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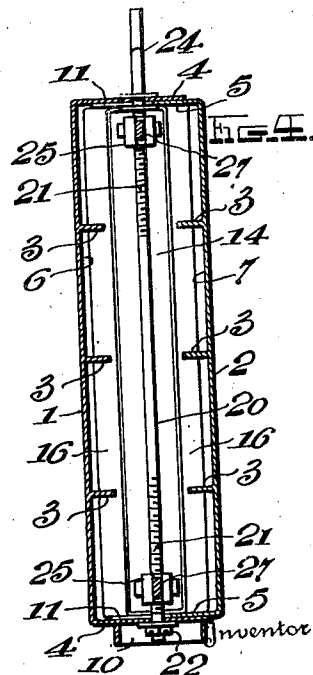
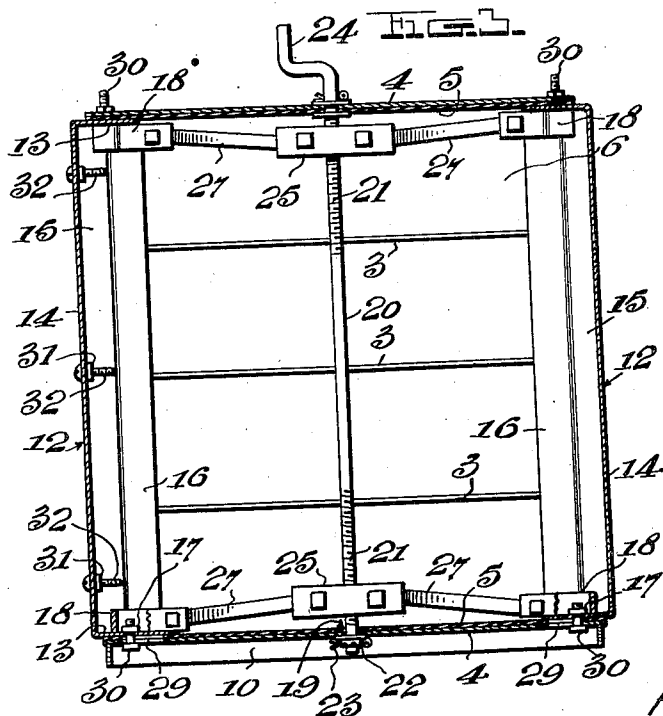
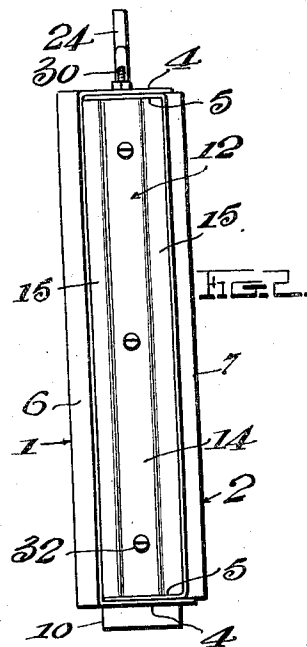
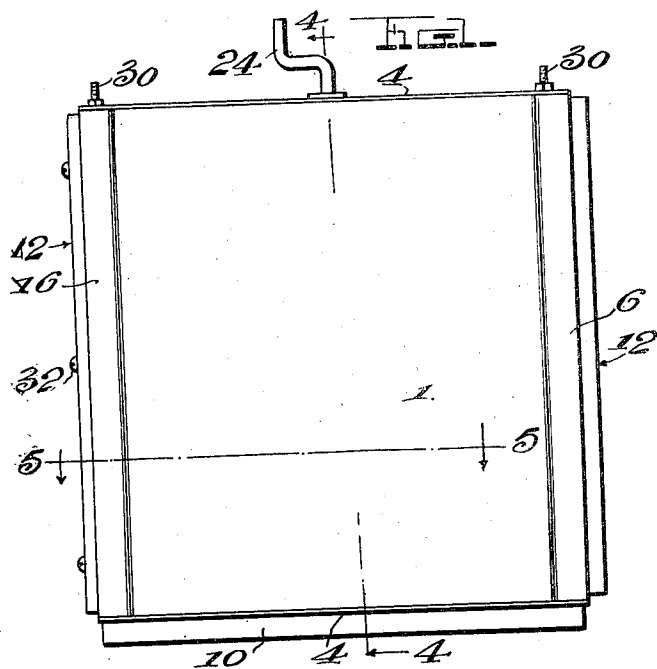
H. R. CORWIN

