R. BOWEN.

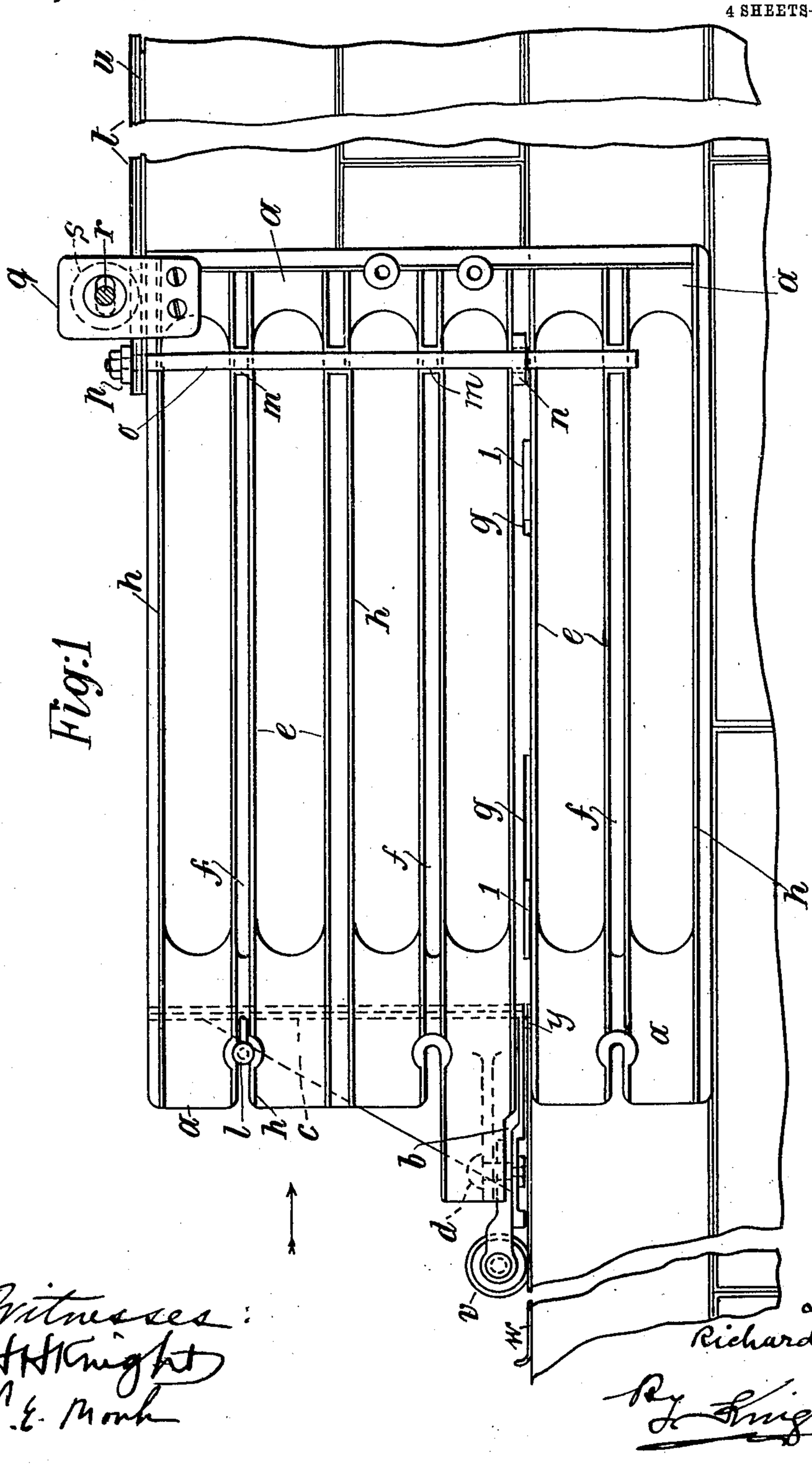
APPARATUS TO BE EMPLOYED IN BUILDING WALLS OF CONCRETE.

APPLICATION FILED MAR. 30, 1908.

919,687. Patented Apr. 27, 1909.

