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(54) **NEST-CASTING OF CONCRETE ELEMENTS.**

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(73) Proprietor: **TOPLAND N.V.**
Zoutmanstraat 6 Oranjestad
Aruba Netherlands Antilles (NL)

(72) Inventor: **SCOTT, Geo A.**
Mezenlaan 6
NL-5301 NW Zaltbommel (NL)

(74) Representative: **Urbanus, Henricus Maria, Ir.**
et al
c/o Vereenigde Octrooibureaux Nieuwe
Parklaan 107
NL-2587 BP 's-Gravenhage (NL)

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Description

The present invention relates to casting of panels in upstanding position in successive or sequentially formed mold forms and more particularly to casting of concrete wall elements formed and molded directly against a previously cast element on one side and with a spaced repositioned element on the other side.

The method of the invention provides for use of a flat or folded concrete element as a stable molding form against which another element is cast employing only one-half of the form otherwise required and successively or subsequently casting another similar element against a previous flat or folded concrete element using only a half form without dismantling the same and including means for its movement after a cast concrete element is set so that it in itself forms a mold surface. Included in forming the half form is the use of a system of supporting structures composed of a rigid assemblage of interchangeable modular structural elements securely hinged to each other forming a half form, while a mold facing previously molded and cured forms the other mold side. The ends are forming by end surface forming means that are reciprocably and parallelly adjustable along a given dimension at the ends of the mold form thus repeated nest-casting of varying or similar wall elements is provided. These elements may have any of the general forms of "I", "L", "M", and "N" or any conventional zigzag-form.

NL—A—70 15 910 discloses a method of sequentially casting a series of correspondingly shaped, concrete panels on a common supporting surface, comprising the casting of a first concrete panel and supporting said first panel in vertical position on said supporting surface, followed by the steps of forming a mold cavity adjacent one side of said first panel by positioning a mold form with its main panel forming surface in spaced relations to said first panel and closing the ends of the mold cavity between the side edges of the mold form and said first panel by end surface forming means, then filling the mold cavity with hardenable concrete, permitting it to set, removing said mold form and repositioning it in spaced relationship to the thus completed second concrete panel and repeating the abovementioned steps to sequentially form a nest of further concrete panels together with said first and second panels by using the same mold form.

The method disclosed in that publication concerns the manufacture of — exclusively — flat slab-shaped panels which are fully identical to each other. The end face forming means must be separately mounted on the movable mold form, or form an integral part thereof, which is not clear from the publication. The publication also does not specify any particulars about the way in which the movable form is displaced each time when a slap-shaped panel is cast and set for casting a next panel.

It is an object of the present invention, elaborating on the method disclosed in NL—A—70 15 910, to provide an improved method in which, each time after the completion of a formed and set panel, the movable form, including the end surface forming means is rapidly and efficiently repositioned, providing at the same time the possibility of dimensional variations between the panels being successively made. It is a further object of the invention to make it possible to manufacture, in addition to flat slab-shaped panels, folded panels, i.e. panels which, as viewed in horizontal cross-section when in upright position have a generally angular shape.

The sequential casting of correspondingly shaped panels is known per se from US—A—3 701 508 and GB—A—2 026 932. The last-mentioned specification also discloses wheel supports on the mold forms and movable between raised and lowered positions. Furthermore, there are also used ram means. The prior methods do not, however, relate to nest-casting but they are battery-casting methods, in which a plurality of upstanding, L-sectioned mold wall members is used and each concrete panel is cast between a pair of such mold wall members. The end surface forming means in GB—A—2 026 932 are fixedly mounted on one of the two mold wall members between which a panel is cast. Battery-casting methods have the disadvantage that the molds are not rapidly and easily alterable to vary the dimensions of the resulting concrete elements. Also the mold assemblies do not give easy access to the mold cavity in between. In contra-distinction therewith, nest-casting methods require less space and movement of equipment for concrete casting of elements, while there is no lost space between the individual concrete elements formed, resulting in considerably less space being required for casting.

Nest casting of folded concrete panels, i.e. those of angular shape in cross-section is further known per se from GB—A—234 545, but in this prior method the panels are cast successively, i.e., each next panel is cast against the previously completed, set, angularly-shaped panel in the horizontal position of the panels.

According to the present invention, a method of the kind as known in accordance with the above definition, from NL—A—70 15 910, is characterized in that the said steps of repositioning the form include the step of horizontally moving said form including the end surface forming means, which constitute part of said form and are mounted thereon on supporting wheels and vertically moving it by hydraulic rams, rolling the movable form into position when being elevated in its vertical position by the rams and then lowering it onto the supporting surface and the step of adjusting horizontally the end surface forming means relatively to the remainder of the mold form.

Preferably, said steps of repositioning the movable form further include moving said form with its main panel forming surface into final spaced relation to said first panel by lower actuating jack

screw arrangements respectively extending between the supporting surface and the mold form outside the mold cavity by upper jack screw arrangements and extending across the mold cavity from the first concrete panel and being connected thereto and — if needs be — moving the end surface forming means by actuating jack screw arrangements extending near the edges of the mold form.

The method according to the invention is uniquely adapted to form upstanding panels of generally angular shape in horizontal cross-section.

Preferably the method according to the invention includes the further step of reinforcing the movable mold with triangulate reforcing arrangements attached to the exterior of said movable mold form.

The present invention provides for a thoroughly flexible and versatile method of casting a great variety of shapes, dimensions and contour surface finishes in a nested sequence of concrete elements.

In the following, the invention is described in more detail with reference to the accompanying drawings, in which

Figure 1 is a plan view of a concrete casting assemblage illustrating method for nest-casting of concrete elements according to a preferred embodiment and best mode of the present invention.

Figure 2 is an elevational view of a side taken on an enlarged scale.

Figure 3 shows a typical sectional view of the embodiment shown in Figure 2 but on an enlarged scale.

Figure 4 is an enlarged view taken along line 4—4 of Figure 2.

Figure 5 shows an enlarged view of a detail of an assembly connecting two various components of a main structural frame.

Figure 6 is a sectional view taken along line 6—6 of Figure 5.

Figure 7 is an alternate detailed view of the assembly shown in Figure 6.

Figure 8 is a plan and broken away view on an enlarged scale of an end stop assembly.

Figure 9 shows detail of an assembly coupling system.

Figure 10 shows in an enlarged scale details of an inclined top mold having apertures for inserting and pouring concrete material therethrough.

Figure 11 shows a modification of an arrangement shown in Figure 8 for constructing a series of contoured end stop surface elements.

Figures 12—18 show component assemblage elements some of which are interchangeable modular structural components, some of which are hingedly connected, adjustable in length, and demountable from the assemblage as desired.

Figures 19, 20 and 21 show improved contour concrete elements of configurations attained by the method and apparatus of the present invention.

Figure 22 is a plan view similar in some features to the plan view of Figure 1 but illustrating the method and apparatus of the invention for nest casting of concrete elements in the shape of "N" and "M", respectively.

Figures 23 and 24 are sectional views taken along lines 23—23 and 24—24, respectively, of Figure 1 and contain details of stiffening assemblies.

Figure 25 is a plan view showing the casting of an inclined assembly and for casting flat elements.

Figure 26 is a sectional view thereof taken along lines 26—26 of Figure 25.

