J. P. JACKSON.

TIE BAR AND SPACER.

APPLICATION FILED DEC. 23, 1920. RENEWED APR. 29, 1922.

1,436,345. Patented Nov. 21, 1922.

Fig. 1.

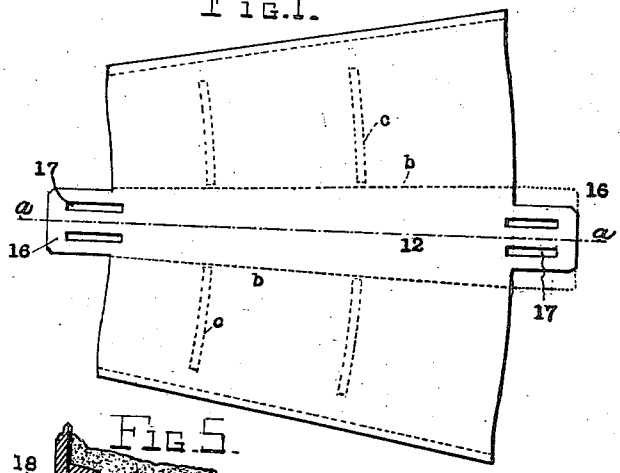


Fig. 3.

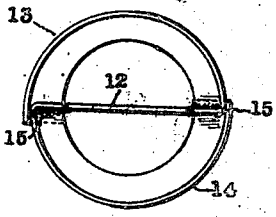


Fig. 4.

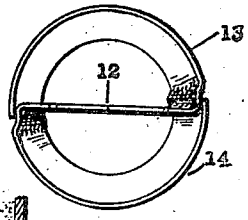


Fig. 5.

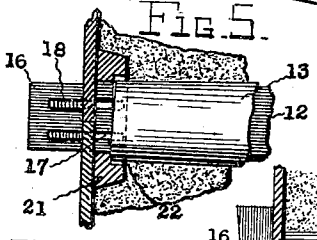
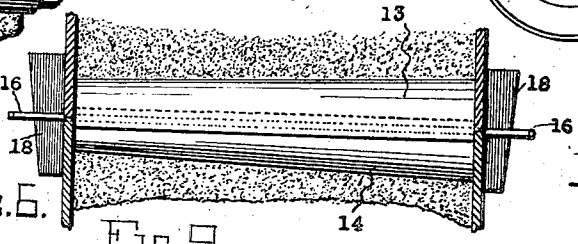


Fig. 2.



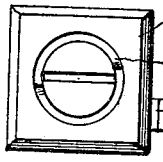


Fig. 6.

Fig. 7.

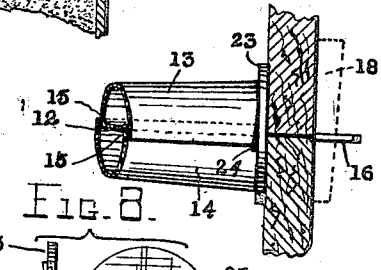


Fig. 9.

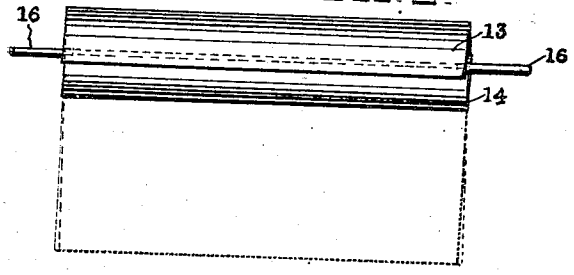


Fig. 8.

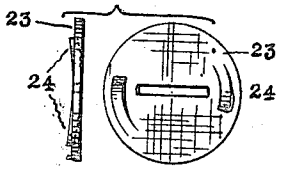
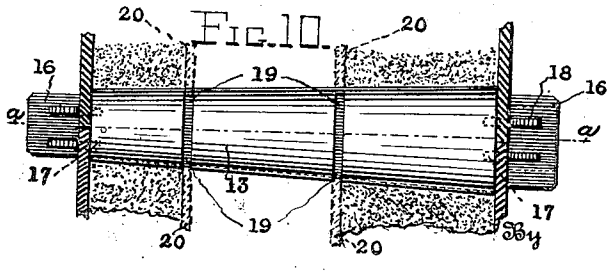


Fig. 10.



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UNITED STATES PATENT OFFICE.

JOHN P. JACKSON, OF WASHINGTON, DISTRICT OF COLUMBIA.

TIEBAR AND SPACER.