4 SHEETS—SHEET 1.

Fig:1



Witnesses:
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L. E. Monk

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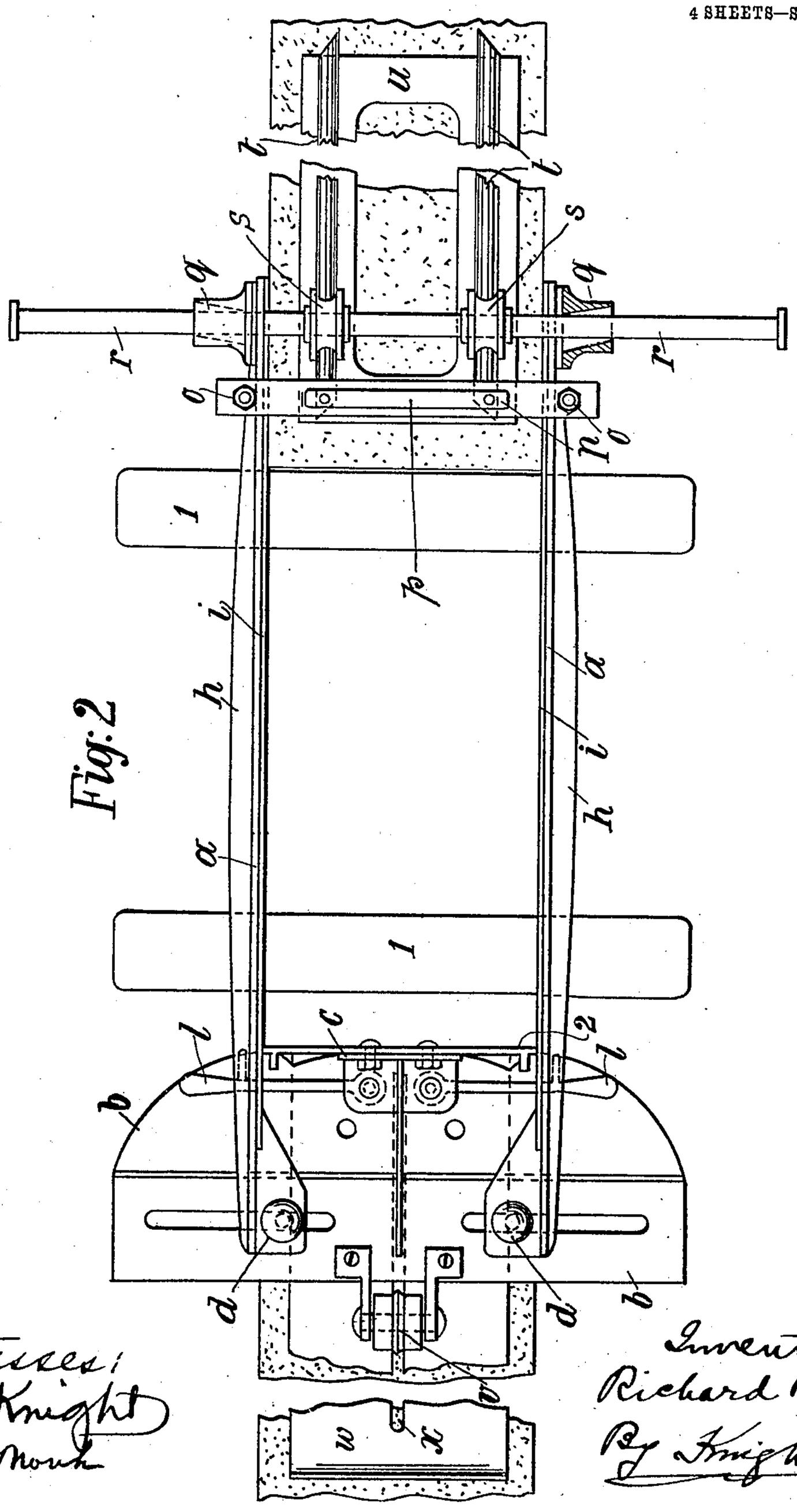
4 SHEETS—SHEET 2.

Fig. 2



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4 SHEETS—SHEET 3.