2,138,693

CONTRACTIBLE REMOVABLE INNER METAL CELL FORM

Filed Aug. 26, 1935

2 Sheets-Sheet 1



HARRY R. CORWIN

By *A. M. Wheatley* Attorney

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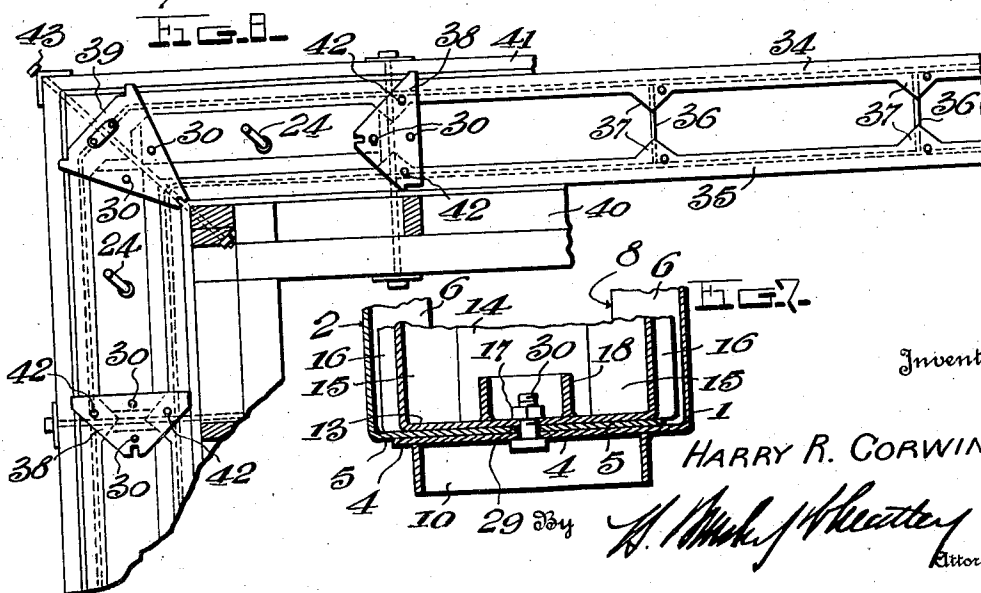
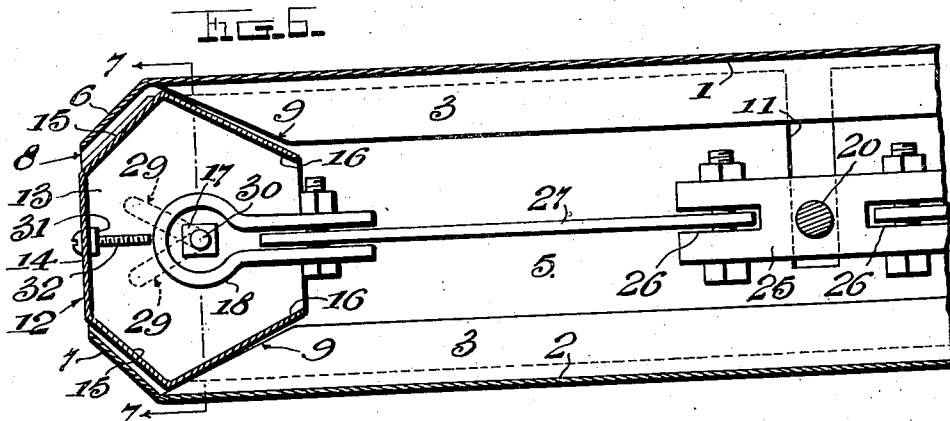
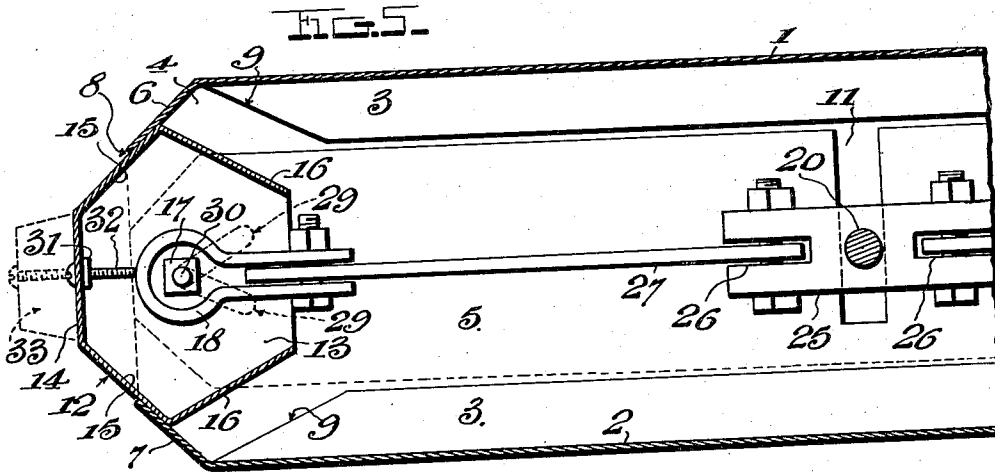
H. R. CORWIN