Application filed December 23, 1920, Serial No. 432,765. Renewed April 29, 1922. Serial No. 557,422.

To all whom it may concern:

Be it known that I, JOHN P. JACKSON, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Tiebars and Spacers, of which the following is a specification.

My invention appertains to improvements in tie-bars and spacers for side plates of molds or forms, such as are used in constructing walls of cement, concrete or other plastic. A tie-bar and spacer made to accord with my invention is adapted to be used to connect and space forms, which may be either of wood or metal, to hold the frames or plates spaced apart and connected, the space between the plates being filled with concrete which also surrounds the tie-bar and spacer, rendering removal thereof difficult and when removed by hammering the wall is liable to be injured, by being jarred before the concrete becomes fully hardened.

The object of my invention is to provide a tie-bar and spacer for molds or forms that is held in place by wedges or keys which engage the ends of the tie-bars and the outer faces of the mold or mold plates, either directly or indirectly, and to provide the portion of the tie-bar between the mold-plates with integral arched members which incase such intermediate portion of the tie-bar and serves as spacing members, each of said spacing members having the ends and one edge unrestrained, whereby, after removal of the wedges and the sides of the mold or form the tie-bar and spacer may be readily removed from the concrete or cement, by simply pulling upon one end thereof, and in case the resistance against withdrawal is such as is likely to affect the wall injuriously the spacing members may be reduced in diameter by twisting a projecting end of the tie-bar.

A further object of my invention is to provide a longitudinally tapered tie-bar and spacer the spacing members being of such configuration that pressure against end portions thereof will increase the curvatures or areas of the arched encasing portions that form the spacer, and when the pressure is released the encasing portions will return to normal area, so as to be readily removable from the cement wall or structure.

A further object of my invention is to provide a tie-bar and spacer, the central portion having extended ends provided with apertures, and arched members which extend from the side-edges and encase an intermediate portion of the tie-bar, the arched members being of such character and form that when subjected to strain or stress the circumferential areas thereof may be varied, and to provide a tie-bar with transversely curved encasing members that are integral therewith and extend from opposite sides thereof to provide encasing members for an intermediate portion of the tie-bar and means for stiffening the same.

With the above and other objects in view my invention consists in the novel features of construction, formation, combination and arrangement of parts to be hereinafter more particularly described, claimed and illustrated in the accompanying drawings, in which—

Figure 1, is a plan view of a blank from which a tapered tie-bar and spacer may be produced by bending. Fig. 2, is a side elevation of a tie-bar and spacer, made from a blank as shown by Fig. 1, the mold-plates being in section. Fig. 3, is an end view, looking toward the larger end of the tie-bar and spacer. Fig. 4, is an end view of a slightly modified form. Fig. 5, is plan view of an end portion of the tie-bar and spacer showing the same as in use with a block or washer. Fig. 6, is a view showing the inner face of the block or washer. Fig. 7, is a side view showing one end of the tie-bar and spacer as used with wooden mold-boards or forms and with a washer. Fig. 8, illustrates a form of washer which may be used with either metal or wooden molds or forms, when the tie-bar and spacer is made with ends of the spacing and encasing members without pitch or inclination. Fig. 9, is a side elevation of a cylindrical tie-bar and spacer, the broken lines showing the part from which a spacing member is formed by being projected therefrom, and Fig. 10, is a plan view of a tie-bar and spacer constructed to maintain inner mold-plates used in constructing hollow walls.

Figure 1 of the drawings illustrates a blank, the perimeter being in full lines and indicating the shape of a piece of sheet metal that may be formed into a tie-bar and spacer that accords with my invention. The broken line *a*—*a*, has reference to the longitudinal center of the blank; the portion in-

cluded between the broken lines *b*—*b* forms the tie-bar, the ends thereof having apertures or slots; and extending from the lines *b*—*b*, are side portions which when circumflexed provide encasing members for the tie-bar and spacing members for the mold plates. The outer longitudinal edges of the blank diverge or are angularly disposed relative to the longitudinal center of the blank. The ends of the blanks are preferably formed with a suitable pitch, and the sides when circumflexed form arched segments their longitudinal edges overlapping.