Detailed Description of the Preferred Embodiments

Referring now to the drawings, there is shown apparatus 10 for casting a nest of panels of generally large concrete elements, concrete elements 12, 14, 16 having previously been cast and, as shown in Figure 1, a concrete element in the process of being formed. Nest casting of these concrete elements may proceed as shown from a cast concrete element 12 and the sequential process of casting proceeding on each side thereof and in which prior casts fold concrete elements such as concrete element 16 forming one side of a mold form or cavity 18 for casting a concrete element while a sequentially repositionable mold form 20 forms the other side of the mold form. Sequentially repositionable mold form 20 previously had formed concrete element 12, 14, 16 and may now form the other side of the mold form 18 for a further concrete element. Similarly, folded concrete element 12 which is shown as an L-shaped configuration, but may as well be an I, M, N, zigzag, flat, or other folded concrete elements, comprise a predetermined side of the cast folded concrete element 14 forming one side of the mold form therefor, with the mold form 22 forming another side of the mold form 14, it having formed the predetermined side of the folded concrete element 12. This is continued as will be described hereinbelow for forming the nest casting of generally large concrete elements, particularly the several concrete elements configured as I, L, M, N, or other flat or zigzag configurations. Form assembly 22 is initially used together with assembly 20 to mold a first concrete former. Subsequently, assembly 20 is relocated to mold a subsequent element, whereas assembly 22 remains in place or may be discarded.

The concrete element being cast or formed may also be identified herein as a sequentially casted folded concrete element formed by a last, prior or image forming element 16 having a surface generated by a sequentially repositionable or image forming surface mold form 20. These are comprised of a series of mold facings or sheet steel facings 30, behind which there may be provided cold rolled stiffeners 32 held in place and supported by stiffener beams or frames 34 as is particularly shown in Figures 3, 23 and 24. Secured behind these frame structures are further framing supports and structures 36 and are held

in place by stays 38 and stays 40 which may comprise a triangulate support frame or stays 42 and which may be connected by a hinged clevis 44. The structures of stays 42 may be of various constructions and design as particularly shown generally in Figure 2 and more specifically in Figures 12—15. Spacers 46, pivot receiving elements 48 and pin receiving elements 50, 52, 54, are exemplarily shown in Figures 16—18 for receiving shafts or pins 60 shown in Figure 12.

Also supported as part of the frame 34 is a retainer beam 62 having its swivel head 64 and a rotating jack screw 66, which provide support for end casting form structures 70 as shown in each end of the cavity 18.

A perforated stiffening beam 74 is supported from a foot attachment fitting as shown in Figure 3 and the entire assembly 20 is raised by a beam supported hydraulic ram 80 shown connected to hydraulic lines 84 in Figure 3. The hydraulic ram 80 is supported by a swivel wheel assembly 82.

The stays 38 support in horizontal relation any number of walking support surfaces or walking planking elements 86 which are cooperatively disposed with safety railings 88. The base floor or shoe fittings 54 are precisely held in stabilized position by an arrangement including a jack screw 90 coupled to a hinged hasp assembly 92, all of which may be raised temporarily from the anchored position shown in Figure 3 when the hydraulic ram 80 and swivel wheel assembly 82 is capable of removing or displacing the mold form outwardly to a new given or predetermined position. The hinged hasp assembly 92 is connected to an anchor assembly 94.

Jack screw spacer arrangements 100 are separately provided as shown in Figures 1 and 3, among other Figures, so that a top fixed relationship that corresponds with the fixed relationship of the anchor assembly 94 is similarly achieved as desired for maintaining precise dimensional relationships. Anchor details are shown in Figure 6 and when an anchor arrangement is not in use or needed, the assembly 94 is removed from fixed position 104 and a cover plate 106 is placed to hide or cover the opening left by the anchor assembly.

Modification of an end stop assembly is shown by end stop assembly 110 in Figure 11 having a similar type retainer beam 62 and a swivel head 64 with a rotating jack screw 66.

Where a top surface of a mold frame is designed to have a nonlevel resulting surface, an initial former 114 shown in Figure 10 is provided so that concrete is cast and poured therein by pumping, such as through a canvas chute (not shown), elephant trunk or the like, extended so that the pouring device is extended as deeply into the mold as possible to overcome splashing and clinging of concrete from removing the molding oil, wax or the like, as described below, which is applied to the initial or forming surfaces. The oil or wax performs its function and is not removed which would occur quite easily with splashing the damp structure of the poured concrete. While the concrete is increasing in depths during pouring within the mold form 18, external vibratory mechanisms or vibrators 120 are activated to insure compaction and early settling of the wet concrete so that an excellent surface finish is achieved, even though the fresh concrete is fairly thick. Thus a satisfactory concrete surface finish free of depressions is produced. Within the frame arrangement and stays 42 and interspersed at variously desired distances apart throughout a length of the form 20, there are a plurality of heater assemblies such as electric or gas operated heaters 140. Convection and radiated heat energy are applied against the metal forms, the heat being applied during molding and allowed to rise between the stiffeners, which may be directed along a controlled path by an insulating canvas 144, Figure 3, fastened to a rear and top arrangement of a mold facing section so that hot air is distributed and energy is transferred in the form of heat unto the metal form. Because of the nature of sequential molding to be performed by the mold structure 20, it is possible that the arrangement of heaters 140 and the canvas 144 are not removed during the repositioning of the form 20.

The system of the present invention is capable of being used to precast flat I-shaped panels and even relatively large floor slabs where they are erected in a vertical or generally vertical array. As has been referred to above, it is appreciated that the system of cement forms and uses of the present invention may be used to form the various constructions, shapes or sizes of I, L, M and N or zigzag configurations 212, 214, 216 illustratively shown in Figures 19, 20 and 21. Also, it is within the purview of the invention to provide that the assemblies may be positioned at a slight inclination from the vertical. This form of the invention is illustrated and described in connection with Figures 25 and 26. It is also appreciated that the elements need not be finished at a top at an exact level orientation of the mold facing and can therefore be screeded at a lower level whether horizontal or even slightly inclined. It is further seen that nested elements 12—16 are finished at the top by screeding flush with the tops of the preceding elements, such tops providing further a convenient area to stand or work from. An element can be cast on a base elevated from and supported upon a base floor 160 (Figure 3) and fitting in the casting cavity, so that such element, while matching the nest top may be of less height if desired than other elements of the same nest. New concrete against a freshly cast element tends to maintain to a higher or highest degree of both water and heat in the elements, thereby enhancing a proper curing without the use of special curing compounds or other conventional and routine methods of the prior art.

It should be noted that before the pouring and dispensing of the concrete mix into the forms, that the prior or image mold form is prepared throughout its surface by being treated with release oil applied by brush or spray. The casting

face of the element 16 is coated with form oil or wax, the floor area in front of the assembly being likewise treated with oil or wax. The materials which may be used for this purpose are demolding oil or soft wax and the like which is extended to such widths that it will be covered throughout by a bottom seal to form the assembly of the cast element when in place.

A few hard rubber or wooden blocks 180 are set on the floor against the assembly preventing it from being accidentally impaired by assembly 20 when being placed. The assembly of the mold form 20 may then be rolled into position in front of the set assembly and after removal of the safety blocks, if desired, the assembly is slowly pushed within millimeters of its final position. The arrangement is then connected to the anchor assembly 90, 94 and the form 20 is then lowered onto the base floor 160 whereby tightly compressing the bottom seal 182 as well as the seal under the end stop assembly. This assembly is then slowly moved into its final position by adjusting the jack screw spacer 90 while keeping a correct and proper distance between the assemblies by removable spacers at the bottom and with the jack screw spacers 100 along the top shown in Figure 3. The jack screws 102 and their corresponding bracket assemblies are installed on the fittings 38, 40 and are operated to pull the assemblies tightly against each other and squeezing any seals along the end stop assemblies 70. Stiffening assemblies associated with the connection are then tightened by actuating the jack screws 210 shown associated with the members 212, and ladders 200 shown in Figures 4 and 23 are installed. Spacer blocks at the bottom of the mold may then be removed and this completes the readiness of the mold cavity for receiving concrete for casting in the mold form 18.

