No. 845,635. PATENTED FEB. 26, 1907.

W. D. HAM.

MOLD FOR FORMING WALLS.

APPLICATION FILED MAY 29, 1906.

Fig. 1.

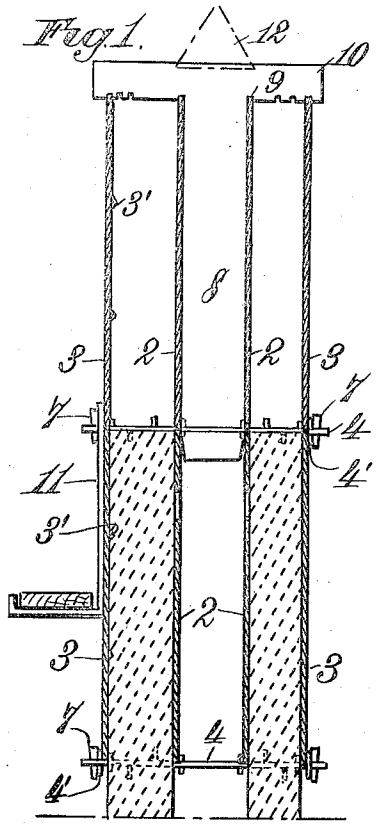



Fig. 2.

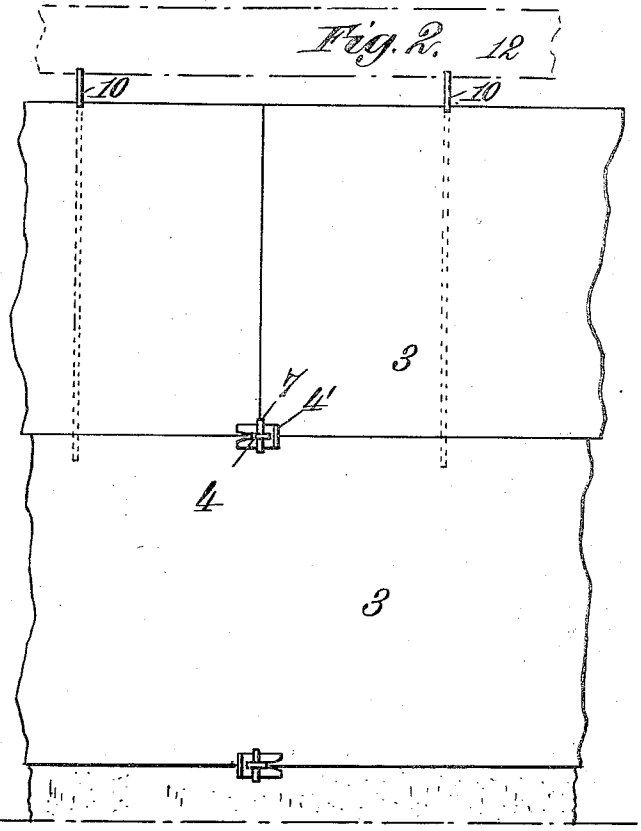



Fig. 3.

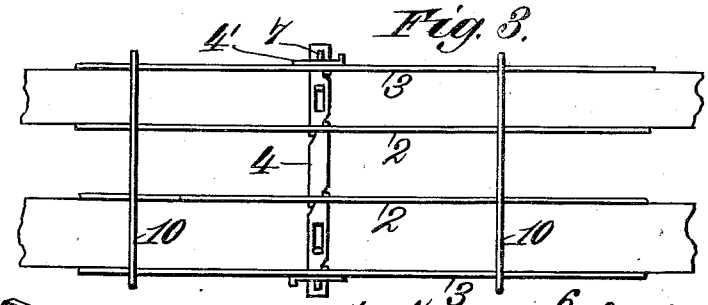



Fig. 4.

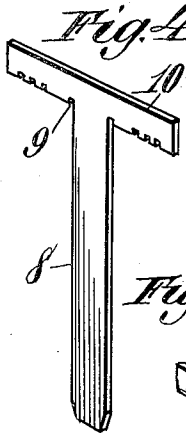



Fig. 5.

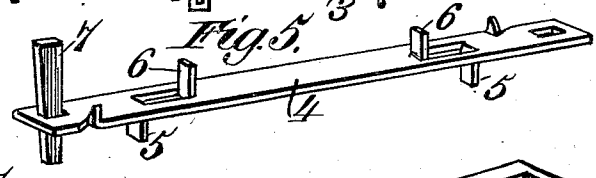



Fig. 6.

