June 24, 1969 L. R. ANDERSSON 3,451,108

MOVABLE CONCRETE FORM WITH A PAIR OF ENDLESS FLEXIBLE MATS

Filed Jan. 18, 1966 Sheet 1 of 2

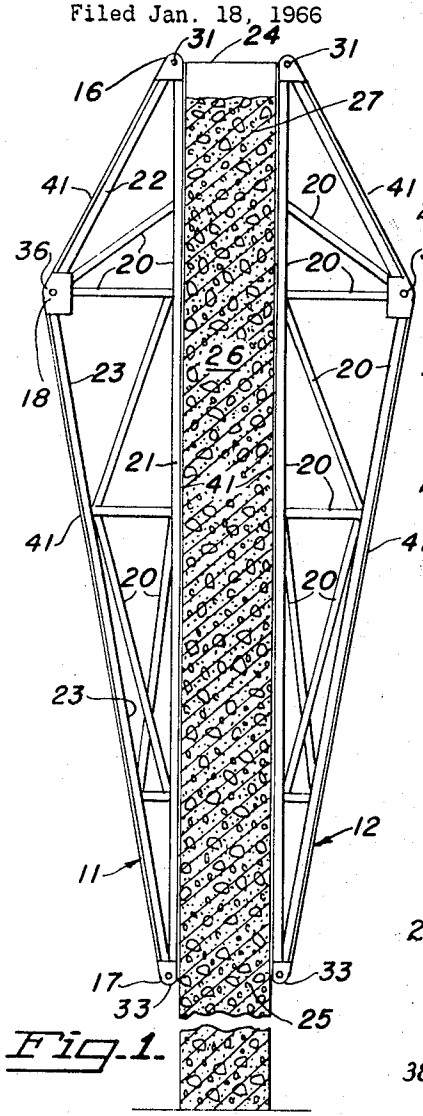

Fig. 1.

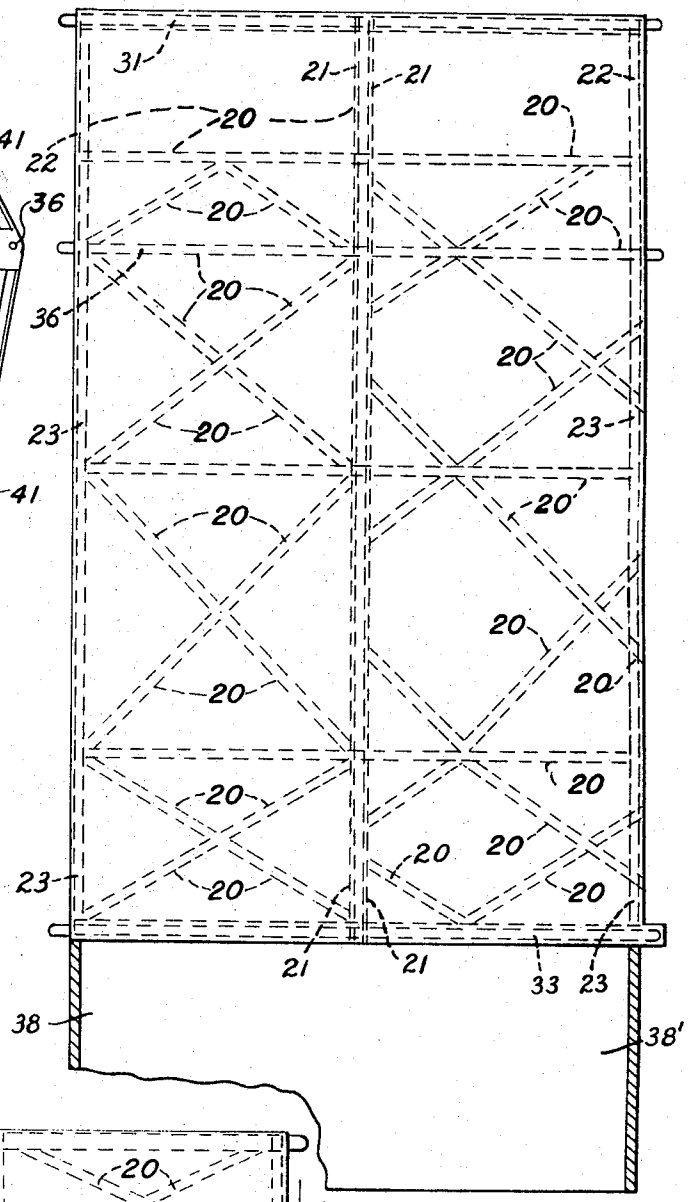

Fig. 2.

