April 22, 1969 A. HAIDER 3,439,894

KNOCKDOWN FORMWORK FOR WALL OPENINGS

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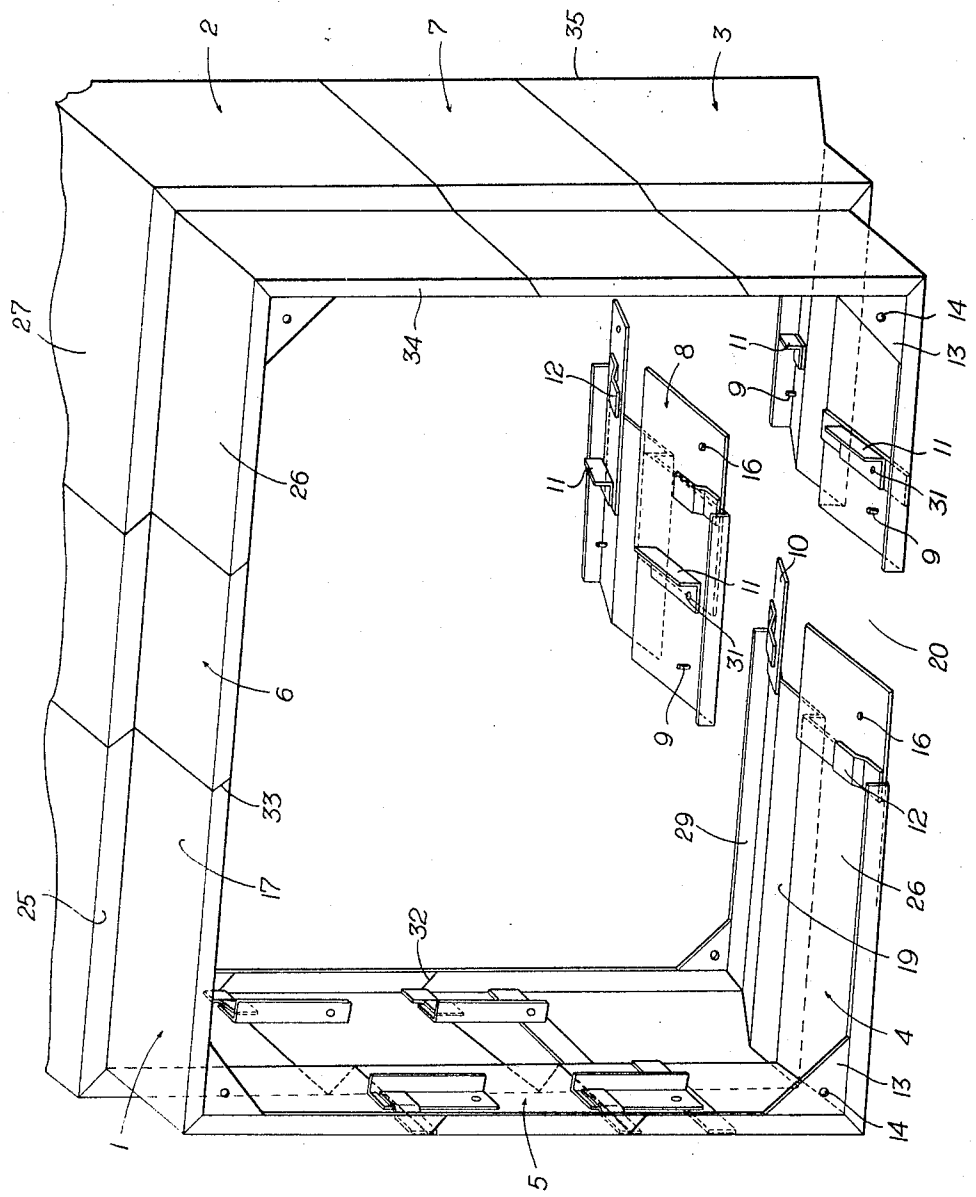


