

April 9, 1935.

F. F. HANSEN

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WHEELING SCAFFOLDING

Filed June 13, 1931

4 Sheets-Sheet 1

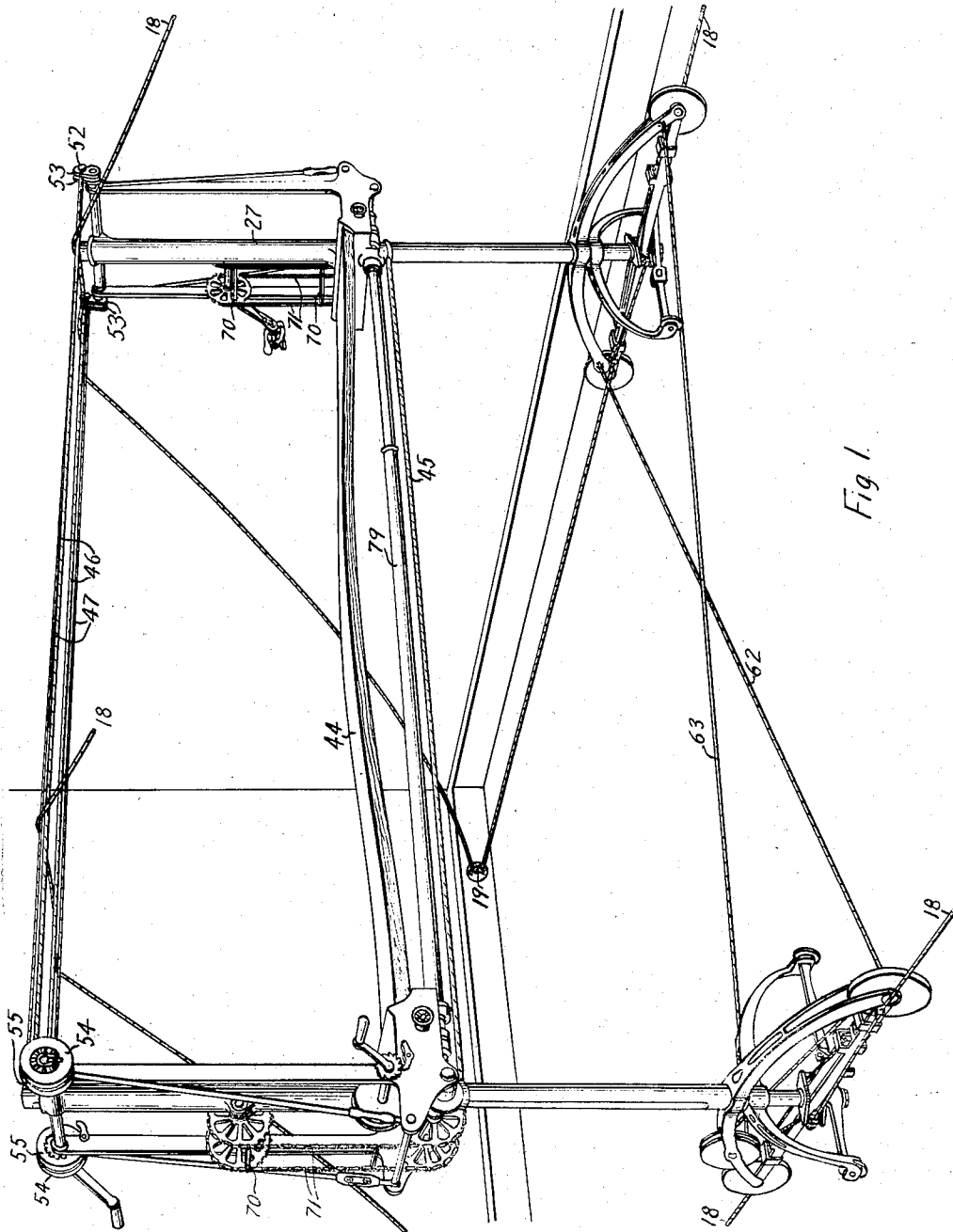


Fig. 1.

Witnesses
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Peter Christensen.