Fig: 3

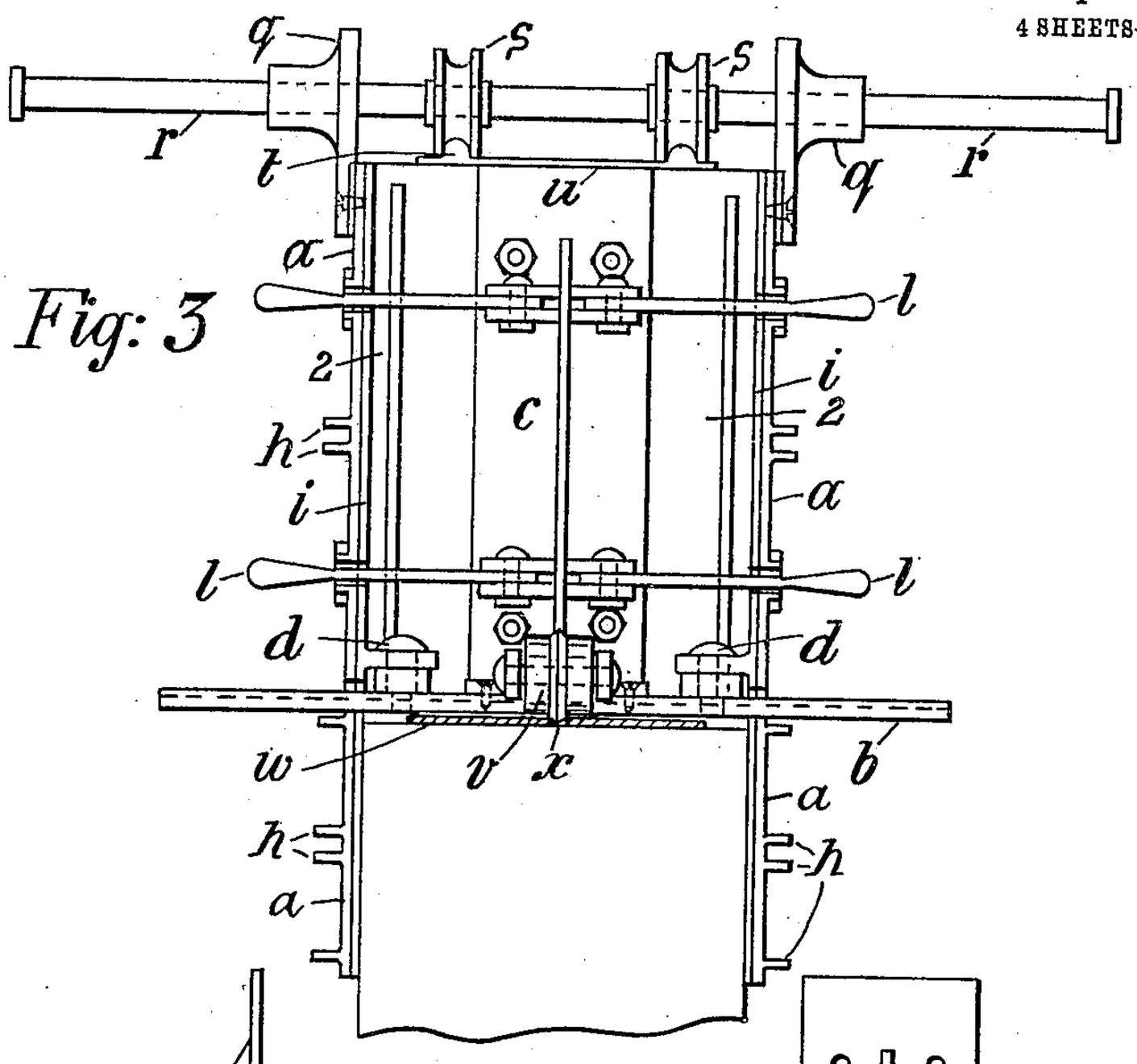

Fig:4

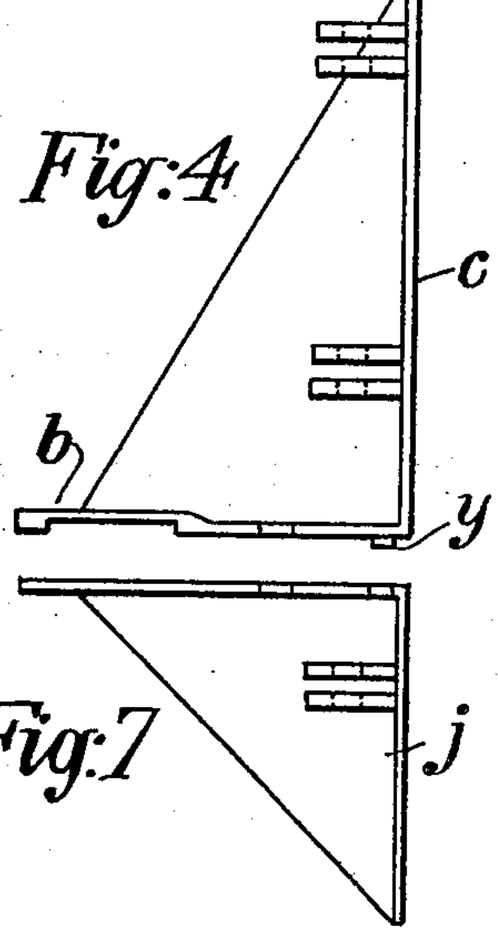

Fig:7

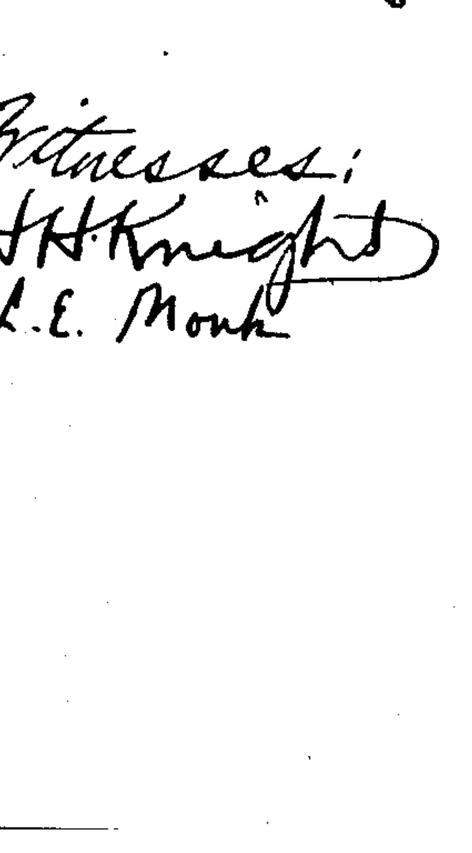