FIG. 1

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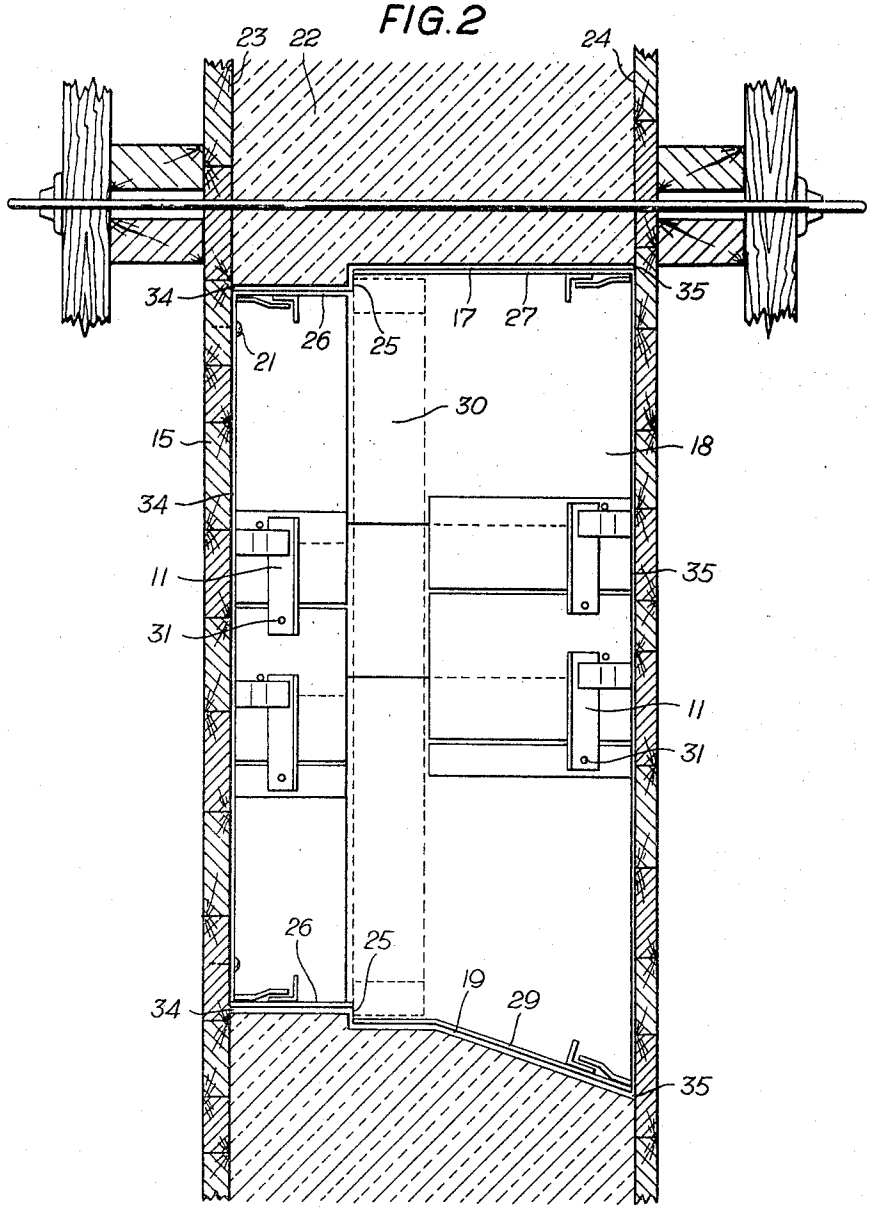
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FIG. 2



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KNOCKDOWN FORMWORK FOR WALL OPENINGS

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ABSTRACT OF THE DISCLOSURE

A formwork for openings in a wall in which corner components are joined by connected components having end faces oblique to the periphery of the formwork. The components are joined by lapping plates held in place by friction latches.

When houses are being constructed, openings are left in the walls for the reception of windows. Suitable wooden boards have previously been used as formwork for the wall openings. Such boards can be used only for a limited period of time because they can easily be damaged when the formwork is stripped (e.g., removed from the concrete structure).

