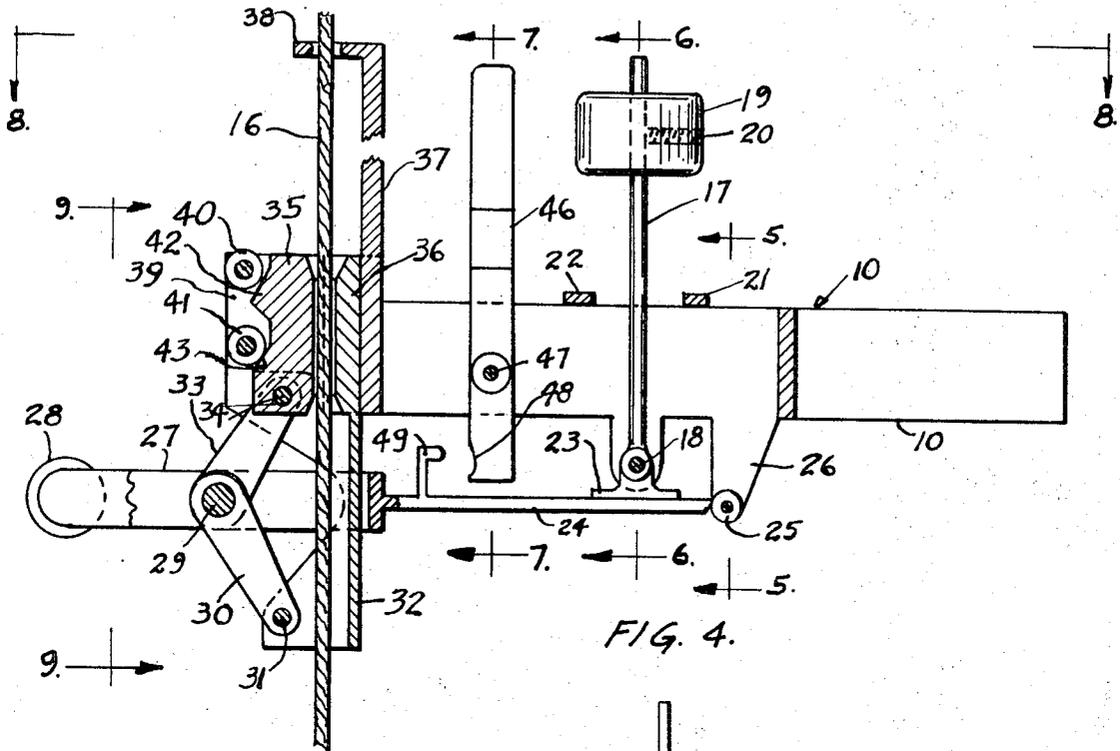


FIG. 4.