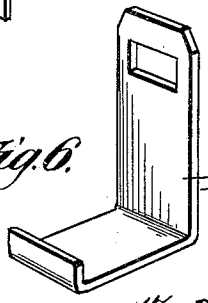



Fig. 8

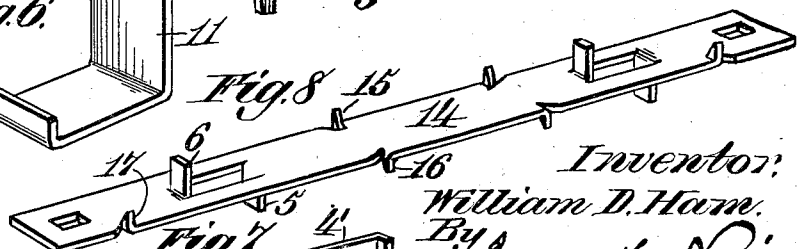
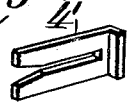



Fig. 7.

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# UNITED STATES PATENT OFFICE.

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## MOLD FOR FORMING WALLS.

No. 845,635. Specification of Letters Patent. Patented Feb. 26, 1907.

Application filed May 29, 1906. Serial No. 319,341.

*To all whom it may concern:*

Be it known that I, WILLIAM D. HAM, a citizen of the United States, residing at Knoxville, in the county of Knox and State of Tennessee, have invented new and useful Improvements in Molds for Forming Walls, of which the following is a specification.

This invention relates to molds for forming walls.

The wall may be composed of any desirable material—such as concrete, cement, or other like substance—and I use in the formation of the wall mold means of advantageous construction. The wall is composed of inner and outer sections, an air space or cavity intervening between the two. This air-space is a confined air-space and insulates the exterior of the wall from the interior thereof and also prevents the conduction of water from the exterior of the wall to the interior. Any water applied to the exterior surface of the wall cannot pass entirely therethrough, but can only go to the air-space, which causes a downflow of the water. Both sections of the wall are simultaneously built up and are seamless or jointless, and in this respect are distinguished from walls made of brick, blocks, or other like articles which are ordinarily held together by mortar. I therefore provide a double preventive of moisture traversing the wall, one being due to the absence of joints in the sections of the wall and the other being due to the dead-air space between said sections.

A wall made in accordance with my invention possesses all the strength and lasting qualities following a wall made of bricks or blocks.

The mold for forming the wall usually comprises two inner members and two outer members, which may be made of metal or wood, or they may be of composite construction, as may be desired. I find, however, that galvanized sheet metal is quite satisfactory for these sections. The members are arranged in coöperating pairs, one inner member being arranged opposite one outer member and the same being the case with the other two members, by reason of which cement can be introduced into the spaces between the said inner and outer members to form the sections of the multipart wall, the space between the two inner members defining the air-space between the wall-sections. I provide means of a positive character for holding these mold members in rigid relation—that is to say, I hold them spaced the requisite distance apart and also prevent them from longitudinal and other movements. The article made in accordance with the invention is a monolithical insulated wall.

In the drawings accompanying and forming a part of this specification, Figure 1 is a vertical section of a wall and a mold for making the same involving my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a top plan view of the parts shown in Figs. 1 and 2 with the deflector omitted. Fig. 4 is a detail view in perspective of a spacing member. Fig. 5 is a like view of a tying-strip. Fig. 6 is a similar view of a scaffold-supporting bracket. Fig. 7 is a detail view in perspective of a key, and Fig. 8 is a like view of a modified form of tying-strip.

Like characters refer to like parts throughout the several figures.

The mold for forming the wall is represented as comprising two inner members 2 and two outer members 3, such members being arranged in coöperating pairs, as clearly shown in Fig. 1, wherein each inner member 2 cooperates with an outer member 3, the cement or concrete material to form the wall being introduced simultaneously or substantially simultaneously into the spaces between said respective inner or outer members. From what has been hereinbefore briefly stated it is believed that it will be understood that the space defined by the two inner members 2 constitutes the air or insulating space between the two sections of the wall. Of course the wall may be made of any desirable numbers of sections, although the wall shown is only composed of two. In Fig. 1 I show an upper mold and a lower mold, each including the four members described.