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CONTRACTIBLE REMOVABLE INNER METAL CELL FORM

- Filed Aug. 26, 1935

2 Sheets-Sheet 2



Inventor

HARRY R. CORWIN

Attorney

UNITED STATES PATENT OFFICE

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CONTRACTIBLE REMOVABLE INNER METAL
CELL FORM

Harry R. Corwin, Palm Beach, Fla., assignor to
Harry R. Corwin & Company, Inc., Palm Beach,
Fla., a corporation of Florida

Application August 26, 1935, Serial No. 37,995

7 Claims. (Cl. 25—128)

My invention relates to the art of building and especially to the art of concrete wall and pier construction.

Primarily the invention has for its object to provide a new and improved contractible inner metal cell form for use in constructing hollow, damp-proof, fire-proof and vermin-proof monolithic reinforced concrete walls and piers.

Further, the invention has for an object to provide a cell form which, by reason of the material (metal) it is made of and by reason of its form and construction, furnishes a practical, sturdy, yet flexible and positive action form unit for making hollow monolithic concrete walls, with either continuous or spaced air spaces as desired, and permits a greater saving of concrete material than types of concrete unit walls now in common use.

Further, the invention has for an object to furnish to the building industry an easily handled cell permitting the exterior walls of buildings to be made double of monolithic reinforced concrete in a continuous manner with continuous air space between of sufficient size to permit standard soil lines, piping and other equipment usually concealed in walls, to be installed, removed or changed, after the walls are completed, thus permitting the concrete work to proceed without interruption and without having to work around same.

A further object of the invention is to provide a cell that by reason of its design and shape, monolithic concrete walls can be made with an unusually small amount of material (in comparison to the overall thickness of finished walls) with inner pilaster or columns occurring at close intervals and of ample section to encase vertical reinforcing steel properly and thin reinforced panels between, and large section corners; the combination making an unusually strong wall.

Further, it is an object to provide a cell of a structure which can be economically handled, hauled, stored and maintained, and by its design and construction can be manufactured in standard stock sizes with a minimum of special sizes required to permit its use in constructing walls similar in thickness to those now commonly specified in residential and commercial buildings.

Other objects will in part be obvious and in part be hereinafter pointed out.

To the attainment of the aforesaid objects and ends, the invention still further resides in those novel details of construction, combination

and arrangement of parts, all of which will be first fully described in the following detailed description, then be pointed out in the appended claims, reference being had to the accompanying drawings, in which

Figure 1 is a side elevation of a cell form embodying my invention.

Figure 2 is an end elevation thereof.

Figure 3 is a central vertical longitudinal section of the same.

Figure 4 is a vertical cross section on the line 4—4 of Figure 1.

Figure 5 is an enlarged detail horizontal section on the line 5—5 of Figure 1, the cell being in the expanded position.

Figure 6 is a view like Figure 5 but with the cell contracted.

Figure 7 is a detail cross section on the line 7—7 of Figure 6.

Figure 8 is a detail plan view of a wall under construction.

In the drawings, in which like numerals of reference indicate like parts in all of the figures, 1 represents the stationary metal side section, 2 the movable side section and 12 the columnar end pieces of the cell. The side walls of the sections 1—2 are reinforced on their opposing faces with horizontal stiffening ribs 3 located at suitable intervals apart (see Figures 3 and 4).

Each side section also comprises a top and a bottom flange, those of section 1 being numbered 4—4 and those of section 2 being numbered 5—5.

The sections also have vertical end walls 6 and 7, respectively, which are inclined toward the mid-plane of the cell at angles of about 45° (see Figures 5 and 6). The walls 6 and 7 do not meet, however, but are separated to leave end openings 8 through which the columnar end pieces 12 are projectible.

The ribs 3 have their ends cut on inclines as at 9 and serve as stops against which the inclined vertical inner walls of the end pieces 12 engage when the cell has been contracted or collapsed.