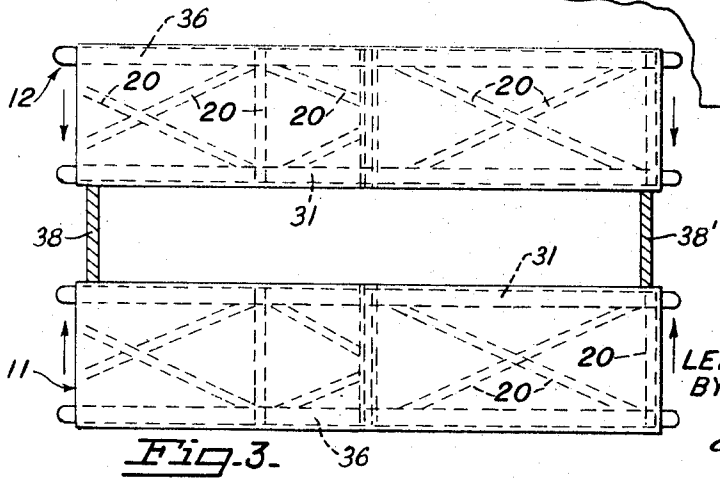

Fig. 3.

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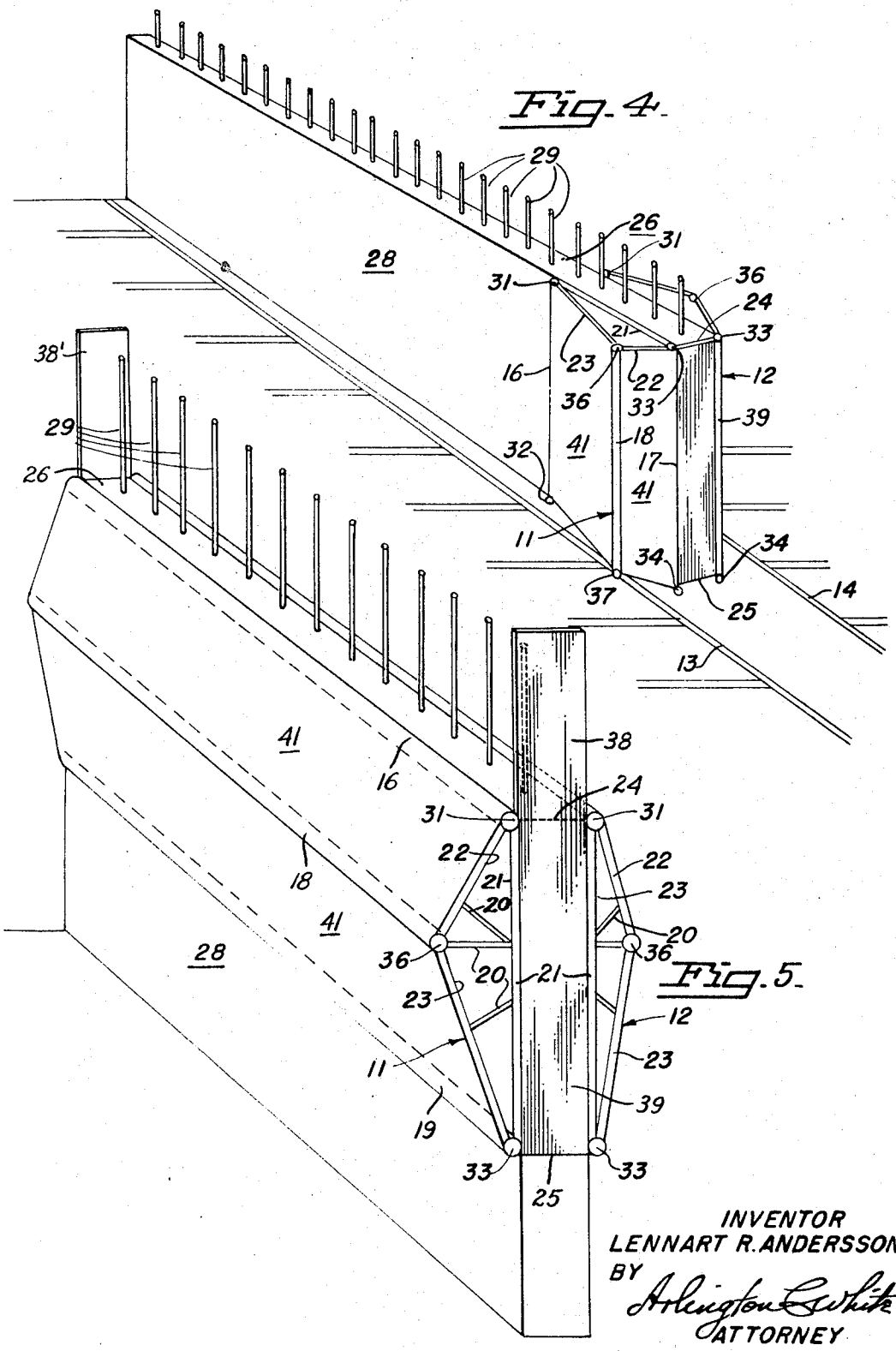
Fig. 4.