In making a wall with my mold I usually in some suitable manner simultaneously build the two sections thereof a short distance above the ground or substantially to where the horizontally-disposed tying-strip 4 is illustrated as located in Fig. 1. I then place along the upper side of the two parallel sections one or more of said strips 4, which I prefer to make from galvanized sheet metal. The ends of these strips extend outward beyond the inner and outer surfaces of the wall, so as to afford a support for the outer mold members 3, the inner mold members 2 being supported by the strips 4 between the ends thereof. I may punch from the strips 4 upper and lower teeth or projections, as 5 and 6,

the lower teeth 5 being embedded into the cement or concrete, which is to make the wall when the mass is in a green condition—that is to say, before the mass has set. After thus positively connecting several of these strips 4 with the wall built up to such reduced height I pass downwardly through slots near the extreme outer ends of said strips pins, as 7, which I generally make of wedge form, so as to avoid the necessity of providing extraneous means for holding said pins in place. I then set the mold members 2 and 3 on the anchoring or tying strips 4. The pins 7 will prevent outward displacement of the lower portions of outer members 3, while a spacing member, as 8, will prevent inward motion of the members 2. After setting the lower sections of the inner and outer mold members upon the lowermost horizontally-alined strips 4 I place the spacing member 8 into the space between the inner members 2 and 3 and introduce the upper edges of said members 2 and 3 into proper notches, each designated by 9, in the head 10 of said spacing member. The spacing member 8 and its head may be integral and may consist of galvanized sheet metal. Two of the notches 9 are formed in the head 10 immediately next the spacing member 8. Really the side edges of said spacing member constitutes the inner wall of such inner notches, into which inner notches the inner mold members 2 are fitted. There are a series of these notches 9 in the outer portions of the head 10, into any one of each of which the respective outer mold members 3 may fit. By providing a series of outer notches to receive the outer mold members 3 I adapt the appliance to making walls of varying thicknesses. The spacing member 8, with its head 10, presents a structure of substantially T form. After mounting and properly spacing the several mold members 2 and 3 I fill in the cavities between such inner and outer mold members with concrete or cement in a plastic condition and build up the same to the tops of said members, leaving, however, small spaces for the anchoring-strips. I then withdraw the spacing members 8 and afterward lift the inner mold members 2 from place, following which I lay across the tops of the outer mold members several of the strips 4 in vertical line with the spaces left for them in the wall, and fasten these strips permanently in place by a small amount of concrete, so that such series of strips can be employed to sustain the upper series of mold members 2 and 3. (Shown in Fig. 1.) I leave the outer mold members 3 temporarily in position, so that workmen cannot deface the wall. The outer members 3 (shown in the left in Fig. 1) may have beads as 3′, on their inner surfaces to form in the wall a brick or block like effect.

The ends of the strips 4 which project beyond the exterior surface of the wall may be, as shown in Fig. 1, utilized for supporting angle-brackets, as 11, which may be employed for carrying the scaffolding-boards used by the workmen in construction of the wall.

I may, as represented in Fig. 1 by full lines and by dotted lines in Fig. 2, mount centrally upon the heads 10 of the spacing members 8 an angular deflecting member 12, the lateral upwardly-converging inclined faces of which are employed for positively directing cement or concrete material into the spaces between the inner and outer mold members 2 and 3.

It will be understood that in Fig. 1 I have shown two separate molds, which are used in succession, although when I use the second mold or the upper one in said figure I leave the outer members of the lower mold in place, so as to prevent defacement or injury to the opposite faces of the wall. As the elevation of the wall progresses the molds are moved upward therewith, and the scaffold-brackets 11 are also lifted step by step. When the brackets are detached from the strips 4, I provide means for preventing outward displacement of the lower members 3 of the mold, which fit against the exterior surface of the wall. For example, it will be assumed that the brackets 11 have been taken from the lower strips 4 and have been applied to the upper strips 4 in said Fig. 1. In this case there will be spaces between the wedge-pins 7 and the said lower mold members 3, and naturally there will be a tendency for the said members 3 to tip. To obviate this, I drive onto the left projecting ends of the said lower strips 4 keys or washer-plates 4′ of bifurcated form, the branches of these keys or washer-plates 4′ being adapted to straddle the left projecting ends of said strips 4 and to tightly fit in the spaces between the pins 7 on the left and the lower members 3 on the left, whereby it will not be possible for said members to be accidentally displaced. I may also apply these washer-plates or keys 4′ to the right ends of the strips 4, which is of utility in holding longitudinally-abutting members 3 in place, the keys covering the joints between such abutting members.