Fig:5

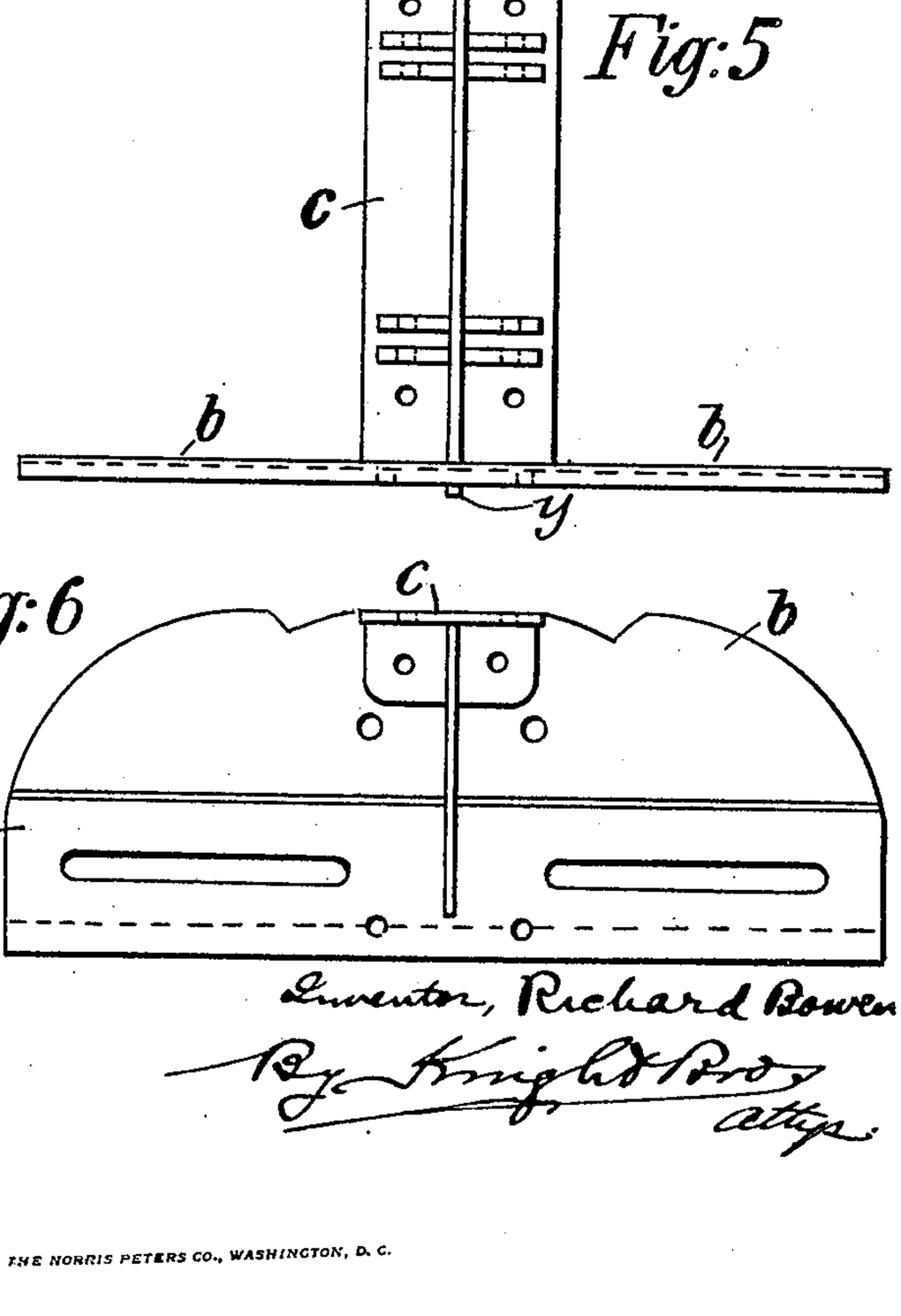

Fig:6

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4 SHEETS—SHEET 4.