Concrete used or poured for the initial former and as required in subsequent elements is of relatively high strength such that compaction by the vibrators insures full contact of the concrete with all surfaces of the forms resulting in the satisfactory concrete surface finish free of depressions. The concrete can be fed by skip from above through a hopper or by pumping. While the concrete continues to be poured, vibrators and heater elements are activated as necessary to insure perfect casting. When the concrete reaches near a top of the forms, screw jacks 102 remain firmly in place until stripping is being performed and spacers 100 may be removed and the top of the cast element is then screeded at a required or desired level. When the concrete has sufficiently set and hardened, the stiffening assemblies of connections are respectively slackened by actuating corresponding jack screws 210, and other with corresponding brackets being released, removed or rotated upwards on hingedly fittings 48, 50 and then the form assembly 20 is removed. This is referred to further in connection with Figures 22—26.

Jack screws 90 closest to being perpendicular to the mold are loosened enough that their hasp may be removed from the anchor assembly 90, 94 and these jack screws are then rotated above the clevis and brought to rest in their non-active position. Subsequently, the remaining jack screws 90, more or less set at 45° to the mold faces, are then activated so as to pull the form assembly, sliding it on the floor a few millimeters. Once the assembly is sufficiently freed from the concrete element, it is raised by depressing the wheel assemblies 82 while disengaging the last jack screws 90 from the anchor assemblies and folding them to non-active position. The form assembly is then rolled away, throughly cleaned and prepared or transformed for another and subsequent casting.

The operation of cleaning the surfaces and preparing for another casting may include firstly an inspection of the newly stripped prefabricated concrete element surface for possible defects such as cavities formed by entrapped air bubbles, slight honeycomb effects or any other defects which in the first instance should have been avoided. Such defects, if any, are carefully corrected with an application of cement grout finished by steel trowel or putty knives, following the hardening of which the concrete surface is throughly brushed or preferably vacuum cleaned and coated with a quick setting cement slurry applied preferably with a rubber squeegee to fill up all minute civities or seal the pores of the cast element surface. Then prior to the next and sequential step of molding, the surface is prepared by an oil or wax being applied thereupon. If the next element is to receive reinforcing steel, lifting lugs, blocking for lift hook cavity or to include prescribed contrivances such as electrical conduit, electrical boxes, templates, template mounted piping assemblies or the like to be be embedded therein, these are fitted into mold assembly 20 after the surfaces of such assembly, are properly oiled with the oil or wax treatment as is the base floor, earlier described and outlined above.

Building elements are cast such that the initial and starting building element is the largest element and sequentially the elements are progressively cast to smaller sizes as is consistent with established general production schedules. Once the nest becomes sufficiently heavy to withstand thrust of the concrete, the initial former is relocated on the base floor and set on a felt pad cut flush with the casting surface of the former, which is subsequently strutted at the reverse face by wooden blocks 190 which may be attached to the stiffening beam 74 being held by jack screws 90 anchored to the assemblies 94. In this manner, a new nest is started.

As nests are increasing at one end, the older or oldest elements at the other end, insofar as needed, are removed by whichever moving device is available and immediately set on trailers, for example, and then directly transported to their ultimate erection site. It is appreciated that in this process there is no storage handling at all, while the storage as well as curing occur at no

additional expense within the nest which in turn require the smallest possible grouping area for this comprehensive single production, curing, and stocking process.

In permanent or semi-permanent installations, the lifting devices are preferably movable by gantries on rails or the like. For less permanent installations including the fortuitous temporary utilization of floors of buildings at the project site, the lifting of building elements as well as relocating the initial former is done by mobile cranes.

Lifting may generally be required and is realized by means of spread beam with close perforations serving to engage upper hooks of lifting chains with lower hooks strung through the lifting lugs of the formed elements 12, 14, 16. The lifting lugs are cast in a vertical plane, passing through the center of gravity of the elements, members so cast that the latter may be lifted and most importantly be then set, in a perfectly vertical position. The distance between the lugs are so arranged and constructed between the perforations of the spread beam that the lifting chains also are nearly vertical during the lift while the main hook of the crane is on a vertical through the center of gravity of the total element. The removal of an element can be further aided at the moment of lifting by pushing or pulling such element sidewise using a lever pinned into the orifice of a cover plate 106, which orifice is in the first instance intended for removal of the cover from the collar 108.

The illustration of stiffening assemblies including stays 208 such as in Figures 23 and 24 are totally flexible and adjustable and allow for usage of additional jack screws 210. The stiffening assembly also carries the ladder 200. A longer ladder 202 is required for use in Figure 24.

The jack screws are generally of the same construction throughout where possible. They are composed of the jack bolt and a corresponding short initial body section having at one end a quick acting screw- and- lock nut combination and at the other end a standard threaded cavity for enabling the jack body to be lengthened by one or more extension sections likewise provided with a standard threaded cavity and at the other end a threaded pin fitting the standard cavity. The combination allows the initial jack body and the extension bodies to be coupled to each other as well as to the hinged clevis 44 by a tailend 220, as shown in Figure 5 or any similar fittings. The jack bodies are also perforated in order to be keyed to fitting 221 or bracket 222, or the swivel head 64, or the like.

It is further appreciated that the system of the method and apparatus of the invention and new form of casting is also used to precast flat "I" panels even for relatively large floor slabs. As a way of example, form assemblies 240, 250 are positioned at a slight inclination 'x' from the vertical, see Figures 25 and 26. The mold facing assemblies are set on a face spreader 254 while the screws 256 are adjusted to fully bear the form assemblies and anchorage to the base floor is realized in the manner described above. A matching form assembly composed of a number of assemblies 240 fastened to each other by clamps 258 (Fig. 22) and attached to the earlier positional assemblies to cast the buttress initial former 260 which in turn is used to precast other building elements 262 and so on, each stably leaning on the other.

Claims

1. Method of sequentially casting a series of correspondingly shaped concrete panels (12, 14, 16) on a common supporting surface, comprising the casting of a first concrete panel and supporting said first panel in substantially vertical position on said supporting surface, followed by the steps of forming a mold cavity (18) adjacent one side of said first panel by positioning a mold form (20) with its main panel forming surface (30) in spaced relation to said first panel and closing the ends of the mold cavity between the side edges of the mold form and said first panel by end surface forming means (70), then filling the mold cavity (18) with hardenable concrete, permitting it to set, removing said mold form (20) and repositioning it in spaced relationship to the thus completed second concrete panel and repeating the above-mentioned steps to sequentially form a nest of further concrete panels together with said first and second panels by using the same mold form (20), characterized in that the said steps of repositioning the form (20) include the step of horizontally moving said form including the end surface forming means (70), which constitute part of said form and are mounted thereon, on supporting wheels (82) and vertically moving it by hydraulic rams (80), rolling the movable form (20) into position when being elevated in its vertical position by the rams (80) and then lowering it onto the supporting surface and the step of adjusting horizontally the end surface forming means (70) relatively to the remainder of the mold form.

2. Method according to claim 1, characterized in that the said steps of repositioning the movable form (20) include moving said form with its main panel forming surface (30) into final spaced relation to said first panel by actuating lower jack screw arrangements (90) respectively extending between the supporting surface and the mold form outside the mold cavity (18) and by upper jack screw arrangements (102) extending across the mold cavity from the first concrete panel and being connected thereto and — if necessary — moving the end surface forming means (70) by actuating jack screw arrangements (66) extending near the edges of the mold form.

3. Method according to claim 1 and 2, characterized by the forming of upstanding panels of generally angular shape in horizontal cross-section.