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4 Sheets-Sheet 2

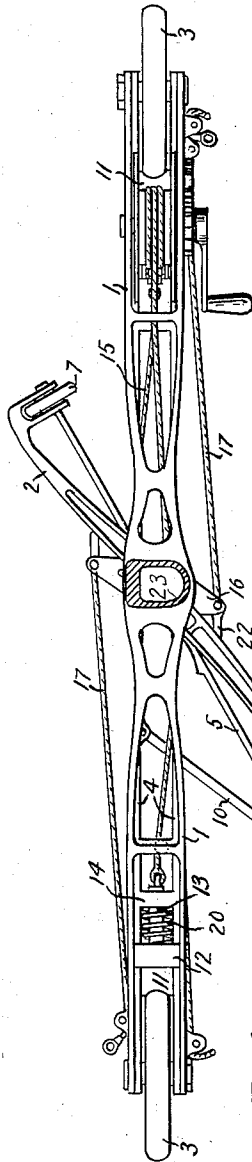


Fig. 3.

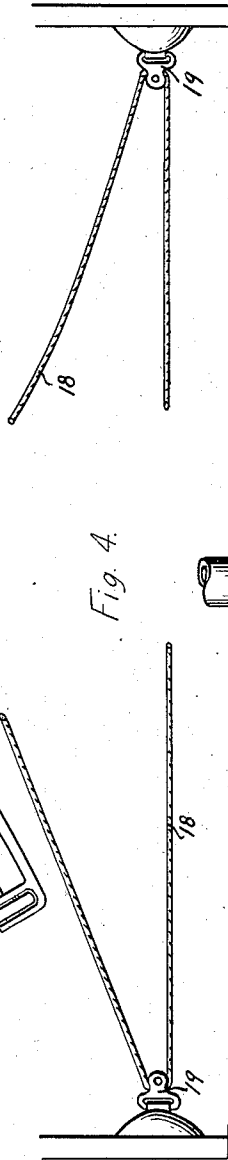


Fig. 4.

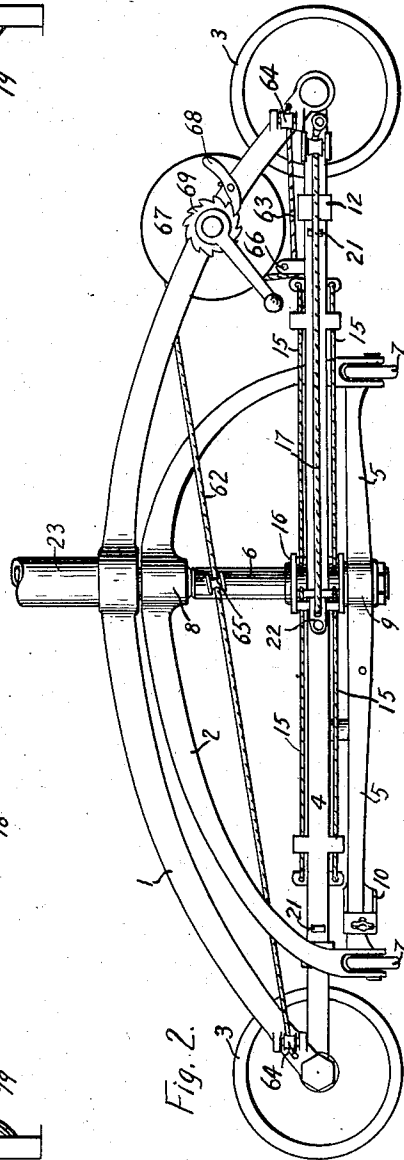


Fig. 2.