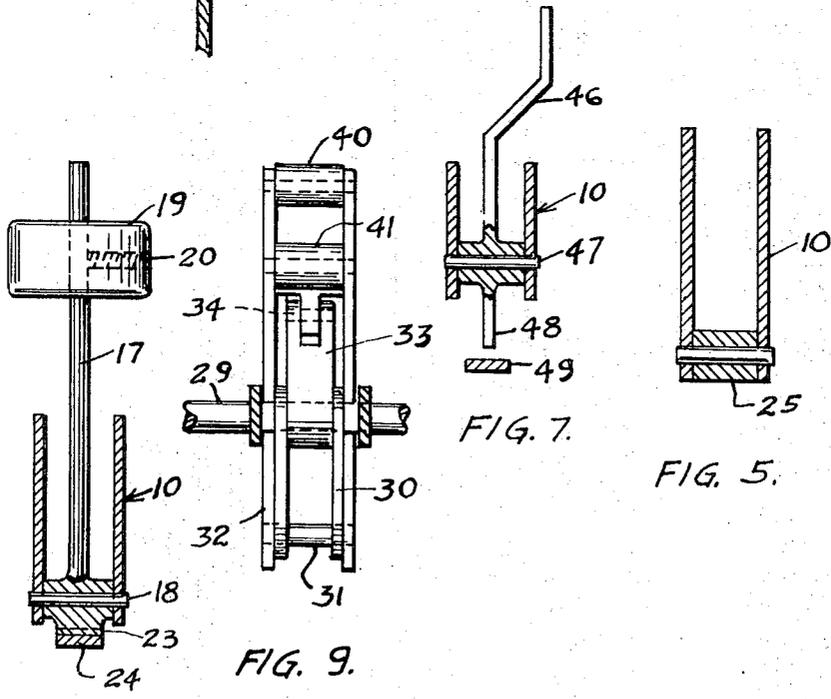


FIG. 7.

FIG. 5.

FIG. 9.

FIG. 6.

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SCAFFOLD SAFETY SUSPENSION SYSTEM

BACKGROUND AND SUMMARY

Scaffolds are supported by cables engaging drums which are usually power driven for raising and lowering the scaffolds, the weight of the scaffold and men working thereon being supported by the frictional drag of the cable which is wound around the drum several times. In the operation of such scaffolds, serious accidents have occurred causing loss of life of men working on the scaffolds. Tilting of the scaffold leading to the loss of men working on the scaffold or of material carried by the scaffold may be caused by a number of conditions. Should the cable, for some reason, be lubricated or be wet, the frictional resistance would be greatly reduced, and the same may result when the cable is worn or the hoisting blocks faulty or impaired.

I have discovered that tilt-responsive means may be carried by the scaffold or by extensions of the scaffold for triggering cable clamping means when tilting occurs at either end of the scaffold so that the tilting is checked automatically. At the same time, by providing a safety net under the scaffold structure and supporting it in a manner so that it cooperates with the cable blocking or clamping means, additional safety is provided with respect to persons on the scaffold and material which may slip from the scaffold. By supporting the net upon swinging supports and by utilizing a guide wheel following the line of the building adjacent the scaffold, the net location can be maintained accurately so as to contain any person or object falling from the scaffold.

DRAWINGS

The invention is illustrated by the accompanying drawings, in which —

FIG. 1 schematically shows a suspended scaffold equipped with safety cables, clamping mechanism, and a safety net embodying my invention; FIG. 2, a sectional detail view, the section being taken as indicated at line 2-2 of FIG. 1; FIG. 3, a view similar to FIG. 2 but showing the net supported in a different position; FIG. 4, an enlarged detail sectional view of the clamping and tilt-responsive actuating mechanism; FIG. 5, a detail sectional view, the section being taken as indicated at line 5-5 of FIG. 4; FIG. 6, a detail sectional view, the section being taken as indicated at line 6-6 of FIG. 4; FIG. 7, a broken sectional detail view, the section being taken at line 7-7 of FIG. 4; FIG. 8, a broken plan view, the view being taken as indicated at line 8-8 of FIG. 4; and FIG. 9, a sectional view, the section being taken as indicated at line 9-9 of FIG. 4.

DETAILED DESCRIPTION

In the illustration given, 10 designates a scaffold which is suspended by the hoist cables 11, the cables being wound about a drum indicated by the numeral 12. The drum may be manually operated or operated by an electric motor, as in the usual practice, for the raising and lowering of the scaffold. Normally the scaffold is provided with a railing 13, but such railing cannot prevent workmen from falling off the ends of the scaffold or on the side facing a building wall.

To contain a person or object falling from the platform 10, I provide a net 14 carried by a bar 15, the net being supported below the scaffold and in a manner which will be described more in detail hereinafter.

In the practice of my invention, I provide safety cables 16 which are suspended in parallel with the hoist cables 11 and which are adapted to be clamped or locked automatically when a tilting of the scaffold 10 occurs. While a single safety cable 16 may be employed, I prefer to have two cables and individual clamping mechanism for engaging each of the cables irrespective of the direction of the tilting of the scaffold.