It is already known to use a frame made from prefabricated parts, which frame surrounds the wall opening in a part of the wall thickness and which remains in the wall, and to detachably secure formwork boards to this frame, which surround the wall opening in the remainder of the thickness of the wall and which are removed when the resulting formwork has been filled with wall material and the latter has set. The frame may comprise angle members placed in the corners of the wall opening, and straight bars disposed between said angle members. This formwork has the disadvantage that the frame remains in the wall and cannot be reused.

Other formwork, particularly for lintels or headers for doors and windows, is known which comprises two sheet metal troughs, which are longitudinally adjustable relative to each other and can be fixed in position. This formwork carries bars, which can be pushed out and are spaced from the extreme end of the trough and serve for supporting the entire formwork on the masonry which surrounds the opening. It is complicated to set such formwork in its correct position and subsequently to remove it from the wall opening.

For concrete windows, formwork is known which has components that are moved to their operative position by means of a complicated lever mechanism and serve only as formwork for concrete windows.

It is an object of the invention to provide a knock-down formwork for wall openings, which formwork consists of parts which are detachable toward the interior of the opening to strip the formwork. This is accomplished in that the components of the formwork have in cross section a step (across the plane of the assembly), which results in the formation of an abutment for the frame lining the opening; at least one of the components of the formwork has two end faces which engage the remaining components of the formwork and which are oblique with respect to the longitudinal surface of the wall opening, and the peripheries of the formwork are parallel or larger on the inside of the wall than on the outside thereof. This design facilitates the assembling of the formwork and its removal after use. It is preferable to use selectively insertable connecting bars, which enable an adjustment of the size of the formwork to the desired size of the wall opening.

The invention relates also to details of the formwork.

Compared to the known types of formwork, the formwork according to the invention has the advantage that it

can be reused practically indefinitely, can be designed for a very wide range of profiles, can easily be stripped, and can easily be adjusted to different sizes of windows by the aid of connecting bars.

An embodiment of the formwork according to the invention for a window opening will now be explained by way of example with reference to the accompanying drawing, in which

FIG. 1 is a perspective view showing a formwork with connecting bars and

FIG. 2 is a vertical sectional view taken through the formwork in position for use.

The formwork shown in FIG. 1 comprises four corner pieces **1**, **2**, **3** and **4** and four connecting bars **5**, **6**, **7** and **8**. Of the latter, three bars **5**, **6**, **7** are shown in inserted position whereas the fourth bar **8** is shown in a detached position (FIG. 1).

The connecting bars **5**, **6** and **7** abut the corner pieces of the formwork. At **20**, where the connecting bar **8** is to be inserted, one of the two components to be joined is provided with sheet metal lap elements **10** and the other with retaining pins **9**, which are received by bores **16** of these lap elements **10** for an additional initial fixation of the formwork components **3**, **4** and **8**.

The corner piece **3** carries near its end adjacent to the connecting bar **8** a pin **31**, on which a friction latch **11** is pivotally mounted. The connecting bar **8** is provided near its end adjacent to the corner piece **3** with a keeper lug **12**, which is spaced from the adjacent face of the connecting bar **8**. In the assembled formwork, the latch **31** is frictionally held between the lug **12** and the adjacent face of the bar **8**.

The joints between components **4**, **5**, **1**, **6**, **2**, **7** and **3** are at an angle of approximately 45° to the periphery so that the corner piece **1** can easily be removed inwardly during stripping. The joints between parts **4**, **8** and **3** are at right angles to the periphery.

It will be understood that the joints between components **4**, **5**, **1**, **6**, **2**, **7** and **3** need not extend at an angle of exactly 45°. It is essential, however, that one of the components of the formwork, e.g., the corner piece **1** in FIG. 1, has opposite end faces **32** and **33**, which engage adjacent components of said formwork; one of said opposite end faces extends from the outside periphery of the formwork to the inside periphery of the formwork in a direction which is at an oblique angle to the direction of the outside periphery of the formwork adjacent to said one end face; and the other of said opposite end faces extends from the outside periphery of said formwork to the inside periphery of said formwork in a direction which is nonconvergent, i.e., parallel or divergent, to said direction of the first-mentioned one of said end faces. Besides, each component of the formwork has inwardly and outwardly facing edge faces **34** and **35** and the length of the outwardly facing edge face **35** of each component is, e.g., in the case of the connecting bars **5**, **6**, **7**, **8**, as large as or, e.g., in the case of the corner pieces **1**, **2**, **3**, **4** larger than the length of the inwardly facing edge face **34** of the same component.