Witnesses
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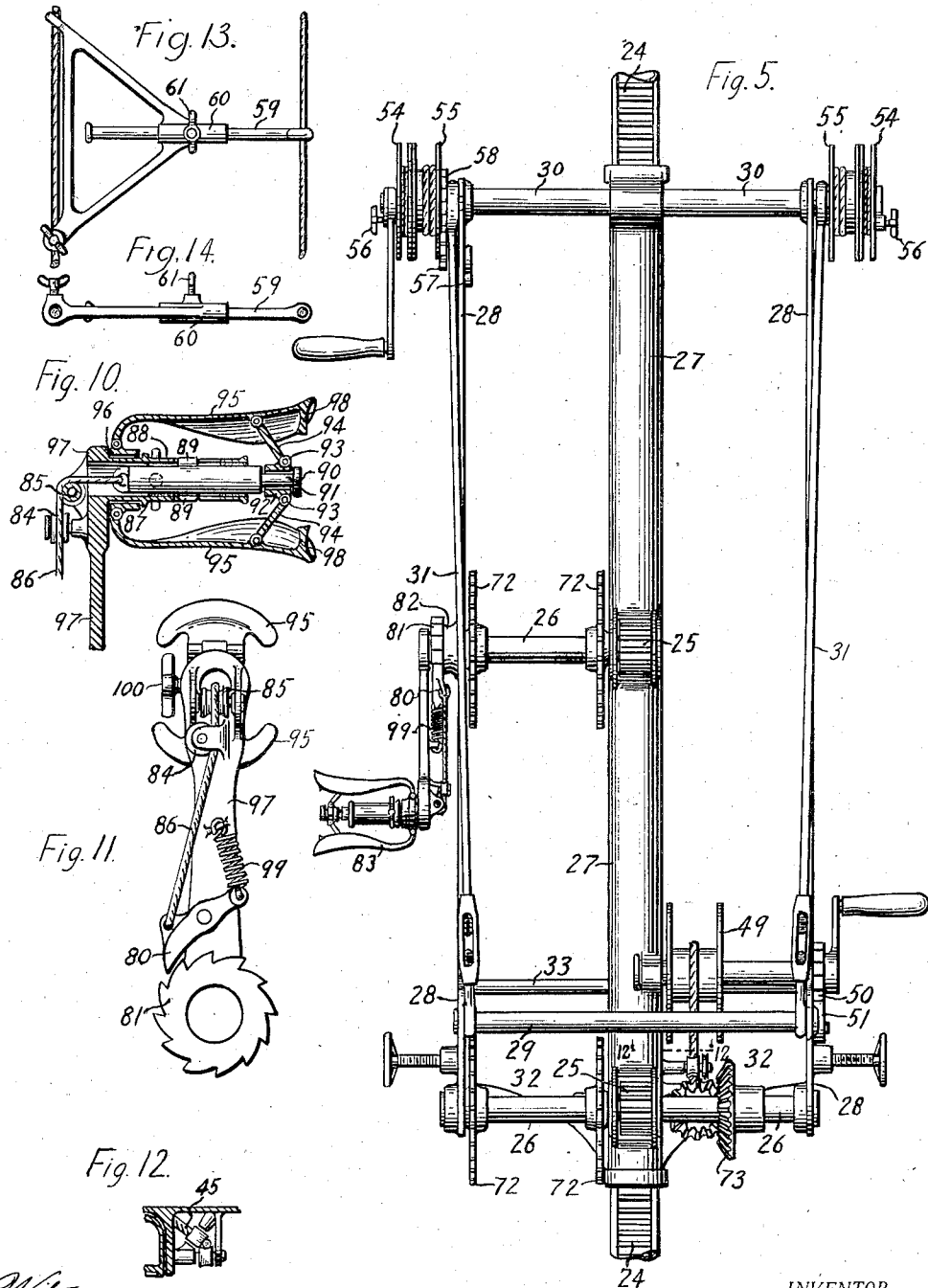
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WHEELING SCAFFOLDING

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4 Sheets-Sheet 3



Witnesses
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UNITED STATES PATENT OFFICE

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WHEELING SCAFFOLDING

Folmer Forsom Hansen, St. Paul, Minn.

Application June 13, 1931, Serial No. 544,246

8 Claims. (Cl. 304—9)

My invention relates to a type of scaffolding constituted by one or more sets of two wheeling trestles, each set holding therebetween a plank, or other member, bent into a vaulted shape by means of rope connections between the trestles, the resulting balance of tensional and elastic forces lending stability to the unit as a whole and giving the plank increased supporting strength.

Also, it relates to an arrangement of certain ones of the above mentioned ropes, by which they are made to serve as carriers or "ways" for containers for paint, etc., hanging from the ropes by pulleys.

Furthermore, it relates to devices and arrangements for raising or "stepping up" and lowering a unit of the scaffolding, consisting of the plank previously referred to in combination with a separate sliding part of each trestle encompassing and through gear engagement carried by rack teeth in a column rising from the base of the trestle, and of an extensible, self aligning, slightly flexible medium of power transmission, between the two trestles partly embodied in the above mentioned sliding units.

Finally, my invention relates to a rope pull, which acts on the brakes of the trestle wheels by way of pulleys at each end of the course concerned, and by which the whole unit can be drawn along the course.

The objects of my invention are to provide my own and other trades with scaffolding facilities enabling mechanics to work over the entire ceiling and upper part of the walls in a given room without having to leave the scaffolding in order to move or adjust the same and to provide for safety and for handiness of tools.