In the illustration given, the scaffold 10 is provided with a tilt-responsive member 17 which may be in the form of a lever pivotally mounted on pin 18. The shaft 17 is provided at its top with a weight 19 and with a setscrew 20 which permits adjust-

ment of the weight along the length of the shaft 17. I prefer to employ spaced cross pieces 21 and 22 to limit the length of swing of the member 17. Integral with the shaft 17 is a heel or foot 23 which extends below pivot 18 and engages a trigger member 24. The end of the trigger member 24 engages a roller 25 supported upon a bracket 26 carried by the scaffold 10.

The trigger strip 24 is formed integrally with a U-shape strap 27 which is provided at its outer end with a counterweight 28. A cross rod or pivot bar 29 extends through the member 27 and supports a toggle consisting of a lower toggle arm 30 pivotally mounted by pin 31 upon depending frame member 32 forming a part of the scaffold 10 or extension thereof. The other toggle arm 33 extends upwardly and is pivotally connected by pin 34 to a slide block 35 having an inner clamping surface adapted to press the safety cable 16 against a fixed shoe or guide support 36 formed as a part of the scaffold 10. Adjacent shoe 36 is an upwardly-extending standard 37 having a flange 38 apertured to receive the cable 16.

A fixed bracket 39 carried by the scaffold or extension thereof is provided with a pair of rollers 40 and 41 which abut cam surfaces 42 and 43 on the other side of the movable block 35. Thus, when the block 35 is thrust upwardly, the cam surfaces 42 and 43 engaging rollers 40 and 41 respectively move the block inwardly to clamp the cable 16 against the fixed shoe 36. The gripping effect of the block 35 is enhanced by the relative movement of the cable 16 upwardly as the scaffold 10 tips downwardly so that the upward pull against block 35 increases the gripping action of the block.

To further increase the gripping action of block 35 against cable 16, I suspend the bar 15 carrying net 14 upon the shaft 29 of the toggle so that when weight is imposed upon the net the thrust of the net against the bar 29 pulls it forwardly and presses block 35 upwardly.

As shown best in FIG. 8, I provide springs 44 and 45 which are anchored at their inner ends to pivot bar 18 and at their outer ends to toggle bar 29 so that, when the trigger 24 is released from the roller or abutment 25, the springs draw the bar 29 inwardly and move toggle arm 33 upwardly so that the cams of block 35 press it into clamping engagement with cable 16.

In order to reset the mechanism after the clamping operation, I provide a lever 46 which is pivotally mounted on pin 47 and which is provided at its bottom with a hook 48. The hook 48 is adapted to engage a lug 49 carried by the trigger member 24, as shown best in FIG. 4. The lever 46 enables the operator to move the member 24 to the position shown in FIG. 1 so that the inner end thereof engages the roller or abutment 25.

Since the scaffold 10 may be moved at different distances from the adjacent building, it is desired to maintain the net evenly supported with respect to the scaffold at all times, and for this purpose I provide a lever 50 which is pivotally mounted upon the platform and which carries at its outer end a wheel 51 which is preferably rubber-tired and to which a guide arm 52 is secured and connected at its lower end by the link 53 to the net bar 15. A limit cable 54 may be provided for limiting outward swinging of the wheel 51.

In the operation of the device, the mechanism is set as indicated in FIG. 4 with the tilt-responsive shaft 17 in an upright position having its heel or shoe resting upon the trigger member 24. The member 24 is in horizontal position and is normally held in this position by the counterweight 28. The inner end of the member 24 rests against the abutment 25, and in this position the slide block 35 remains at a spaced distance from the cable 16. Should the platform or scaffold tilt in either direction, the tilting of the member 17 depresses the trigger 24 below the roller 25 and the tension springs 45 draw the toggle bar 29 inwardly so that the arm 33 thrusts the block 35 upwardly. Engagement of the cams 42 and 43 with rollers 40 and 41 move the block inwardly to clamp cable 16 against shoe 36. In addition, relative upward movement of the cable 16 further exerts upward force against block 35 and aids in clamping the block against the cable. In addition, the weight of the net 14 and any object carried thereby helps in drawing the pivot bar 29 inwardly and thus increases the clamping operation.