A continuous metal band 10 is welded to the bottom flange 4 and serves three purposes—to reinforce and stiffen the bottom flange of the side 1, to protect the bolts 30 and end nut 22 and cotter pin 23 of the crank rod 20 from concrete and also furnishes a substantial base on which the form will stand upright.

The top and bottom flanges 5 have slots 11 to pass the rod 20.

The columnar end pieces 12 each have top and bottom plates 13—13, a square across end wall 14

and inclined walls 15 which are set at 45° angles to cooperate with and comprise continuations of the walls 6—6 when the cell form is expanded. Inclined side walls 16—16 also are provided and cooperate with the stop edges 9—9 before referred to.

Nuts 17 are welded to the top and bottom plates 13 as are also yokes 18 and the plates 13 have holes through which the pin bolts 30 pass, the flanges 4 and 5 having inclined slots 29 through which the pin bolts 30 also pass.

The flanges 4 have holes 19 through which the crank screw-rod 20 passes, the rod having right and left threads 21 to receive the traveller blocks 25 whose ends are slotted at 26 to receive the links 27 which are pivoted to the blocks and to the yokes 18 by the pivot bolts and nuts 28—28.

The end vertical walls 14 have holes at intervals and nuts 31 are welded to the inner face of said walls to receive screws 32, by which, when desired, nose pieces 33 may be secured thereto. The rod 22 is provided at its upper end with a crank portion 24.

By referring to Figure 8 it will be seen that 34 and 35 designate respectively the outside and inside concrete wall shells which are joined together by metallic cross ties 36. Triangular wall ribs 37 are formed between the ends of adjacent cells.

Punched spreader plates 38—39 are engaged by vertical reinforcing rods 42 which join tie rods 43 to the outside and inside wall forms 40—41 together.

As will be seen by an inspection of Figures 3 and 5 and 6, upon turning rod 20 in one direction the travelled blocks are moved toward each other, thus drawing together the columnar ends 13. These ends in turn, through the action of the pin bolts 28 and slots 29, draw the section 2 toward the section 1 and thereby the cell is contracted (see Figure 6). Turning the crank rod 20 in the opposite direction reverses the process and expands the cell (see Figure 5).

It will be noted in the expanding operation, that the outward movement of the side 2 is assisted by the 45° angle faces 15 of the end pieces 12 coming in contact with the two 45° lip flanges 6—7 of the side pieces 1 and 2; these lip flanges being bent with a slight bite so, when expanded, a concrete-tight joint is made.

It is intended that the cell forms be made in suitable sizes for convenient handling (approximately 2 feet wide, 4 feet high, 6 inches thick when expanded, for example). Sufficient forms, standard size, are to be used on each job to make a complete pour at one time of all exterior walls around buildings being constructed, with sufficient number of smaller or larger sizes being furnished to make up the proper form space in each run of wall. By attaching wooden nose pieces 33, as shown in Figure 5, any minor differences in length of space occupied by cell forms can be made up. In use, all inside wall-forms are erected in the customary manner and these cells are then installed, fully expanded, on the foundation in a continuous end to end manner, properly spaced from the inside form, after which the outside form (which should be made sectional of the same height as the cell forms) can be erected and held in place by proper and suitable wall ties. By the use of the punched spreader plates 38 and 39 it will be noted (see Figure 8) the vertical reinforcing steel 42, and also the cell forms themselves, are held accurately in proper position for concrete to be poured. It is to be noted the

plates 38 and 39 have holes to fit over the pin bolts 30 of the adjacent cell units.

After each concrete pour is completed to the height of the cell forms and properly set, by turning crank rod 20 of each cell, these cell forms are contracted and raised vertically (by lifting on crank rod) to position for the second pour of concrete, leaving about two inches of the lower end of each cell form in the hole previously occupied by it, the expanding of the cell form, after being raised, causing it to fit tightly in the top of the concrete previously poured.

Before reinstalling the cell forms for each succeeding pour, the thin web of concrete left between the two previously poured wall sections and between the wall ties should be knocked out, leaving only the metal wall ties connecting the inner and outer wall shells, which eliminates all means for moisture, by capillary attraction, to pass from the outer wall shell to the inside wall shell.

From the foregoing description, taken in connection with the accompanying drawings, it is thought the complete construction, operation and advantages of my invention will be readily understood by those skilled in the art.