Stiffening angles **13** are provided in the corners and have a nail hole **14** so that nails **21** inserted through these nail holes can be driven to secure the formwork to the formwork wall **15** adjoining the outside surface **23** of the wall **22**. The inside surface of the wall **22** has the reference numeral **24**.

As is apparent from the drawings, the top **17** and the two sides **18** of the formwork extend in their transverse direction at right angles to the plane of the wall whereas the bottom **19** extends in its transverse dimension at an oblique angle to the plane of the wall to facilitate stripping. To strip the formwork, the friction latches **11** are turned about their pins **31** so that the

connecting bars **8** can easily be removed. The top **17** and the two sides **18** of the formwork have a step **25** between an outer portion **26** and an inner portion **27**. The bottom **19** is also provided with such a step **25** between outer portion **26** and an inner portion **29**. The step **25** results in the formation of an abutment for the window frame **30**, which is indicated in broken lines in FIG. 2, and prevents an angular misalignment of this frame relative to the wall **22**.

The formwork is preferably made from a material which has a small adhesion to concrete, e.g., of sheet metal or plastics material.

What is claimed is:

1. A knockdown formwork for wall openings, comprising a plurality of detachably connected components, at least one of said components having opposite end faces which engage adjacent components of said formwork, one of said opposite end faces extending from the outside periphery of said formwork to the inside periphery of said formwork in a direction which is at an oblique angle to the direction of the outside periphery of said formwork adjacent to said one end face, the other of said opposite end faces extending from the outside periphery of said formwork to the inside periphery of said formwork in a direction which is nonconvergent to said direction of said one end face, each of said components of said formwork having inwardly and outwardly facing edge faces, the length of the outwardly facing edge face of each component being at least as large as the length of the inwardly facing edge face of the same component, said components being formed on their outside peripheral surface with a step which faces generally in the same direction as said outwardly facing edge face, said components comprising corner pieces and connecting pieces between said corner pieces.

2. A formwork as defined in claim **1** wherein both said end faces of said one component are parallel.

3. A formwork as defined in claim **1** wherein said directions of said two end faces are divergent.

4. A formwork as defined in claim **1** wherein said direction of said other end face is at an oblique angle to the direction of the outside periphery of said formwork adjacent to said other end face.

5. A formwork as defined in claim **1** wherein at least one of said components is provided at one end with a lap portion formed with a bore and another of said components is disposed adjacent to said lap portion and provided with a retaining pin inserted in said bore.

6. A formwork as defined in claim **1** wherein one of two adjacent components is provided near its end with a keeper lug spaced from the adjacent face of said one component and the other of said two adjacent components is provided with a pivoted friction latch frictionally held between said lug and said adjacent face of said one component.

7. A knockdown formwork for wall openings, comprising a plurality of detachably connected components, at least one of said components having opposite end faces which engage adjacent components of said formwork, one of said opposite end faces extending from the outside periphery of said formwork to the inside periphery of said formwork in a direction which is at an oblique angle to the direction of the outside periphery of said formwork adjacent to said one end face, the other of said opposite end faces extending from the outside periphery of said formwork to the inside periphery of said formwork in a direction which is nonconvergent to said direction of said one end face, each of said components of said formwork having inwardly and outwardly facing edge faces, the length of the outwardly facing edge face of each component being at least as large as the length of the inwardly facing edge face of the same component, said components being formed on their outside peripheral surface with a step which faces generally in the same direction as said outwardly facing edge face, and connecting means securing said components detachably together, said connecting means including a lapping plate carried by one of said components and overlying another of said components, a pin on said other of said components engaged in said plate, and a friction latch swingably parallel to said plate is retaining same in interconnecting relationship between the components.

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