4. Method according to claim 1, 2 and 3, characterized by the step of reinforcing the movable mold with triangulate reinforming arrangements (42) attached to the exterior of said movable mold form (20).

Revendications

1. Méthode de coulage séquentiel d'une série de panneaux en béton (12, 14, 16) de formes correspondantes sur une surface de support commune, comprenant le coulage d'un premier panneau en béton et supportant le premier panneau dans une position sensiblement verticale sur la surface de support, suivi des étapes de formage d'une cavité de moule (18) adjacente à un côté du premier panneau en positionnant un coffrage de moule (20) dont le panneau principal forme une surface (30) espacée du premier panneau et fermant les extrémités de la cavité du moule entre les côtés du coffrage de moule et le premier panneau par des moyens formant une surface d'extrémité (70), puis le remplissage de la cavité de moule (18) avec du béton durcissable, en lui permettant de prendre, l'enlèvement du coffrage de moule (20) et le repositionnement de celui-ci avec un espacement par rapport au second panneau en béton ainsi réalisé et la répétition des étapes ci-dessus pour former séquentiellement une série d'autres panneaux en béton avec les premier et second panneau en utilisant le même coffrage de moule (20), caractérisée en ce que lesdites étapes de repositionnement du coffrage (20) comprennent l'étape de déplacement horizontal du coffrage comprenant les moyens formant une surface d'extrémité (70), qui constituent une partie du coffrage et y sont montés dessus, sur des roulettes de support (82), et son déplacement vertical par des vérins hydrauliques (80), la mise en place du coffrage mobile (20) en le faisant rouler lorsqu'il est soulevé en position verticale, et ensuite sa descente sur la surface de support et l'étape de reglage horizontal des moyens formant une surface d'extrémité (70) par rapport au reste du coffrage de moule.

2. Méthode suivant revendication 1, caractérisée en ce que les étapes de repositionnement du coffrage mobile (20) comprennent le déplacement du coffrage dont le panneau principal forme une surface (30) avec un espacement final par rapport au premier panneau en se servant des systèmes de vis vérins inférieures (90) disposées respectivement entre la surface de support et le coffrage de moule hors de la cavité du moule (18) et par les systèmes de vis vérins supérieures (102) disposées en travers de la cavité de moule à partir du premier panneau en béton et reliées à celui-ci et — si nécessaire — le déplacement des moyens formant une surface d'extrémité (70) en se servant des systèmes de vis vérins (66) disposées près des bords du coffrage demoule.

3. Méthode suivant revendications 1 et 2, caractérisée par la formation de panneaux droits de forme généralement angulaire en coupe transversale horizontale.

4. Méthode suivant revendications 1, 2 et 3, caractérisée par l'étape de renforcement du moule mobile par des dispositifs de renforcement triangulaires (42) fixés sur l'extérieur du coffrage mobile (20).

Patentansprüche

1. Verfahren zum aufeinanderfolgenden Gießen entsprechend geformter Betonplatten (12, 14, 16) auf einer gemeinsamen Unterstützungsfläche, bei dem das Gießen einer ersten Betonplatte und das Halten der ersten Platte in einer im wesentlichen senkrechten Position auf der Unterstützungsfläche erfolgt, wonach die Schritte des Bildens eines Formhohlraums (18) neben einer Seite der ersten Platte durch Positionieren einer Gußform (20) mit ihrer Hauptplattenformungsfläche (30) in einem Abstand zur ersten Platte und das Schließen der Enden des Formhohlraums zwischen den Seitenrändern der Gußform und der ersten Platte durch Randflächenformungseinrichtungen (70) durchgeführt werden, und schließlich der Formhohlraum (18) mit aushärtbarem Beton gefüllt wird und ihm erlaubt wird, sich zu setzen, wonach die Gußform (20) weggenommen und in einem Abstand zu der so gebildeten zweiten Platte erneut positioniert wird, und bei dem die oben erwähnten Schritte wiederholt werden, um aufeinanderfolgend einen Satz weiterer Betonplatten zusammen mit den ersten und zweiten Platten zu bilden, indem die gleiche Gußform (20) verwendet wird, dadurch gekennzeichnet, daß die Schritte des erneuten Positionierens der Form (20) den Schritt des horizontalen Bewegens der Form einschließlich der Randflächenformungseinrichtungen (70) enthalten, die einen Teil der Form bilden und an ihr auf Stützrädern (82) befestigt sind, und daß die Form vertikal durch hydraulische Kolbenstangen (80) bewegt wird, daß die bewegbar Form (20) in Position gerollt wird, während sie durch die Kolbenstangen (80) in ihrer vertikalen Position angehoben ist, und daß sie danach auf die Unterstützungsfläche abgesetzt wird und daß als Verfahrensschritt vorgesehen ist, die Randflächenformungseinrichtungen (70) horizontal in Bezug auf den Rest der Gußform zu justieren.

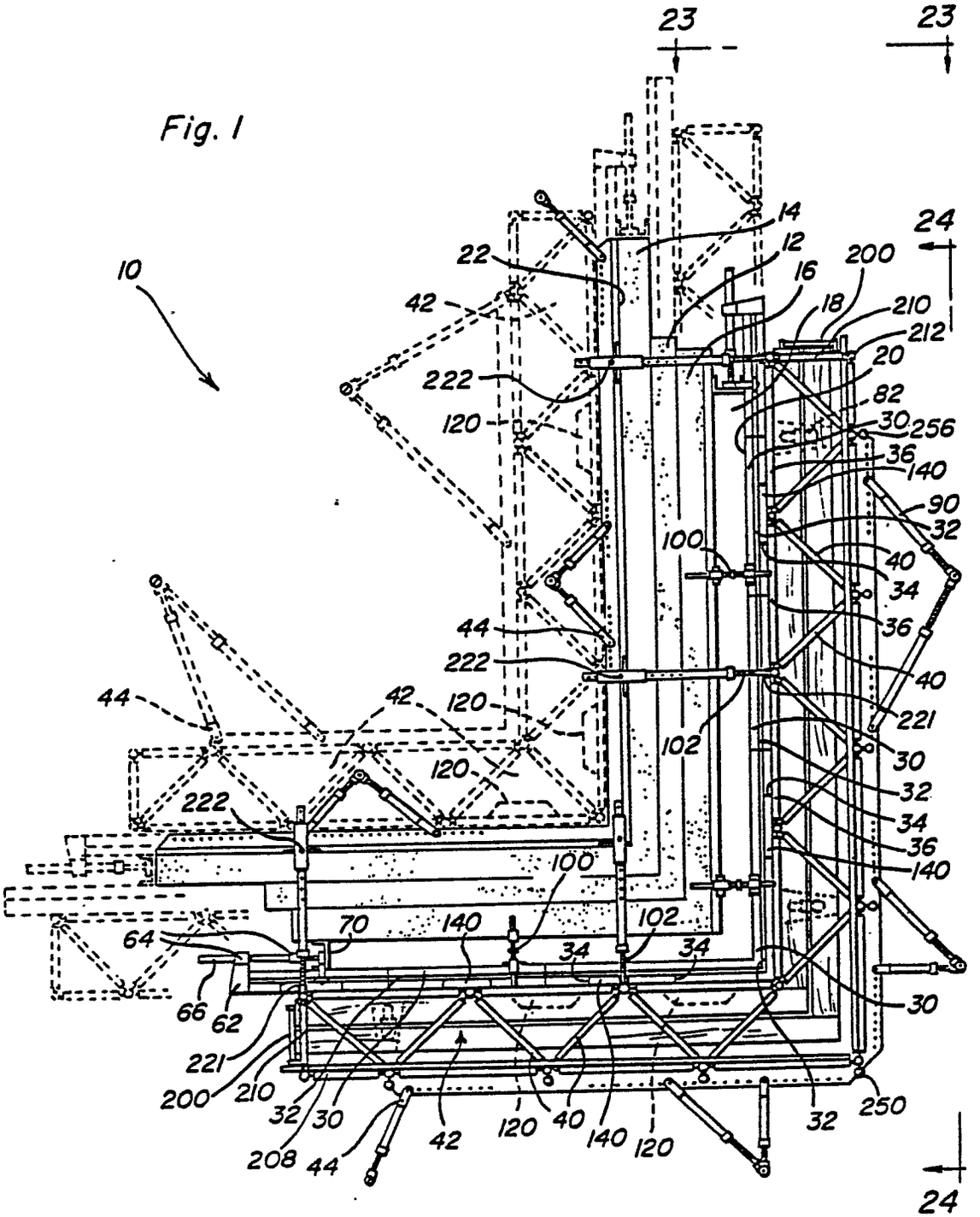
2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß die Schritte des erneuten Positionierens der bewegbaren Form (20) einen Schritt umfassen, bei dem das Bewegen der Form mit ihrer Hauptplattenformungsfläche (30) in die endgültige Abstandslage zur ersten Platte durch Betätigen unterer Schraubspindelanordnungen (90), die sich jeweils zwischen der Unterstützungsfläche und der Gußform außerhalb dem Formhohlraum erstrecken, und oberen Schraubspindelanordnungen (102) erfolgt, die sich ausgehend von der ersten Betonplatte, an der sie befestigt sind, über den Formhohlraum erstrekken, und daß — falls nötig — die Randflächenformungseinrichtungen (70) durch Betätigen von Schraubspindelanordnungen (66) bewegt werden, die sich in der Nähe der Ränder der Gußform erstrecken.