I attain these objects by the mechanisms illustrated in the accompanying drawings in which—

Figure 1 is a perspective view of the scaffolding unit as a whole;

Figs. 2 and 3 are respectively side and top plan views of the wheeled base of one trestle;

Fig. 4 is a side view of vacuum cup fastenings of pulleys for rope pull arrangements;

Fig. 5 is a side view of the sliding unit of one trestle seen from the outside (i. e. side opposite plank);

Fig. 6 is a partially broken away end view of the same unit;

Fig. 7 is a horizontal section of the same unit on the line 7—7 of Fig. 6 as indicated by the arrows;

Fig. 8 is an elevational view of the base of the same unit seen from the inner side of the trestle;

Fig. 9 is a partially broken away view of the

telescoping shaft connection between the self aligning bearings of the trestles;

Fig. 10 is a detailed sectional view of the crank handle;

Fig. 11 is a rear elevational view of the same handle and the ratchet wheel with which its mechanism engages;

Fig. 12 is a detailed local view of a pulley guide for one of the ropes on the line 12—12 of Fig. 5;

Figs. 13 and Fig. 14, are respectively top plan and side views of a device for adjusting the distances between ropes 46 and 47 of Fig. 1.

Similar numbers refer to similar parts throughout the several views.

The wheel base of each trestle is constituted by two arched members 1 and 2, Figs. 2 and 3; the former, providing bearings for the wheels 3 is strengthened by horizontal parallel members 4, connecting its ends and carrying the brake mechanism. The arched member 2, similarly strengthened by a horizontal member 5 pivots around the lower part 6 of center column 23 and may be swung into plane with the rest of the base, when not in use, its wheels 7 then being out of contact with the supporting surface. When turned back into working position, its internally screw-threaded upper portion 8 is screwed downwardly, bringing the wheels closer to the ground and creating in the portions 8 and 9 a tension preventing looseness and assisting the arm 10 in keeping the member in proper place.

Each trestle thus has an area of support allowing it to be operated as an individual unit, in the same way as when they are both used in combination.

The brake mechanism consists, in each wheel, of a brake block 11 secured to and guided by a sliding part 12 and a cylindrical piece 13 passing through a hole in the cross piece 14 and connected to the ropes 15 which are fastened to the lever arm 16, the latter being operated by the ropes 17 connected to the respective ends of the rope 18 shown in Fig. 4, which passes through the pulleys 19 at opposite ends of the course and extends over the top of the scaffolding as shown in Fig. 1. By this arrangement the rope, when pulled in a direction away from the scaffold from either side thereof will cause the brake blocks to recede, compressing the springs 20 until the guides hit the stops 21, the pull after this acting solely to draw the trestle along on released wheels, which in turn are braked, when slackening of the pull causes the compressed springs to act on the brake blocks. The parts 22 provide connect-

ing points for hooking scaffolding sets together by ropes or other means.

Fig. 4 illustrates rubber vacuum cups as a means of fastening pulleys at the ends of the course. In order to create a proper base for their adhesion on rough or porous surfaces, coats of a solution of collodion or another quick drying fluid may be applied with vaseline as an additional means.

The single column 23, rising from the base, is constructed to combine light weight with strength being hollow and having its longest transverse measurement in the line of greatest strain. It carries on its outside a toothed rack 24, shown in Fig. 5, engaging the two pinions 25, which, through their shafts 26 and their bearings, carry the sliding unit of the trestle, the framework of which unit is constituted by a central hollow member 27 encompassing and in shape conforming to the central column, on which it slides, and of two side pieces 28 connected to the former and with one another by the tubular pieces 29 and 30, to which the bracing rods 31 are fastened. Also such connection is more firmly established by the vertical cross wall 32, its substantially horizontal continuation 33, shown in Fig. 6, the front piece 34, shown in Figs. 6, 7 and 8 and two grooved bottom bars 35 strengthened by the bridge 36, all of which pieces contribute to form a casing or receptacle for the plank end and the mechanism for securing it.

This mechanism is constituted by a substantially horizontally disposed but slightly sloping plate 40 supported by two wedges 37 and 38, one wedge overlying the other, the wedge 38 being supported by the above mentioned bars 35 on which it slides, its motion guided by two ribs on its underside conforming to and bearing in the grooves of the bars. Similarly the motion of the wedges in relation to one another is guided by ribs engaging in grooves as illustrated in Figs. 6 and 7; moreover their dislocation is prevented sideways by means of two rods 39 depending from the plate 40 and fitting into holes in the bridge 36, and by two vertically disposed ribs 41 on the crosswall 32, and vertically by the spring 42 connecting the plate 40 and bridge 36.