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United States Patent Office 3,451,108
Patented June 24, 1969

3,451,108

MOVABLE CONCRETE FORM WITH A PAIR OF ENDLESS FLEXIBLE MATS

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Filed Jan. 18, 1966, Ser. No. 521,315
Int. Cl. B28b 7/24
U.S. Cl. 25—131 2 Claims

ABSTRACT OF THE DISCLOSURE

The disclosure comprises a pair of triangular-shaped form structures each consisting of tubular rods connected together to define a relatively long base, a short side and a long side, ties connecting said form structures together with said bases confronting each other and defining a space therebetween in which concrete may be poured and allowed to set, roller means rotatably mounted on said tubular rods at each angle of said triangular-shaped form structures, a pair of endless flexible mats overlying said form structures and said roller means and movable relative thereto to effect a smoothing of the outer surface of a concrete wall progressively cast and erected in said space between said mats, means defining end walls to contain concrete between said mats, and means for progressively moving said form structures.

The invention, in general, relates to the building construction art and more particularly relates to a bidirectional, movable concrete form for enabling the rapid and continuous construction of reinforced concrete walls, partitions and the like.

A primary object of the present invention is to provide improved equipment capable of being moved to and fro as well as up and down and constituting movable form structures in opposed relationship to one another and between which the concrete may be poured and set under pressure.

Another important object of the present invention is to provide improved movable concrete form structures of the indicated nature which are additionally characterized by the ready movability of the equipment and included form structures to permit the use thereof on adjacent wall constructions while the poured concrete is allowed to set and at the same time permit the erection of the walls either in a horizontal direction or a vertical direction, depending upon the site and the particular location of any gievn wall or partition.

A still further object of the invention is to provide improved concrete form structures of the aforementioned character which are inexpensive to manufacture and which have longevity of use before replacement thereof is required.

Other objects of the invention, together with some of the advantageous features thereof, will appear from the following description of a preferred embodiment of the invention which is illustrated in the accompanying drawings, it is to be understood, however, that I am not to be limited to the precise embodiments illustrated, nor to the precise arrangement of the various components thereof, as my invention, as defined in the appended claims, can be embodied in a plurality and variety of forms within the scope of the present invention.

Referring to the drawings:

FIG. 1 is an elevational view partially in section of a preferred embodiment of the opposed concrete form structures of the present invention; this view showing the forms in opposed relationship adjacent to the top of a concrete wall substantially completely erected.

FIG. 2 is a front elevational view of the preferred embodiment of the invention.

FIG. 3 is a top plan view of the preferred embodiment of the invention.

FIG. 4 is a front perspective view of the improved concrete form of the present invention shown in operative position in relation to a concrete wall carrying reinforcing elements and showing the erection of a wall by movement of the form in a horizontal direction.