3. Verfahren nach Anspruch 1 und 2, gekennzeichnet durch das Formen aufrechtstehender Platten mit im horizontalen Querschnitt allgemeiner winkliger Form.

4. Verfahren nach Anspruch 1, 2 und 3, gekenn-

zeichnet durch den Schritt des Verstärkens der bewegbaren Form mit aus Dreiecken zusammengesetzten Verstärkungsanordnungen (42), die außen an der bewegbaren Form (20) befestigt sind.

Fig. 1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250

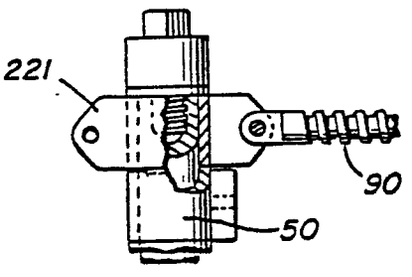
221
90
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Fig.9

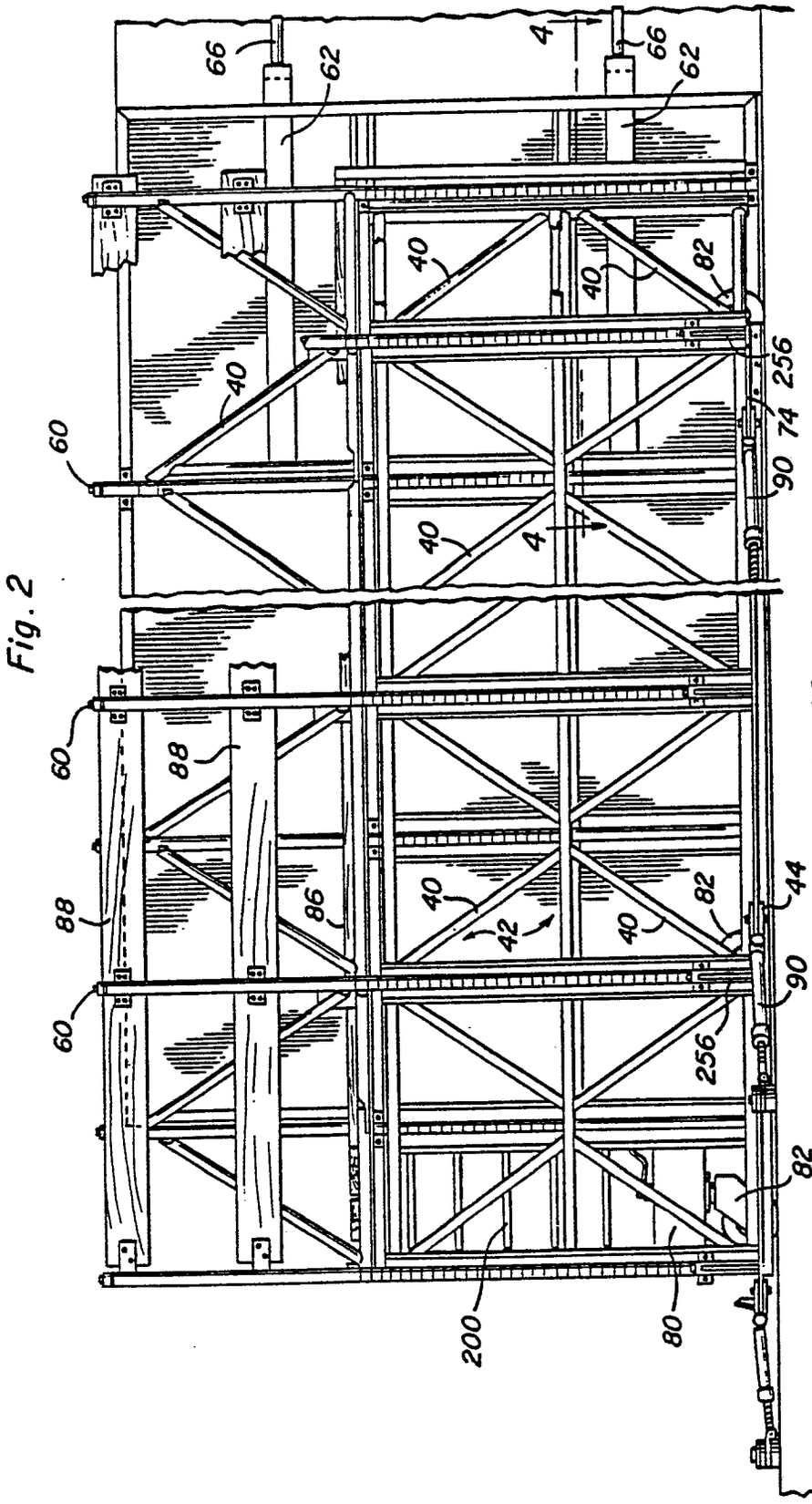

Fig. 2

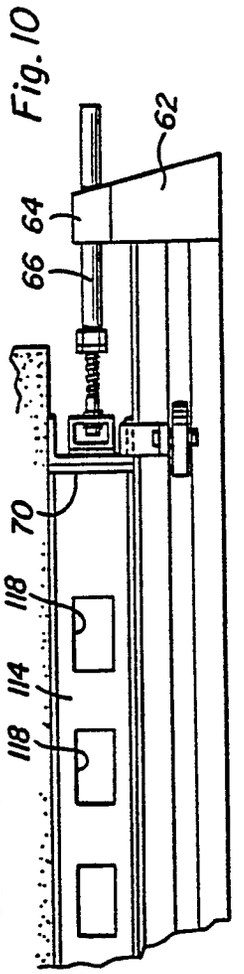

Fig. 10

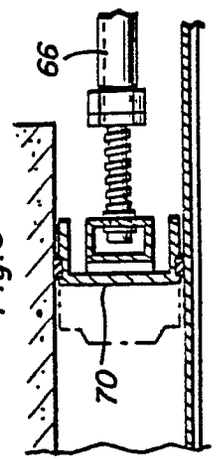

Fig. 8

Fig. 3

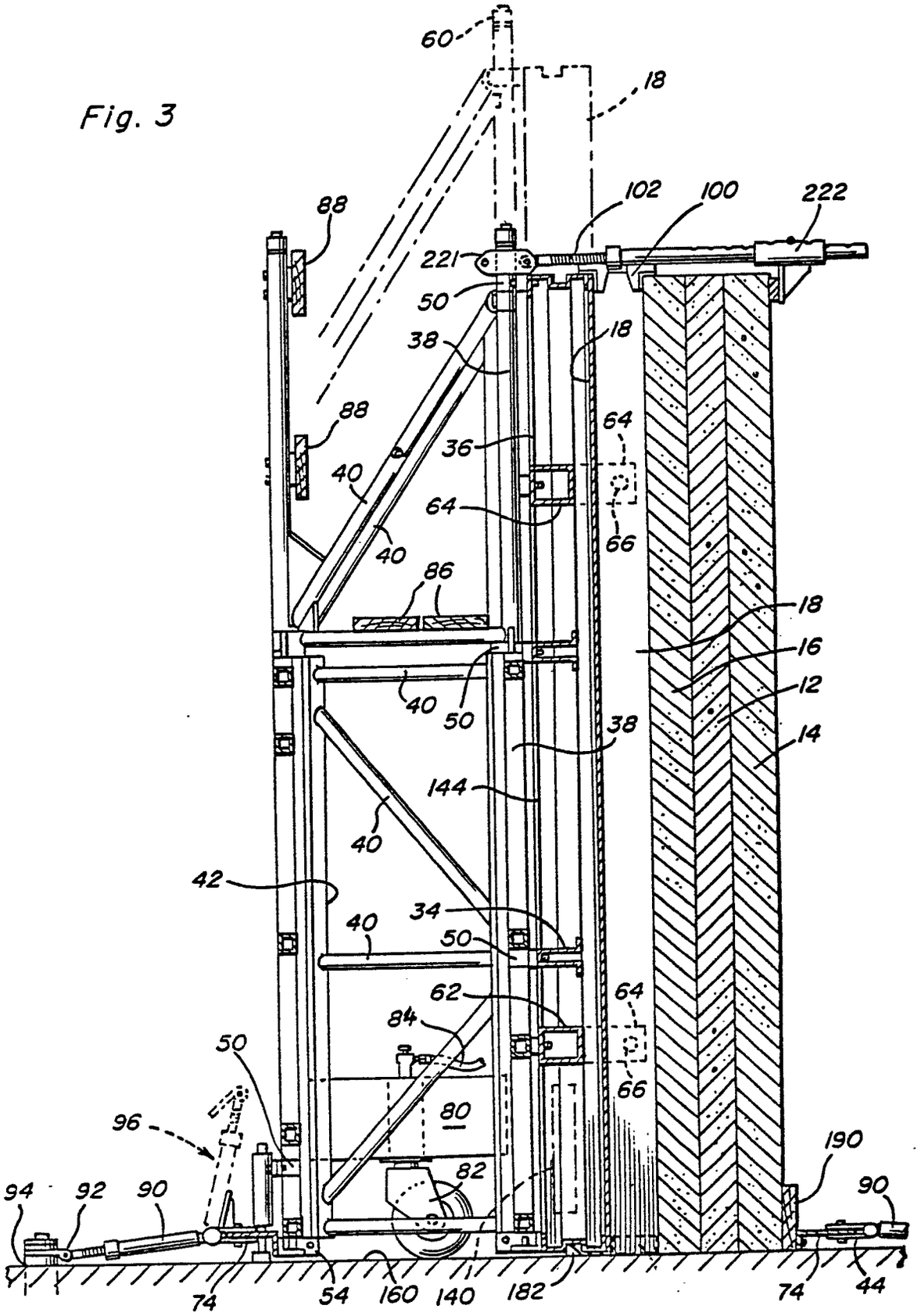
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Fig. 4