Fig: 8

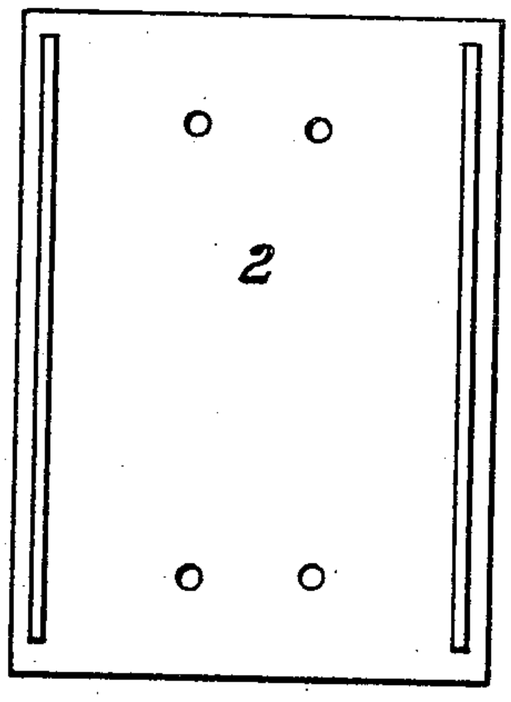
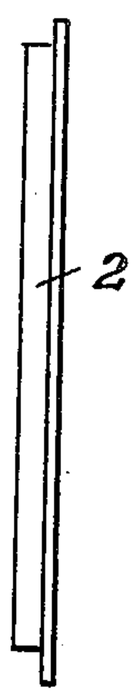