FIG. 5 is a front perspective view of the preferred embodiment of the present invention as embodied in opposed movable ocncrete form; this view showing the concrete form adjacent to the top of a concrete wall and illustrating the vertical movement of the form.

In its preferred form, the movable concrete form of my present invention preferably comprise a pair of form structures of triangular cross-section, and an endless mat substantially coextensive with the length of each of said pair of form structures and overlying the same in relative movable arrangement with respect thereto; said triangular section panel forms each consisting of a series of tubular rods connected together at opposite ends thereof and therebetween to define a base of predetermined length, a short side and a long side, together with means joining said pair of form structures together with their bases confronting one another in spaced relationship to permit the pouring of concrete with or without reinforcing elements embedded therein in the space therebetween for the erection of a concrete wall or other concrete structural member, and roller means rotatably mounted on the tubular rods at each angle of said triangular-shaped form structures to enable ready movement of said pair of form structures as an integrated unit as well as intrinsic relative movement of each form structure to its overlying mat upon movement of the connected form structures.

In accordance with the invention, I provide a pair of similar form structures, generally designated by the reference numerals **11** and **12**, for movement upon a pair of rails **13** and **14**, see FIG. 4, or in riding engagement with overlying beams, not shown. Preferably, each of the form structures **11** and **12** is constructed or fabricated of steel tubing; the steel tubing being of sufficient strength to accommodate the structural strength of the entire unit, and I arrange the series of tubing at the corners **16**, **17** and **18** of an irregular triangle. The tubular rods **16** and **17** are braced apart at opposite ends thereof as well as therebetween by brace rods of predetermined length, all designated by the reference numeral **20**, so as to define each triangular section form structure **11** and **12** consisting of a relatively long base **21**, a relatively short side **22** and a relatively long side **23**. The two form structures **11** and **12** are joined together at opposite ends by any suitable means such as steel rods **24** and **25** which are of equal predetermined lengths and define a space **26** therebetween into which concrete **27** may be poured to form any desired structural member such as a wall **28**. Suitable concrete reinforcing elements **29** may be installed if desired, in the space **26** between the connected form structures **11** and **12** so that the erected structural element cast progressively and erected by the form structures will be of reinforced concrete. Of course, the reinforcing elements **29** may be omitted if desired. The width between the underlying rails **13** and **14** is governed by the assembly of the pair of opopsed form structures **11** and **12**, and the thickness of the wall **28** or other structural concrete member to be erected governs the space **26** between such form structures.

In accordance with the present invention and in respect to each of the form structures **11** and **12**, roller means **31**, **32**, **33**, **34**, **36** and **37** are rotatably mounted on said tubular rods **16**, **17** and **18** at each angle of said triangle-

shaped form structures **11** and **12**. The roller means **31–37** inclusive of the connected and opposed form structures **11** and **12** serve to move the pair of connected form structures as a unit along a concrete structural member, such as wall **28**, as it is being erected, with the relatively long bases **21** of the two form structures confronting each other. Detachable wooden bulkheads **38** and **38'** are removably mounted on the ends of the form structures **11** and **12** and fit across the intervening space **26** to contain the concrete while pouring. I also provide a single forward end wall **39** for this same purpose, such end wall **39** being fixedly secured to the concrete form, as shown in FIG. 4, and traveling with it as a unit.

As particularly illustrated in FIGS. 1, 4 and 5, each of the triangular-shaped form structures **11** and **12** is provided with an endless mat **41** which is preferably formed of rubber but which can be made of thin sheet steel depending upon the application of the form structures to the erection of different structural members, and which is mounted upon the rollers **31, 32, 33, 34, 36** and **37** at the angles of the connected tubular rods **16, 17** and **18**, respectively. The mat **41** on each of the panel forms **11** and **12** will adhere to the uncured or unset concrete of the concrete structural member under erection as the opposed form structures joined together, are moved as a unit with the forward end wall **39** either horizontally or vertically; thus causing relative movement between each form structure **11** and **12** and its overlying mat **41** much in the same manner as a band tractor in relation to its band. That is to say, the mat **41** will remain still or at rest while the form structures **11** and **12** are moved, thus giving a rolling action upon the mat and forming a smooth exterior surface on the exterior as well as interior of the concrete wall **28** or other concrete structural member being formed; the relatively long base **21** of each panel form permitting relatively lengthy rolling movement between the form structures and the mat **41** to enhance the smoothing of the wall surfaces.