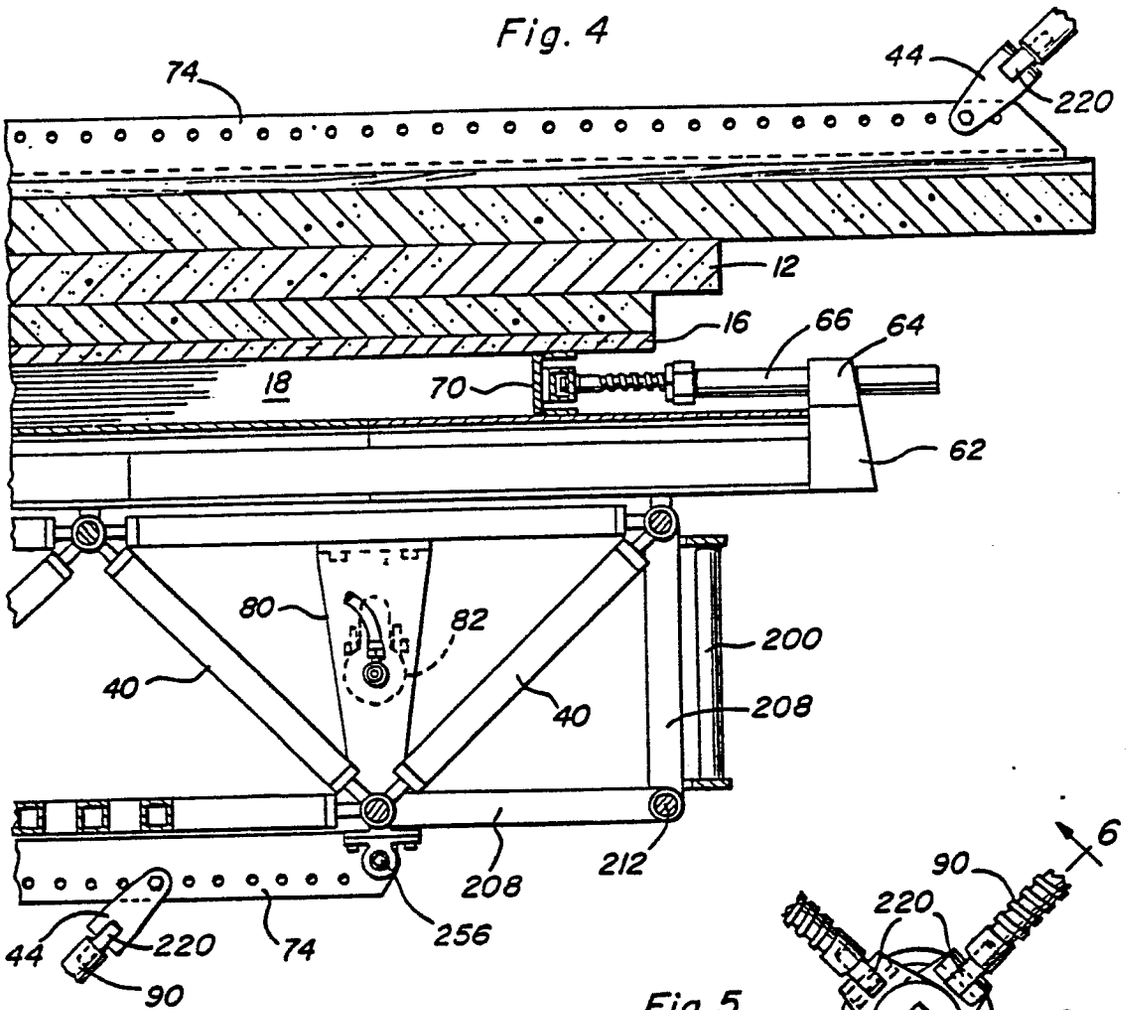

Fig. 5

Fig. 6

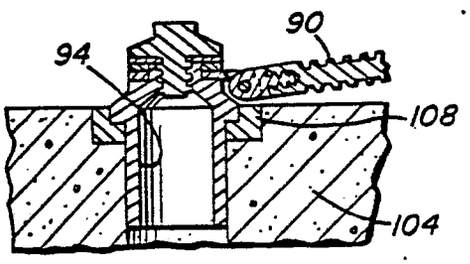

Fig. 7

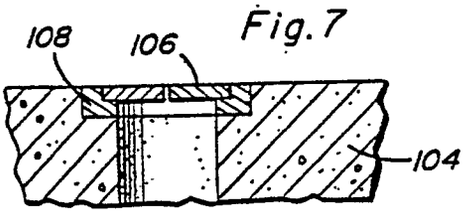

Fig. 11

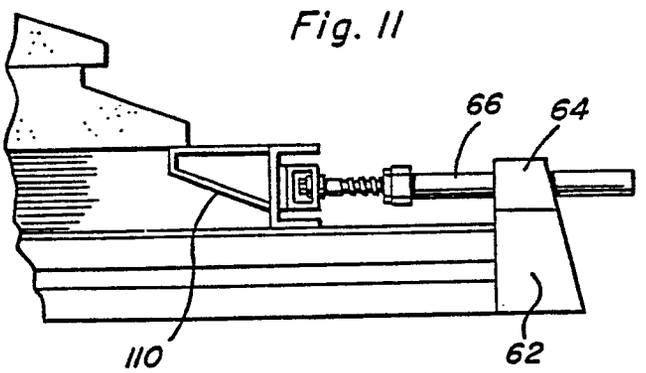

Fig. 12

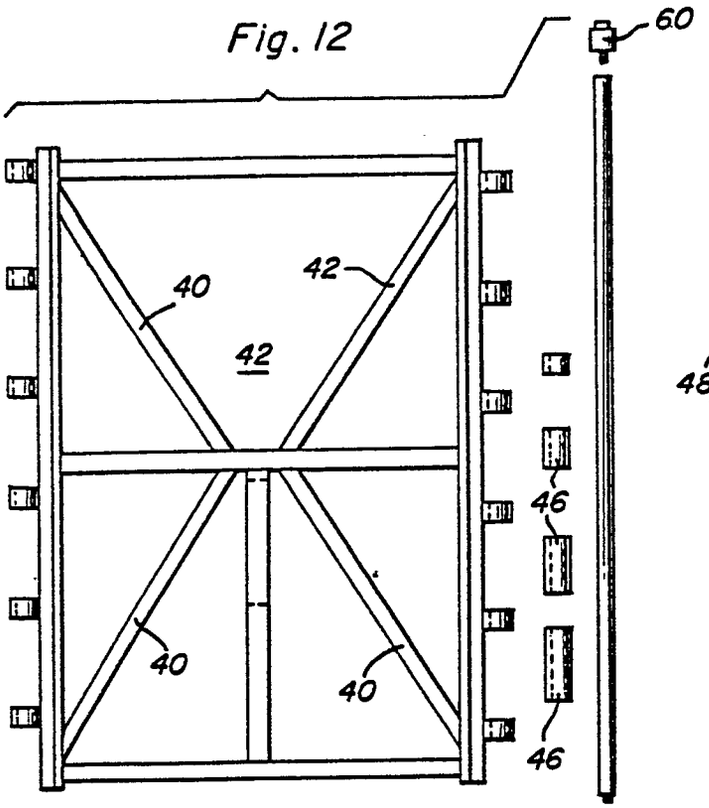

Fig. 13

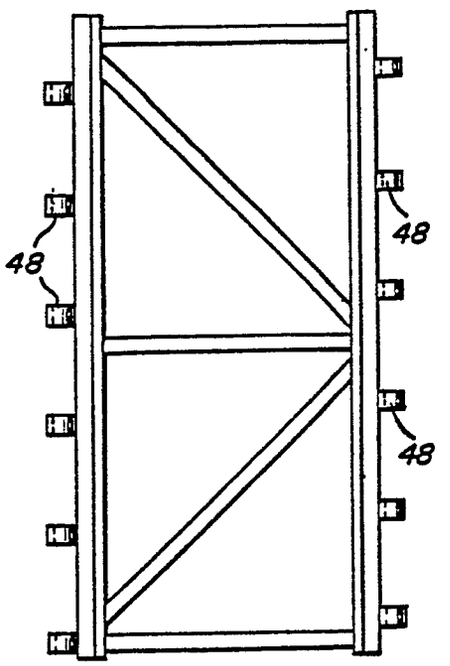