The end portions of the encasing members which lie adjacent to the longitudinal bends will project and the opposite ends recede, so that pressure applied against the projecting portion or adjacent to the ends furthest from the bends will result in an increase of the arcs of the circumflexed side portions. The parallel broken lines *c*—*c* indicate where slots may be formed through the side members of the blank, to provide means for spacing inner mold-plates used in constructing hollow walls. The extensions at the opposite ends of the tapered portion of the blank may be of the same width or of a width equal to the ends of the tapered portion, such ends having therethrough wedge or key receiving slots, the tapered portion and the end extensions together constitute the tie-bar. In the manufacture of the tie-bars and spacers I use sheet metal of suitable thickness and resiliency, and the scraps from the blanks which otherwise might be considered as waste may be used to form wedges or tapered keys.

When the tie-bar and spacer is constructed so that the circumflexed encasing portions 13 and 14 have pitched ends that are substantially parallel, and pressure is applied to bring the edges in line, there results an increase of the diametrical areas of the circumflexed encasing portions 13 and 14 while under such stress or strain which is exerted against the ends by the mold-plates which are drawn toward each other by the wedges, and when the pressure is relieved, by removing the wedges, the circumference of the encasing members is automatically reduced, the center portion that constitutes the tie-bar being rigid and the spacing members resilient.

The construction of the parts are such that when pressure exerted against the arched ends of the spacing members is relieved by removal of the wedges, mold-plates, and spacing blocks or washers when used, there will be a corresponding reduction of the area of the spacing members.

A diminution of the circumferential areas of the circumflexed encasing members may be effected by turning or twisting an end of the tie-bar, and by simultaneously pushing or pulling the same a removal of the tie-bar and spacer from the wall is effected. The several forms of tie-bars and spacers illustrated may be turned in an opposite direction from that which they are turned to reduce the circumference of the encasing members, and when so turned or twisted both of the edges that overlap the bends adjacent to the longitudinal edges of the septum 12, will shear or cut away the cement or concrete, and thus enlarge the opening to effect a release of the tie-bar and spacer, and the material reamed away will be forced into the spaces between the septum and the encasing members.

A tie-bar and spacer made in one piece from a blank as shown by Figure 1, comprises a longitudinally tapered portion 12, circumflexed exterior portions 13 and 14 that encase the septum 12, the longitudinal edges of the parts 13 and 14 extending beyond and overlying the bends 15, as shown by Figs. 3 and 7 of the drawings. The bends or deformations 15 may be as shown by Fig. 4, in which instance the encasing members have their free edges in line circumferentially, and the recesses provide spaces for movement of the encasing members, such recesses merging into inclined surfaces upon which the free edges of the segments 13 and 14 may ride or press, when it is desired to project the free edges to ream or shear away a portion of the concrete to sever its adherence with the encasing members.

The end portions 16 of the septum 12 which extend beyond the ends of the encasing members 13 and 14, are each preferably provided with parallel slots 17, for the reception of keys or wedges 18, the width of the end portions being the same as the width of the ends of the septum 12 or of equal width, and the length of the slots are such as to extend to points beyond the ends of the encasing members.

When the tie-bar and spacer is used in the construction of hollow or spaced apart walls the encircling members 13 and 14 will be provided with openings 19, to receive inner mold plates 20, as shown by Fig. 10, and preferably the openings 19 do not extend either to the longitudinal edges of the septum 12 nor to the edges of the circumflexed encasing portions the openings being formed and spaced away therefrom so as not to materially weaken the arched members to such an extent that they would be likely to buckle under pressure.

To recess and increase the thickness of the walls I may use in connection with my tie-bar and spacer, washers or blocks 21 which have beveled edges, an opening for the passage of the slotted end of the tie-bar, and a circular recess 22 to receive the ends of the spacing members, the bottom of the recess being with or without pitched surfaces, depending upon the conformation of the ends

of the spacing members, as when they do not have pitched ends the recess or the inner face of the block or washer will provide the inclined surfaces.

In use with wooden molds or forms a tie-bar and spacer made to accord with my invention is used with washers or plates 23, as shown by Fig. 7, having therethrough slots for the passage of the slotted ends 16 that extend beyond the septums 12, and when the ends of the encasing members are not spiral or pitched the washers 23 will be formed with suitable projecting portions 24 for engagement with the ends of such members, for the purpose set forth. The projections 24 may be made by stamping or swedging the projections from the metal, as such method of construction will provide projections on one face and depressions on the opposite side, for use on opposite ends of the tie-bar and spacer whether the same be tapered or cylindrical. The ends of the tie-bar may have a single centrally located wedge receiving slot, though parallel slots are preferable as the wedges may engage adjacent plates, and the use of external mold connecting plates are unnecessary.