Fig: 9



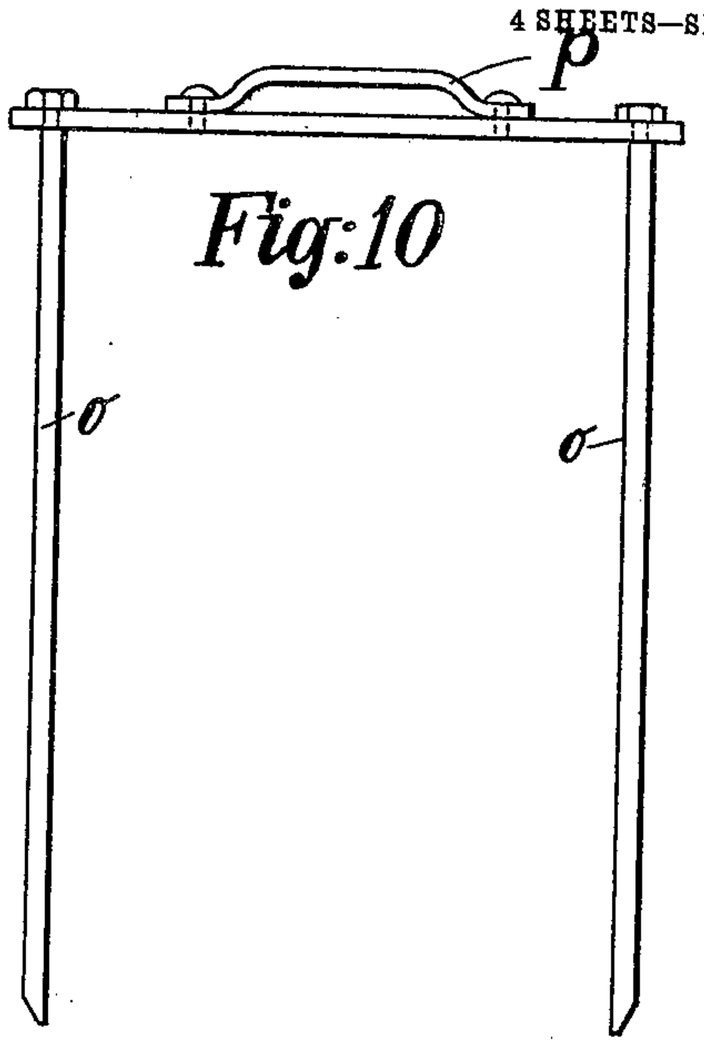


Fig: 10

Fig: 14

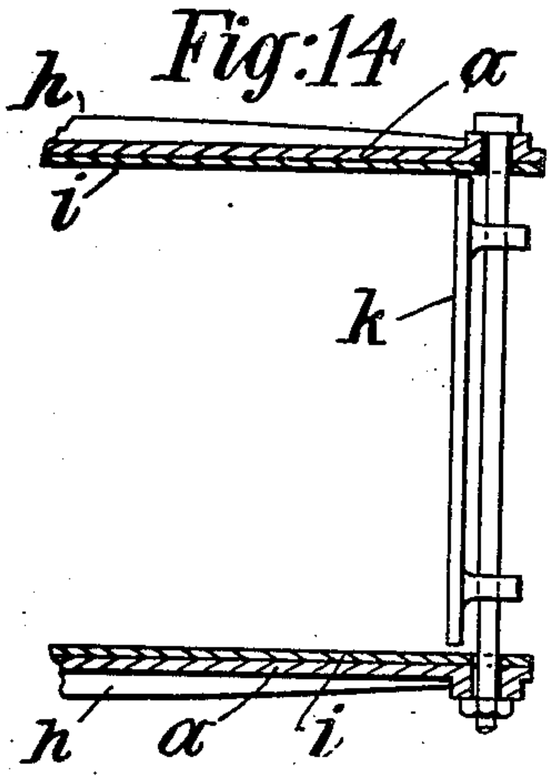


Fig: 11

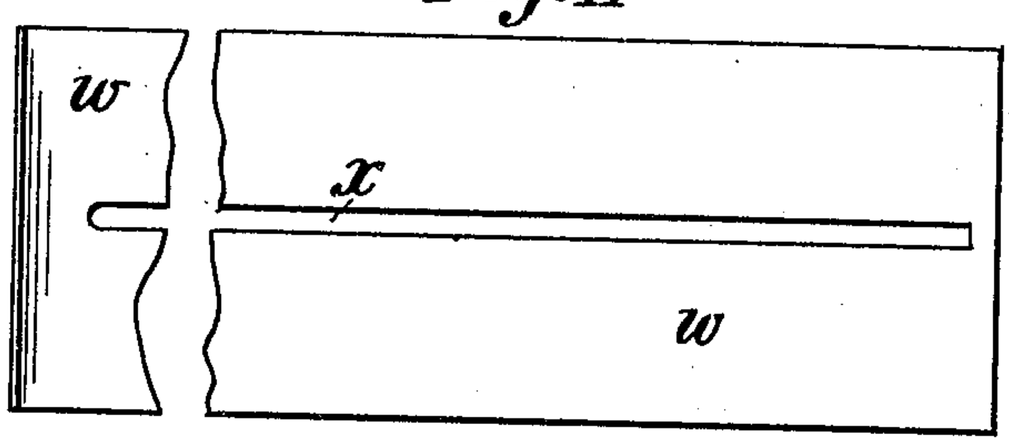


Fig: 12

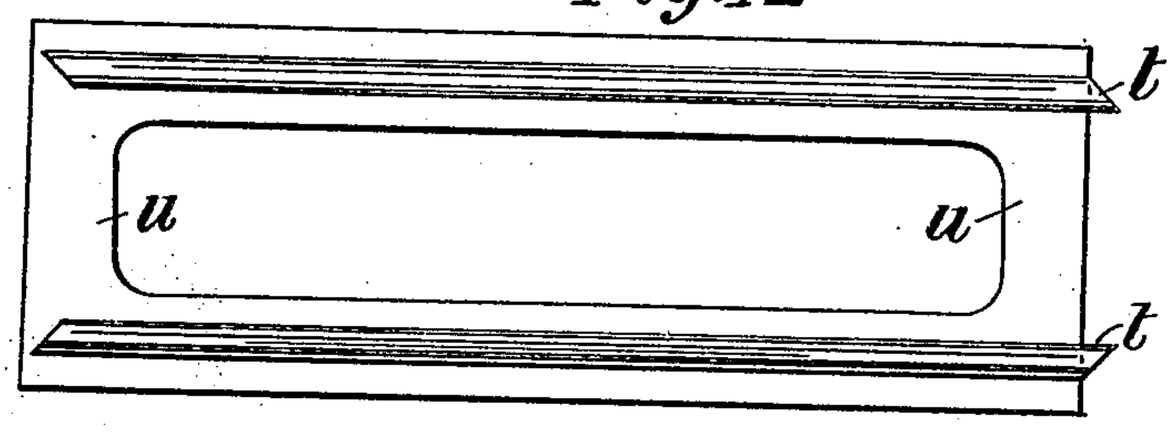
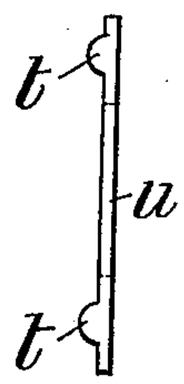


Fig: 13



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UNITED STATES PATENT OFFICE.

RICHARD BOWEN, OF CHELTENHAM, ENGLAND.

APPARATUS TO BE EMPLOYED IN BUILDING WALLS OF CONCRETE.

No. 919,687. Specification of Letters Patent. Patented April 27, 1909.

Application filed March 30, 1908. Serial No. 424,229.

To all whom it may concern:

Be it known that I, RICHARD BOWEN, a subject of the King of Great Britain, residing at Cheltenham, in the county of Gloucester, England, have invented new and useful Apparatus to be Employed in Building Walls of Concrete or the Like, of which the following is a specification.

The invention relates to apparatus to be employed in building walls of concrete and the like, and which is employed in the manufacture, with or without a finished surface, of cement blocks and the like *in situ* on a portion of wall already built, or upon footings or other foundation, without the use of a bed plate, the wall or foundation itself forming the bottom of the mold and, after the completion of the first block, also one end of the mold. In making the first block a supplemental end piece and a second end piece are employed to complete the four sides of the mold. This method of construction of walls is much cheaper than when using shoring up timber as is usual in monolithic construction.

The apparatus consists of a framework preferably of aluminium or magnalium (an alloy of magnesium and aluminium) for the sake of lightness, to enable it to be easily handled.

The framework is formed with sides and ends capable of being readily clamped together to form a mold wherein a block can be made, and of being readily released to enable the apparatus, after a block has been made and without injury to the work, to be immediately shifted to another part of the wall being built, where the parts are again clamped together to enable a fresh block to be made.