The wedges are operated by the screws 43, the degree of their overlapping determining the distance of the plate 40 from the slightly sloping roof of the casing 33, between which two bodies the plank end can be clamped in place.

This mechanism unites the plank 44, Fig. 1 so solidly with the sliding unit of each trestle, that they may be thought of as forming one body, the stability of which can be furthermore increased by tightening of the steel rope 45 and the two sets of ropes 46 and 47, the plank thereby being caused to arch upwardly. The rope 45 is connected to the bottom rim of part 27 of one trestle passing to a correspondingly located pulley 48, Figs. 6 and 8, on the other trestle, from there taking an upwardly slanting course passing through the pulley guide (Fig. 12) and fastening on to the reel 49, the rotation of which can be stopped by engagement between the ratchet wheel 50 and the pawl 51. The ropes 46 and 47, Fig. 1, are at one end coupled together by a cylindrical piece 52, which fits into the grasp of a twin set of hooks 53 on one trestle, from where the ropes 47 and 46 pass respectively to the reels 54 and 55 on the other trestle, as shown in Fig. 5, of which reels 55 are permanently connected with the shaft passing through the cylinder 30, while reels 54 are releasably connected to the same by means

of the set screws 56 so that the tension of rope 47 can be regulated to correspond with that of rope 46, when their function as common carriers of paint pots, etc., makes it desirable. The pawl 57, engaging the ratchet wheel 58 and controllable by means of a lever serves to arrest rotation of the reels connected to the shaft. Figs. 13 and 14 illustrate a means of maintaining a given distance between the ropes 46 and 47, the position of the rod 59 being adjustable in relation to the tubular piece 60, through which it passes, by use of set screw 61.

When the plank is secured to the sliding units 27, and the ropes are slack, its angle with respect to each of the sliding units 27 will be slightly less than 90 degrees due to the slanting surfaces presented by plate 40 and the roof 33 of the casing as best shown in Fig. 6. By suitably tightening rope 45 and then ropes 46 and 47 to slightly arch the plank 44 upwardly, the sliding side units 27 may be brought into parallel, vertically disposed positions, desirable for the smooth raising and lowering of same. In order to further increase the curvature and supporting strength of the plank, while maintaining a parallel relation between the sliding units 27, cooperative tightening of the lower rope 45 and the upper sets of ropes 46 and 47 may be employed. When the plank is raised to working level, its elastic force may be brought to bear on and stabilize the scaffolding unit as a whole by tightening of the upper sets of ropes and increasing the tension in the moderately tightened ropes 62 and 63 connecting the bases of the trestles. The latter ropes are connected to the base of one trestle and, crossing one another, pass to the pulleys 64 of the other trestle, from where they pass, by way of the pulleys 65 and 66 to the reel 67, the rotation of which can be prevented by the pawl 68 engaging the ratchet wheel 69. The raising of the plank is effected by pulling downwardly the rods or steps 70, best shown in Fig. 1, connecting the sprocket chains 71 which drive the wheels 72, Fig. 5, mounted on the shafts 26, previously referred to, the lower one of which carries the bevel gear 73, Fig. 7, which engages the smaller gear 74 carried by the shaft 75, which, through the bearing 76, connects to the flexible or semi-universal coupling 77, the one represented being of standard make, from the other half of which it continues through the self-aligning bearing 78 and ends on its other side presenting features for coupling with the telescoping shaft 79, Figs. 1 and 9, which constitutes the connection to the corresponding mechanism of the other trestle. Downward movement of the plank is prevented by action of the pawl 80, best shown in Figs. 5 and 11 on the ratchet wheel 81, which is in rigid connection with the frame through the bearing 82.