The net is maintained always in operative and effective position below the scaffold 10 irrespective of the position of the scaffold by the guide wheel 51 which follows the inner surface of the building line.

While in the foregoing specification I have described the structure in considerable detail for the purpose of illustrating an embodiment of the invention, it will be understood that such details may be modified widely by those skilled in the art without departing from the spirit of my invention.

I claim:

1. In combination with a scaffold and hoisting cable means for raising and lowering the scaffold, at least one safety cable suspended in parallel with said hoisting cables, a guide support on said scaffold receiving said safety cable, clamping means adjacent said guide support and movably supported for engagement with said cable to clamp the same against said guide support, spring-urged means for moving said clamping means toward said safety cable, and a tilt-responsive member mounted on said scaffold for actuating said spring-urged means when tilting of the scaffold occurs.

2. The structure of claim 1 in which said spring-urged means is normally held in check by a trigger engaging an abutment on said scaffold, said trigger being releasable from said abutment by said tilt-responsive member.

3. The structure of claim 1 in which a resetting lever is mounted on said scaffold and engages said trigger for retracting said spring-urged means.

4. The structure of claim 1 in which said spring-urged means includes toggle arms having one arm pivotally connected to said scaffold and the other arm pivotally connected to said clamping means.

5. The structure of claim 1 in which said clamping means includes a block having on its outer side cam surfaces and said scaffold provides fixed guide elements engaging said cam surfaces.

6. The structure of claim 5 in which said guide elements are rollers.

7. The structure of claim 1 in which said tilt-responsive means comprises a weighted lever pivotally mounted on said scaffold and having at its base a shoe engaging said trigger member.

8. The structure of claim 7 in which said trigger member is pivotally supported at an intermediate point and is weighted at its outer end to bring its inner end normally into engagement with said shoe.

9. In combination with a scaffold and hoisting cable means

for raising and lowering the scaffold, a pair of safety cables, one being suspended on each side of said scaffold in parallel with said hoist cables, extensions of said scaffold providing guide shoes on each side receiving one of said safety cables, clamping means supported for movement toward said shoes to clamp said safety cables against said shoes, spring-urged means for moving said clamping means, trigger means normally engaging an abutment on said scaffold for restraining said spring-urged means, and a tilt-responsive member mounted on said scaffold for moving said trigger away from said abutment when tilting of said scaffold occurs.

10. The structure of claim 9 in which said spring-urged means includes toggle arms on a pivot bar having one arm pivotally connected to the scaffold extension and one arm pivotally connected to the clamping means.

11. The structure of claim 10 in which said clamping means includes a block having an outer surface provided with inclined cam surfaces and rollers carried by said scaffold extension engaging said cam surfaces.

12. The structure of claim 10 in which a net is suspended from the pivot bars of said toggle arms below said scaffold and pulls said bars inwardly to aid said clamping means.

13. In combination with a scaffold and hoisting cable means for raising and lowering the scaffold, a safety cable on each side of said scaffold in parallel with said hoist cables, movably-mounted clamping means on said scaffold for clamping said safety cables to lock the scaffold thereon, tilt-responsive means on said scaffold for actuating said clamping means when tilting of the scaffold occurs, a net suspended below said scaffold, and connecting means between said net and said clamping means for applying the weight of the net and objects carried thereby to said clamping means to increase the clamping effect thereof.

14. The structure of claim 13 in which said connecting means includes toggle arms connected by pivot bars and in which said net is suspended on said pivot bars.

15. In combination with a scaffold and hoisting cable means for raising and lowering the scaffold, net supports pivotally mounted on said scaffold for swinging movement below said scaffold, a guide member pivotally mounted on said scaffold and extending laterally thereof for engagement with a building wall, and means connecting said guide member and said net to maintain said net adjacent to the wall of the building.

16. The structure of claim 15 in which said guide member is provided at its outer end with a wheel member.

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