The mold box, when the first block is about to be made on the footings or foundation, or on an upper course, is provided with two ends, but, for the second and succeeding blocks on such courses, the second end is dispensed with and the sides of the mold box are caused to grip one end of the sides of the last made block, so as to secure alinement and give support against deformation of said last made block while the new block is being made.

When making the second and upper courses of work the sides of the mold box will, at their lower parts, grip the upper part of the previously made course of blocks, to afford support thereto against deformation when making a block in an upper course.

The apparatus is also provided at each end with means to facilitate its motion along portions of the wall already formed and at the same time assist in obtaining perfect alinement in the work.

In the accompanying drawings I have illustrated one form in which the invention may be carried into effect.

Figure 1 is a side elevation, Fig. 2 a plan and Fig. 3 an end view as seen when looking in the direction of the arrow in Fig. 1, the clamp *o* and lugs *n* not being shown. Fig. 4 is an edge elevation, Fig. 5 a back elevation and Fig. 6 a plan of the permanently used mold end. Fig. 7 is an edge elevation of a supplemental end piece to be fixed to the foot plate of the end piece shown at Figs. 4, 5, 6, when commencing the first course of work. Fig. 8 is a back view and Fig. 9 an edge view of a wider end piece to be fixed when required to the end piece shown at Figs. 1 to 6. Fig. 10 is an elevation of clamp. Fig. 11 is a plan of a tramway plate to be used at one end of the apparatus. Fig. 12 is a plan and Fig. 13 an end view of a tramway plate to be used at the other end, and Fig. 14 is a plan of parts showing a temporarily used end piece.

The preferred form of apparatus is constructed as follows:

a a are two mold sides, which are connected at one end to the foot plate *b* of a permanently used end *c* by pivots *d*, to enable the sides *a*, *a*, to be turned in a horizontal plane toward and away from the work. It is evident that these sides *a*, *a*, may be so pivoted as to move on a horizontal axis. These sides may be formed with continuous smooth inner faces or they may be formed, as shown in the drawings, as skeletons, that is to say, with openings *e*, slots *f*, *g*, and strengthening ribs *h*, and have removable inside plates *i* of any desired character secured thereto to produce any particular design or effect on the blocks molded. The plates *i* may be secured in position by means of screws or bolts passing through the slots *f*. The sides *a*, *a*, are of greater depth than that required for the upper courses of blocks, but the permanent end *c* is only of depth sufficient to form such upper blocks and, when molding the first block of the first course of work, the supplemental end piece *j* shown at Fig. 7 is temporarily fixed to the foot plate *b* of the permanent end *c*, so as to make the latter and the sides *a*, *a*, of equal depth, and in such case a second temporarily used end piece *k*, see Fig. 14, of

the like depth to that of the sides *a*, *a*, is secured to the latter to complete the mold box for use in making the first block of each course of work.

The sides *a*, *a*, at their pivoted ends, are clamped together by catches *l* which may be provided with adjustable jaws and which are pivoted to the end *c*. The opposite ends of the sides *a*, *a*, are provided with slots *m* and perforated lugs *n* to receive the two parallel arms of a clamp *o*, which arms are connected together at the top by a cross piece provided with a handle *p* to facilitate manipulation of the clamp. By these means the sides *a*, *a*, are securely clamped together for use and are readily unclamped to enable them to be turned on their pivots *d* when it is desired to move the mold box to a new position. Also, to the upper part of this end of each of the sides *a*, *a*, is screwed or bolted a bracket *q* forming or carrying a bearing, through which bearings is passed a shaft *r* having a pair of grooved rollers *s* adapted to run on a tramway consisting of a pair of rails *t* carried by a plate *u*, which is placed on the top of the last block made. The holes in these bearings are widened out at each end in a horizontal plane to permit, when the catches *l* are loosened and the clamp *o* removed, of the motion of the mold sides *a*, *a*, on their pivots *d*; or bearings pivoted vertically to the brackets *q* may be employed. The ends of the rails *t* are formed to an angle, and they and the plate *u* of a newly laid tram section fit together at their ends, thus securing proper alinement of the rails. The foot plate *b* of the end *c* has fixed thereto a bracket carrying a roller *v*, having preferably a V shaped edge and cylindrical parts on each side of such edge, to run on a tramway plate *w* at each side of a slot *x* within which the V shaped edge of the roller *v* runs; this foot plate *b* has a downwardly projecting stud or peg *y* which fits the slot *x*. The said slotted plate *w* is laid on the top of the course of work on which a new course is being molded; thus by the combined effect of the V shaped edged roller *v* and the peg or stud *y* acting within the slot *x*, the plate *w* is properly alined, as is also the motion of the apparatus when the latter is being moved to a new position to form a new block.