Fig. 14

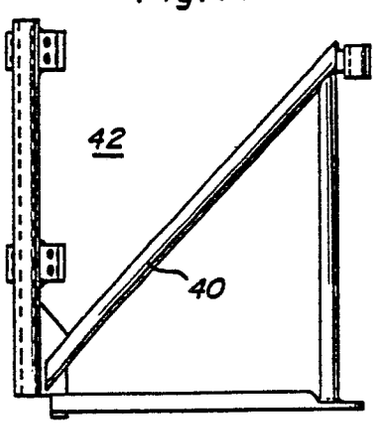

Fig. 15

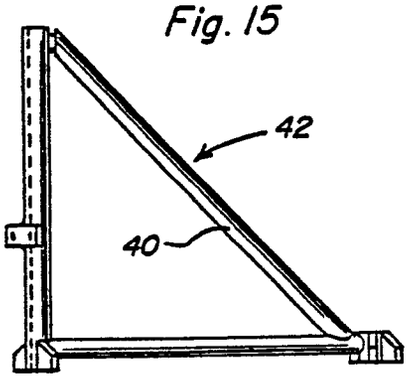

Fig. 16

Fig. 17

Fig. 18

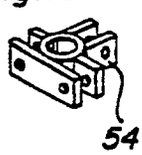

Fig. 19

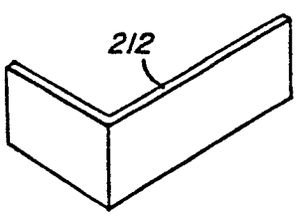

Fig. 20

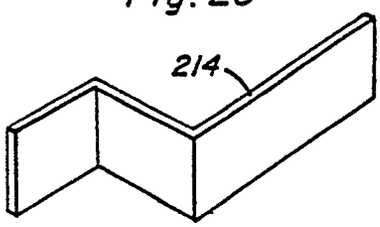

Fig. 21