It will be understood that the teeth or projections 5 and 6 are embedded in the wall, so as to permanently unite the strips 4, of which said teeth form a part, with the wall. After a mold has been dismounted and after the pins 7 have been pulled from place the extreme outer ends of the strips may be sheared or cut off to bring the ends of the strips flush with the wall, or said projecting ends may be bent downward and pressed into the wall and afterward covered over with cement, which will be dressed down flush with the remainder of the wall. In some cases, if desired, the strips 4 may be perfectly plain or smooth, so that they can be driven from the wall. In this event these strips would simply serve to aid in holding the mold members in operative

position. Should I employ such plain or smooth strips, I will prior to applying them in the wall slightly envelop them with oil, which will deaden the cement around them, by reason of which they can after they have subserved their function of upholding and maintaining in operative relation the mold members and also supporting the scaffolding be driven from place and the apertures made by them in the wall closed by cement or concrete.

There are cases, such as when building walls around pilasters, that I may employ anchoring-strips, as 14, for performing the function of said spacing members 8 and holding the mold members in position and maintaining them in spaced relation. This modified form of strip 14 has the projections 5 and 6, which perform the exact office as the projections or teeth 5 and 6 hereinbefore described, and illustrated in Fig. 5 in detail. In addition to these projections or teeth 5 and 6 the strip 14 has on its side edges the upwardly and downwardly extending projections or barbs 15 and 16, respectively, and which are situated between the teeth 5 and 6. The side faces of the inner mold members 2 are adapted to abut against these barbs, while upstanding barbs, as 17, formed near the outer ends of said strip 14, perform a like office with respect to the outer mold members 3. The strips 14 are slotted at their outer ends to receive wedge-pins, as 7, hereinbefore described.

In my claims for convenience I use the term "cement." I use this term in a broad sense to include not only the article so known, but other substances, such as concrete material or, in fact, anything that can be employed for making a wall or equivalent part.

I deem it desirable to state that the present invention is along the same general lines as that included in my copending application, Serial No. 318,586, filed May 24, 1906.

As previously explained, the strips 4 in some cases may be perfectly plain. When plain or smooth, they do not remain permanently in the wall. There are cases where the sections of a multipart wall are required to be tied together—for example, where such wall is of an unusual height. In such an event as this I may tie the sections of the wall together, not by plain strips, but by other and shorter strips, which are laid in the wall during its course of construction. These tying-strips will be like the strips shown in Fig. 5, except that they will be shorter, so that their ends will not project from the opposite faces of the wall.

It will be remembered that I have stated that the opposite ends of strips 4 or the strips 14 may when the wall is complete be cut off or may be bent down into the wall and the bent-down ends covered with cement. To facilitate the latter operation, I will place in the cement as the wall is in process of construction blocks which may be conveniently made of wood, which when removed form under the free or outer portions of the strips 4 or 14 cavities in the outer faces of the wall, and in these cavities the outer ends of said strips 4 and 14 may be bent downward, the cavities afterward being filled with cement, which covers the bent-down ends of said strips.

What I claim is—

1. A mold comprising at least two inner members and two outer members coöperative respectively therewith, strips extending across the upper and lower edges of said members, and a spacing member disposed between the inner members.

2. A mold comprising at least two inner members and two outer members coöperative respectively therewith, strips extending across the upper and lower edges of said members, and a spacing member disposed between the inner members, said spacing member being provided with means for positively holding the several mold members in parallelism.

3. A mold comprising at least two inner members and two outer members coöperative respectively therewith, and a spacing member between the inner members provided with means for positively holding said members in operative relation.

4. A mold comprising at least two inner members and two outer members coöperative respectively therewith, a spacing member situated between the inner mold members and provided with a head having notches to receive the upper edges of the several mold members.

5. A mold comprising at least two inner members and two outer members coöperative respectively therewith, and a spacing member between the inner members having a head, said head having notches to receive the inner members and having two series of notches, each one of which latter is adapted to receive the upper edge of an outer member.

6. A mold comprising at least two inner members and two outer members coöperative respectively therewith, a spacing member situated between the inner members and having a head provided with means to positively hold the several members in assembled relation, and a deflector carried by the head to positively direct cement material into the spaces between the inner and outer members.

7. A mold comprising inner and outer members coöperative respectively with each other, strips extending entirely across and projecting outward beyond the upper and lower edges of the mold to constitute scaffold-supports, said strips having pin-receiving perforations near their outer ends and having projections to prevent outward displace-

ment of the outer mold members, and a spacing device between the inner mold members.

8. A mold comprising inner and outer members combined with a part to extend across said mold members and having notches to receive the said mold members and hold the same in parallelism.

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

WILLIAM D. HAM.

Witnesses:
HEATH SUTHERLAND,
CHAS. S. HYER.