For the second course of work, and in positions where the mold box cannot be supported as hereinbefore described, I employ two thin plates 1 which are passed through the slots *g* in both mold sides *a*, *a*, so as to rest on the course of work below that being made, one or both of such plates being used as may be required. The slots *g* may be made of such width as to allow any length of block to be made shorter than usual.

The mold sides *a*, *a*, and end *c* may be provided with means for holding a rod or bar of any suitable shape to form, as may be required, a keying slot in one or both sides of a block and in one end thereof.

The apparatus can be used in the construction of different thicknesses of walls in the following manner. The permanent end *c* is of width equal to that of the thinnest wall to be built; then, for thicker walls, a wider end plate 2, see Figs. 8 and 9, is used for each thickness, and such wider plate 2 is fixed in any suitable way to the narrow permanent end *c*. The pivots *d* on which the mold sides *a*, *a*, turn are fixed, in proper relative positions, in holes or in slots in the foot plate *b* of the permanent end *c*, and the brackets *q*, carrying the bearings for the shaft *r* carrying the grooved rollers *s*, are moved along such shaft to place that end of the mold sides the required width apart.

After the first block has been molded in an upper course of work the apparatus is arranged, as represented in the drawings, with one end supported on a tramway laid on the last molded block and the other end supported on a tramway laid on the next lower course of work; then, when a new block has been molded, the mold sides *a*, *a*, are liberated and turned away from such block; a tramway section is then laid on such block so as to fit closely the plate and rails of the previously used section, and the tramway section on the next lower course of work is, when required, pulled forward the required distance. The apparatus is then moved forward on the tramways to the required position to enable a new block to be molded therein; the sides *a*, *a*, are then moved toward each other and are clamped together so as to grip firmly part of the last molded block and part of the next lower course of work, and so on.

What I claim is:—

1. In apparatus to be employed in building walls of concrete or the like, the combination of a permanently used mold end having a base by which it is supported on a lower course of work, mold sides deeper and longer than the blocks to be molded on the second and upper course of work and pivoted to said base by vertical pivots, said mold sides and permanently used end being adapted to inclose a molding space bounded on the bottom and one end by the work done, clamping means to enable such mold sides to firmly grip a part of the last molded block, and supporting means attached to the base of the permanent end, and guiding means laid on the uppermost and next lower courses of work to assist the movement of the apparatus in true alinement with the work done.

2. In apparatus to be employed in building walls of concrete or the like, the combination of a permanently used mold end having a base by which it is supported on a lower course of work, mold sides deeper and longer

than the blocks to be molded on the second and upper courses of work and pivoted to said base by vertical pivots, said mold sides and permanently used end being adapted to inclose a molding space bounded on the bottom and one end by the work done, clamping means to enable such mold sides to firmly grip a part of the last molded block, tramway sections to be laid on the course of work being molded and on the next lower course, and wheels carried at the ends of the apparatus to run on said tramway sections.

3. In apparatus to be employed in building walls of concrete or the like, the combination of a permanently used mold end having a base by which it is supported on a lower course of work, mold sides deeper and longer than the blocks to be molded on the second and upper courses of work and pivoted to said base by vertical pivots, said mold sides and permanently used end being adapted to inclose a molding space bounded on the bottom and one end by the work done, clamping means to enable such mold sides to firmly grip a part of the last molded block, tramway sections to be laid on the course of work being molded and on the next lower course, wheels carried at the ends of the apparatus to run on said tramway sections, a slot in one of such tramway sections and a V-shaped wheel and stud on the permanent mold and capable of moving along said slot.

4. In apparatus to be employed in building walls of concrete or the like, the combination of a permanently used mold end having a base by which it is supported on a lower course of work, mold sides deeper and longer than the blocks to be molded on the second and upper courses of work and pivoted to said base by vertical pivots, said mold sides and permanently used end being adapted to inclose a molding space bounded on the bottom and one end by the work done, clamping means to enable such mold sides to firmly grip a part of the last molded block, tramway sections to be laid on the course of work being molded and on the next lower course, wheels carried at the ends of the apparatus to run on said tramway sections, bearings carried by the free ends of the mold sides and having widened out ends, a shaft mounted in said bearings, and grooved wheels on said shaft to run on the rails of a tramway section.

5. In apparatus to be employed in building walls of concrete or the like, the combination of a permanently used mold end having a base by which it is supported on a lower course of work, mold sides deeper and longer than the blocks to be molded on the second and upper courses of work and pivoted to said base by vertical pivots, said mold sides and permanently used end being adapted to inclose a molding space bounded on the bottom and one end by the work done, clamping means to enable such mold sides to firmly grip a part of the last molded block, tramway sections to be laid on the course of work being molded and on the next lower course, supporting means at the ends of the apparatus to run on said tramway sections slots in the mold sides, and plates passed through such slots to support the apparatus in positions in which the said tramways and supporting means cannot be used.

In witness whereof I have hereunto set my hand in presence of two witnesses.

RICHARD BOWEN.

Witnesses:
CLAUDE K. MILLS,
WM. GIRLING.