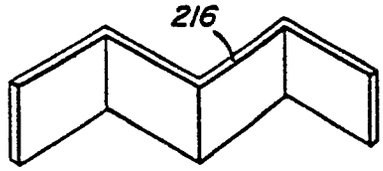

Fig. 22

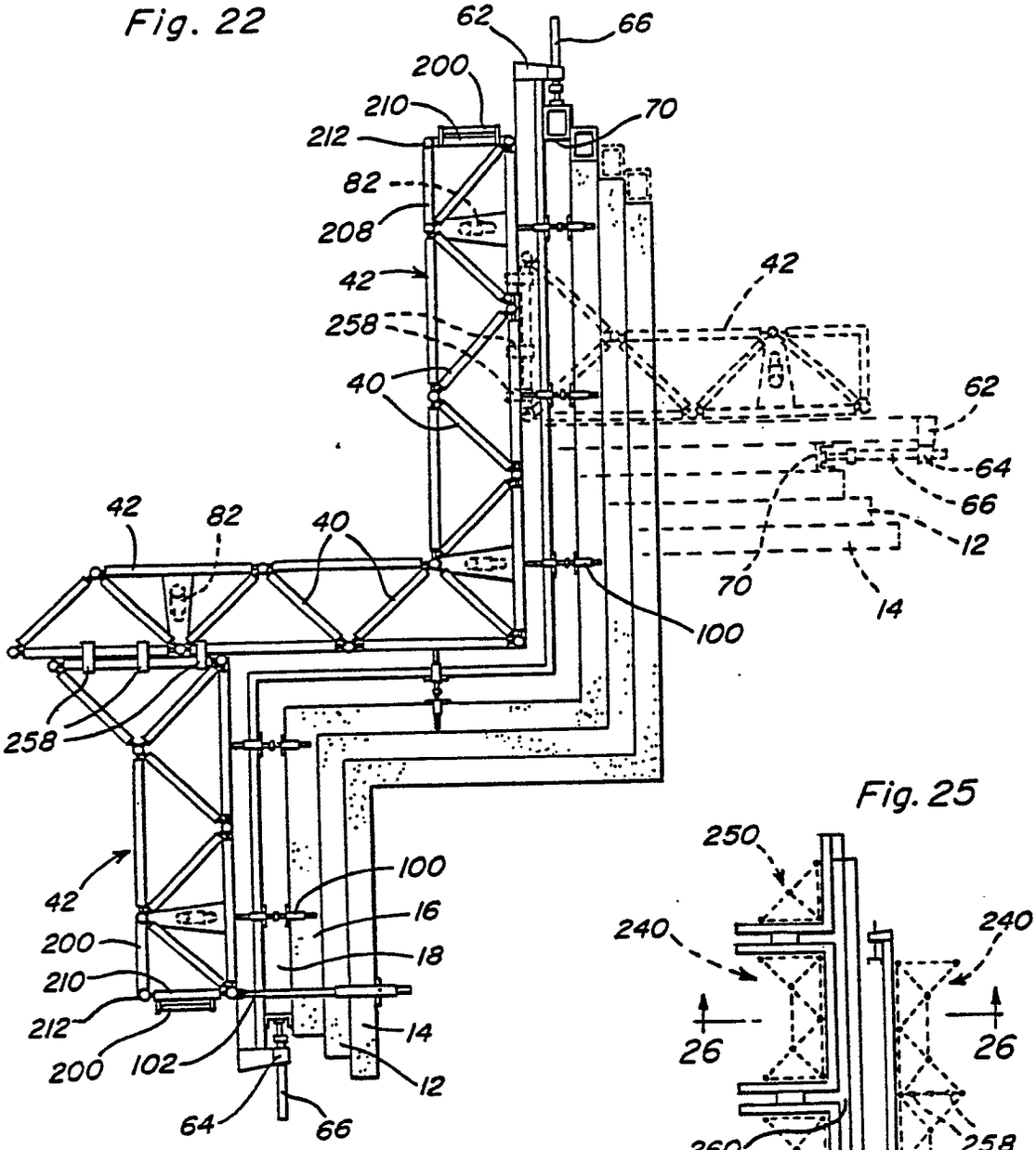
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Fig. 25

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Fig. 26

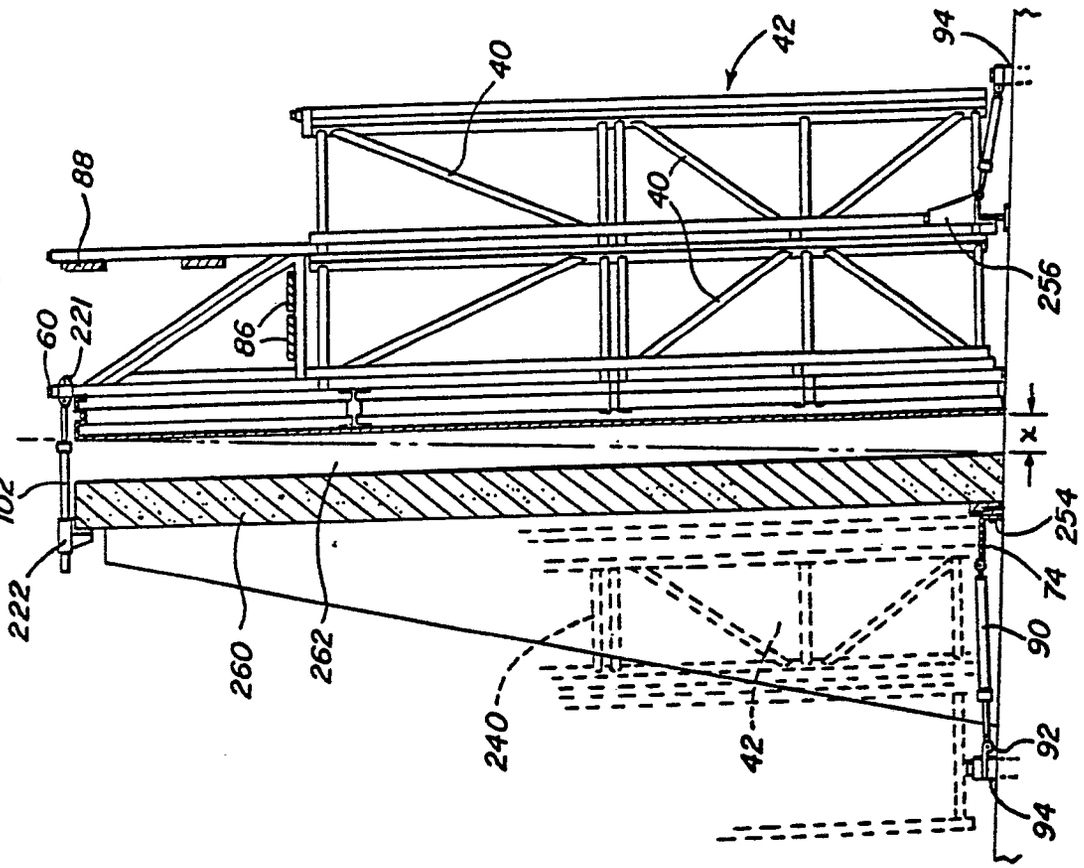

Fig. 24

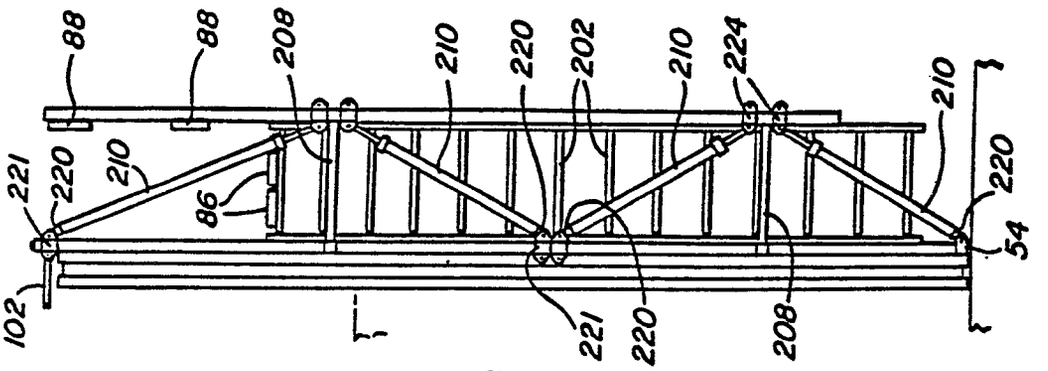

Fig. 23