What I claim is:

1. In hollow monolithic wall building, the combination with inside and outside wall forms, of a series of collapsible cell forms located in horizontal alignment between and spaced from the outside and inside wall forms, said cell forms including pin elements at their upper ends and punched spreader plates straddling the gap between adjacent collapsible forms and extending laterally over the outside and inside wall forms and having holes to receive the pin elements of adjacent collapsible cell forms and connect the adjacent forms together and hold them spaced between the outside and inside wall forms, said spreader plates having provisions to hold vertical reinforcing rods between the cell forms and the outside and inside wall forms respectively.

2. In a collapsible cell form, a stationary sheet metal side section, a sheet metal movable side section parallel thereto, and tubular sheet metal end sections, said side sections having inclined end walls and said end sections having inclined walls cooperating therewith, said side and end sections having overlapped top and bottom flange plates, a vertical crank rod carried by one side section and having right and left threads, traveller blocks on said rod, yokes secured to the top and bottom flange plates of said end sections, and links connecting said yokes and traveller blocks whereby as said crank rod is turned said end sections are moved toward or from each other according to the direction in which said crank rod is turned and means effecting connections between said flange plates whereby as said end sections are moved said side sections will be correspondingly moved.

3. In a collapsible cell form, a stationary sheet metal side section, a sheet metal movable side section parallel thereto, and tubular sheet metal end sections, said side sections having inclined end walls and said end sections having inclined walls cooperating therewith, said side and end sections having overlapped top and bottom flange plates, a vertical crank rod carried by one side section and having right and left threads, traveller blocks on said rod, yokes secured to the top and bottom flange plates of said end sections, links connecting said yokes and traveller blocks whereby as said crank rod is turned said end sections are moved toward or from each other ac-

according to the direction in which said crank rod is turned, means effecting connections between said flange plates whereby as said end sections are moved said side sections will be correspondingly moved, and a continuous metal band secured to and beneath the bottom flange of said stationary section.

4. A collapsible metal cell form including a stationary side section and a movable side section parallel thereto, each having a top and a bottom flange plate and inclined end walls, a pair of tubular end sections each having an outer straight wall and inclined outer side walls cooperating with those of said side sections, and having top and bottom flange plates cooperating with those of said side sections, pin and inclined slot connections between said top flange plates and between said bottom flange plates, means carried by said stationary side section and projecting into and connected to said end sections to expand or contract the cell form, said columnar end sections having inner converging inclined walls, and said side sections having reinforcing ribs with inclined ends.

5. A collapsible metal cell form including a stationary side section and a movable side section parallel thereto, each having a top and a bottom flange plate and inclined end walls, a pair of tubular end sections each having an outer straight wall and inclined outer side walls cooperating with the inclined end walls of said side sections, and having top and bottom flange plates cooperating with those of said side sections, pin and inclined slot connections between said top flange plates and between said bottom flange plates, means carried by said stationary side section and projecting into and connected to said end sections for moving said end sections to expand or contract the cell form, a metal band secured beneath the bottom flange plates, said tubular end pieces having inner converging inclined walls, and said side sections having reinforcing ribs with inclined ends.

6. A collapsible metal cell form including a stationary side section and a movable side sec-

tion parallel thereto, each having a top and a bottom flange plate and inclined end walls, a pair of tubular end sections each having an outer straight wall and inclined outer side walls cooperating with the inclined end walls of said side sections, and having top and bottom flange plates cooperating with those of said side sections, pin and inclined slot connections between said top flange plates and between said bottom flange plates, means carried by said stationary side section and projecting into and connected to said end sections for moving said end sections to expand or contract the cell form, a detachable nose piece secured to the outer straight wall of one of said end pieces, said tubular end pieces having inner converging inclined walls, and said side sections having reinforcing ribs with inclined ends.

7. A collapsible form comprising two side sections of sheet metal each having a top flange and a bottom flange, the flanges of one side section overlying those of the other section throughout the length of the sections, said side sections including parallel side walls and inwardly converging end walls, a pair of sheet metal tubular end sections each having an outer straight wall lying transversely of the form and each having outer inclined walls to cooperate with the converging walls of said side sections, said tubular end sections each having top and bottom plates over which the top and bottom flanges of said side sections lie, inclined slots in said top and bottom flanges, pins carried by said tubular end sections, top and bottom bolts to enter said slots and cooperate therewith in expanding and contracting the form, members rigidly secured to the top and bottom plates of said end sections and projecting through openings in the inner sides of said tubular end sections, a screw carried by one side section, follower blocks on said screw and links connecting said follower blocks with said projecting members that are carried by the end sections for the purposes described.

HARRY R. CORWIN. 45