Fig. 9, shows a tie-bar and spacer of cylindrical form, and in broken lines one of the encasing members prior to being bent in shape. The edges at the ends of the encasing members may be at right angles to the parallel sides of the encased portion, for use with means for engagement with the free ends of the encasing members at one end when desired, or angular to the sides of the septum so that one of the ends thereof will extend beyond the end of the encasing member that it overlaps.

It will be noted that the tie-bar and spacer made to accord with my invention is characterized by an entire absence of screw-threads, nuts and the like, that it is formed in one piece and is adapted for reuse. When tapered apertures are formed in the wall they are adapted to receive and retain tapered plugs of wood to which may be nailed furring strips or other parts of the building.

The holes formed through the walls may be readily filled with concrete by working from the larger ends, and in some instances it may be desirable to let the tie-bars and spacers remain in the wall, as to provide openings for ventilation, and in such case the slotted ends may be bent in opposite directions, and when so bent the openings will permit a circulation of air but will not permit the entrance of rodents.

I claim:

1. A tie-bar and spacer comprising a diametric central member and oppositely disposed circumflexed members of less length than the diametric central member the latter encasing a portion of the central member.

2. A tie-bar and spacer compising a flat septum and resilient encasing members which are integral therewith.

3. A tie-bar and spacer comprising a centrally disposed member having apertured end portions and arched members sprung from and integral with the central member, the arched members encasing a part of the central member and overlapping each other.

4. A mold clamp for concrete work, comprising a tie-bar and integral arched members which encase a major portion of the tie-bar and provide spacing members.

5. A one piece tie-bar and spacer for mold-plates used for concrete work comprising a central flat member provided with apertures adjacent to the ends for the reception of wedges, encasing portions that encircle a part of the flat member the same being sprung from opposite edges of said flat member and of such area that they will extend beyond the opposite edges from which they are sprung.

6. In a tie-bar and spacer for molds used in concrete work a flat member, arched encasing members integral therewith and intervening bends from which the encasing members spring and extend for a distance sufficient to overlie the bend between the flat member and the opposite encasing member.

7. A tie-bar and spacer comprising a septum, arched encasing members and intervening bends which impart rigidity to the septum and from which the encasing members spring.

8. A tie-bar and spacer made of a single piece of sheet metal provided with a flat longitudinal portion and encasing members which extend therefrom, said encasing members being of arched formation and of such resiliency that the diametrical diameters thereof may be reduced by a torsional stress applied to the flat longitudinal portion.

9. A tie-bar and spacer comprising a tapered flat encased portion and tapered encasing portions which are integral with the portion that they encase.

10. A tie-bar and spacer comprising a longitudinally tapered septum to the opposite sides of which are acute bends from which spring arched encasing members the longitudinal edges of said encasing members extending beyond the sides of the septum from which they spring.

11. A tie-bar and spacer comprising a flat diametrical portion having side extensions which are oppositely circumflexed to encase a part of the diametric portion of the tie-bar the ends of the circumflexed portions being spiral.

12. A tie-bar and spacer comprising a longitudinally tapered member provided with slotted end portions, and integral encasing members of arched formation which are of

less length than the member which they encase such encasing members having ends of different diameters when circumflexed and of such circumferential area that the edges will extend beyond the part that they encase.

13. A tie-bar and spacer comprising a tapered portion and integral circumflexed encasing members which taper longtudinally the arched ends being pitched to be subjected to strain or pressure which tends to increase the area of the encasing members.

14. A tie-bar and spacer, comprising a sheet metal unit which is shaped to provide a flat diametric portion and circumflexed members of less length than the diametric portion said circumflexed members being provided between their ends with openings for inner mold plates.

15. In combination with a tie-bar and spacer, a washer or apertured plate that is adapted to be mounted upon the tie-bar and to be engaged by the arched ends of the spacing members.

16. In combination with a tie-bar and spacer having a flat central portion and integral encasing members having arched ends, of a washer having offset portions for engagement with ends of the encasing members, for the purpose set forth.

17. In combination with a tie-bar and spacer for use in concrete work, a tie-bar and spacer provided with a septum that is longitudinally tapered and end extensions each having a plurality of elongated apertures therethrough, circumflexed septum encasing members which extend from opposite sides of the septum they being of such area as to extend beyond the septum and to have their free edges parallel therewith, the arched end portions of the encasing members engaging mold-plates, for the purpose set forth.

18. A tie-bar and spacer formed from a single blank of sheet metal the blank being bent to provide a flat central portion and semi-tubular circumflexed encasing portions of less length than the central portion and openings formed through the ends of the flat portion for the reception of wedges.

JOHN P. JACKSON.