After releasing its pressure on the framework as a whole, the lowering of the plank is effected by the use of the handle 83, Figs. 5, 10 and 11, the mechanism of which allows for the disengagement between said pawl and ratchet wheel maintained as long as the handle is firmly grasped. Guided by the pulleys 84 and 85 the cord 86 passes from the pawl to the cylinder 87 sliding pistonlike in the tube 88 and equipped with lugs 89 engaging with slots in the tube wall, thus preventing rotation. Toward the front the cylinder continues into a portion 90 of smaller diameter carrying a stopper 91, and an encompassing ring 92 furnished with hinged connec-

tions 93 to two arms 94 which in turn hinge on to the handle leaves 95, the latter at their other ends being hinged to another ring 96 sliding around the tube 98, which is embodied in the handle stem 97. The handle leaves can be pressed toward one another, till their projections 98 bear on the hinges 93 pushed forward by the simultaneous movement of the arms, which movement, by the described mediums, will cause the above mentioned disengagement of pawl 80 from ratchet wheel 81 against the force of the spring 99, unless the set screw 100 be used to prevent the cylinder from sliding back. The application of this screw will be necessary in regard to one of the handles, when the lowering of the plank must be undertaken by one person.

It appears to me, that the above described scaffolding unit possesses new and original features entitling me to the claims, which I submit as follow:

1. In a traveling scaffold, wheels supporting said scaffold, a rope connected to said scaffold, anchored pulleys located beyond opposite sides of said scaffold, said rope passing over each of said pulleys and a portion of said rope being accessible from said scaffold, braking means for said wheels, means for normally maintaining said braking means in braking position, and means connected to said rope for releasing said braking means when said rope is tensioned.

2. In a scaffold having a platform mounted for vertical movement and having means for adjusting the height of said platform, a crank for adjusting said means, said crank being revolubly mounted, and a ratchet wheel non-revolubly mounted adjacent said crank, said crank comprising a main lever, a crank handle consisting of two opposing wings swingably connected to the outer end of said lever, each wing carrying a toggle, a spring pressed pawl mounted on said lever to engage said ratchet wheel, and actuating connections between said toggles and said pawl to cause disengagement of said pawl when said wings are moved toward each other.

3. In a scaffold having a platform mounted for movement in a vertical direction and having means for adjusting the height of said platform, a crank for operating said adjustment means, said crank being revolubly mounted in a position accessible from said platform, and a ratchet wheel non-revolubly mounted adjacent said crank, said crank comprising a main lever, a tubular member extending at right angles to said lever, a second tubular member revolubly mounted on said first mentioned tubular member, a crank handle consisting of two diametrically located wings pivotally attached to said second tubular member, a plunger located partially within said first mentioned tubular member, a pair of toggle arms, the outer end of said plunger being connected respectively through said tog-

gles to said wings, a spring pressed pawl mounted on said lever and positioned to engage said ratchet wheel, and operating means connecting said plunger to said pawl to cause disengagement of said pawl when said wings are moved toward each other.

4. In a scaffold, two supporting structures, a carriage mounted on each of said structures for adjustable vertical movement with respect thereto, a cross member supported at its respective ends by said carriages, and means accessible from said scaffold for simultaneously and similarly operating said carriages, said means including two pairs of sprockets, a sprocket chain connecting each of said pairs of sprockets, and bars connecting similar portions of said chains and being disposed at right angles thereto.

5. In a scaffold, two supporting structures, a carriage mounted on each of said structures for adjustable vertical movement with respect thereto, a cross member supported at its respective ends by said carriages and coordinated means accessible from said cross member for simultaneously and similarly operating said carriages, said means including two pairs of sprockets, a sprocket chain connecting each of said pairs of sprockets, and bars connecting similar portions of said chains and being disposed at right angles thereto.

6. In a scaffold, two rigid upstanding supporting structures, a carriage mounted on each of said structures for vertical movement with respect thereto, means for raising and lowering each of said carriages, a cross-member, releasable clamping means mounted on each of said carriages, the ends of said cross-member being respectively rigidly held by said clamping means but being removable therefrom and said clamping means each being disposed in such manner that said cross-member will slope slightly upwardly toward its medial portion from each of said clamping means.

7. In a scaffold, two rigid upstanding supporting structures, a cross-member attached at its respective ends to said structures, means for fixing the angle at which each of the respective end portions of said cross-member are disposed with respect to said structures, and means for drawing said structures toward each other to produce a longitudinal stress in said member to cause the medial portion of the same to arch upwardly.

8. In a scaffold, two rigid upstanding supporting structures, a cross member rigidly secured at its respective ends to said structures, and tension members connected between said structures for causing a longitudinal stress in said cross member to arch the same upwardly, one of said tension members being situated above said cross member whereby it is accessible to a person situated on said cross member for hanging tools and material containers thereon.

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