While any desired series of steps can be followed in assembling the apparatus, I preferably practice the procedure of moving the pre-formed form structures **11** and **12** to the site of the construction to be done and install the two structures **11** and **12** with their bases **21** confronting one another and arranged at a distance apart to accommodate the thickness of the structural member to be erected. The rods **24** and **25** are welded or otherwise fastened to the two form structures **11** and **12** at the top and bottom thereof, and if the structural member to be erected is to be installed at an angle to a given base, then the tie rods **24** and **25** are cut to different lengths for placement of the opposed form structures **11** and **12** at the desired angular relationship. If the concrete is to be reinforced, reinforcing steel elements are placed in the space between the arranged form panels into which the concrete **27** is to be poured.

Preferably, the space **26** between the two panel forms **11** and **12** is filled in layers of approximately 8" to 10" high until the space **26** is filled, and a vibrator or other means, not shown, may be employed to assist compacting of the poured concrete. After the space **26** is completely filled to the length of each form structures **11** and **12**, it can be left alone as in a stationary fill, for a period of two to three hours, and thereafter the connected form structures **11** and **12** can be moved along the underlying rails **13** and **14** or along a hanger, not shown, by means of a suitable propulsion device, also not shown. I am, of course, not be limited to horizontal movement of the connected form structures **11** and **12** inasmuch as this form can be raised vertically so that progression of the erection of the concrete structural member, such as the wall **28**, may be in a horizontal or vertical direction. Additional concrete can repetitively be poured in the empty spaces created by the intermittent movement of the connected form structures **11** and **12** as the work progresses. It seems clear that the rate of travelling depends upon the size (deepness) of the provided unitary form, or space **26** between the two form structures **11** and **12**, as well as the time required for the poured concrete to set and cure. After reaching the desired height and length, the connected form structures **11** and **12** as a unit can be lifted off of the top of the now hard concrete and be taken away to another site.

While the moving and lifting apparatus is not shown in the annexed drawings, it is to be understood that any propulsion means or any crane or jack will be suitable for effecting such movement and lifting. It is also understood that a rail, such as the rails **13** and **14** are required for horizontal movement of the connected form structures **11** and **12** to withstand the form pressure especially at the bottom thereof.

The combined form structures **11** and **12** illustrated in the annexed drawings are in effect a single concrete form and it is to be understood that it need be assembled only once for pouring each structural member and that it will permit concrete pouring of any length of such a member. Further, that the unitary form will strip itself when moving forward or upward and will thereby create the so to speak new form for additional pouring of concrete successively during the formation of the concrete object or structure. Moreover, any thickness of wall or partition or column can be obtained and the form structures do not need to be parallel to one another. There is no necessity for a multiplicity of form ties, and the finished wall or other concrete structure will have a smoother exterior and interior surface than with the employment of any other so-called slip-form system.

It is to be understood that the appended claims are to be accorded a range of equivalents commensurate in scope with the advance made over the prior art.

I claim:

1. A movable concrete form comprising a plurality of connected tubular rods connected together to define a pair of triangular-shaped form structures each consisting of a relatively long base, a short side, and a long side; said form structures being arranged with said bases thereof confronting each other and defining a space therebetween, ties connecting said pair of form structures at opposite ends of said bases, roller means rotatably mounted on said tubular rods at each angle of said triangular-shaped form structures, a pair of endless flexible mats overlying said form structures and said roller means and movable relative thereto to effect a smoothing of the outer surfaces of a concrete wall progressively cast and erected in said space between said mats, means defining end walls to contain concrete in the space between said mats, and means for progressively moving said form structures.

2. A movable concrete form as defined in claim **1**, including a single forward end wall, and a track upon which said pair of form structures is moved horizontally as a unit during the casting and erection of the concrete wall.

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U.S. Cl. X.R.

264—33; 25—99