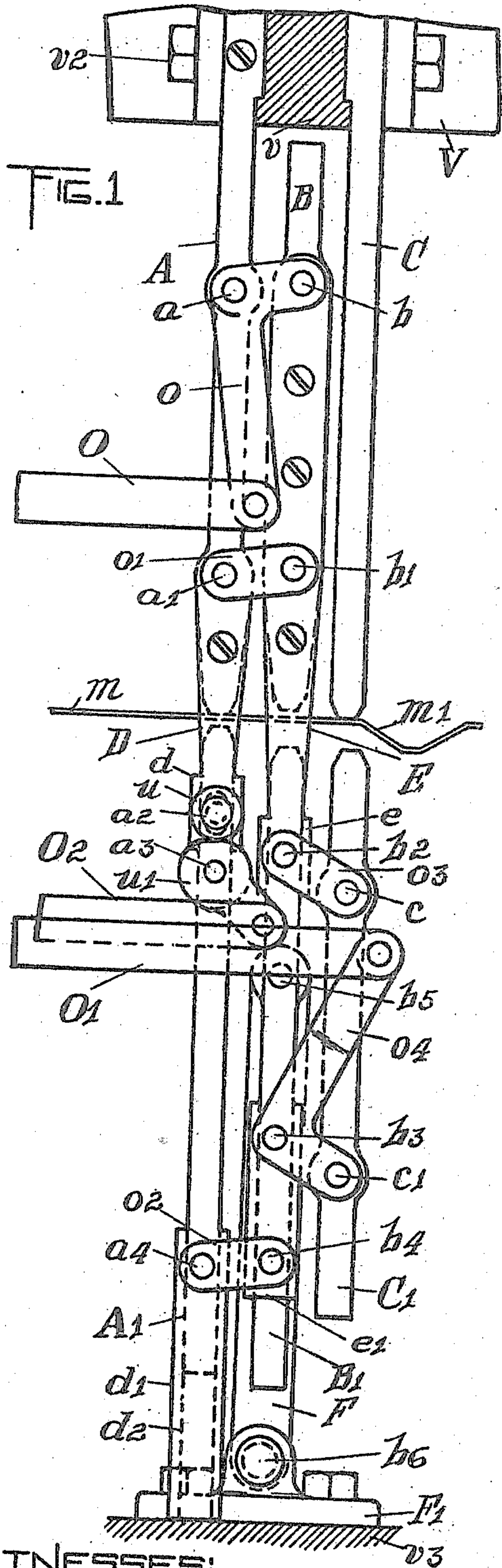


W. H. COOLEY.  
MACHINE FOR CORRUGATING SHEET METAL.  
APPLICATION FILED SEPT. 8, 1908.

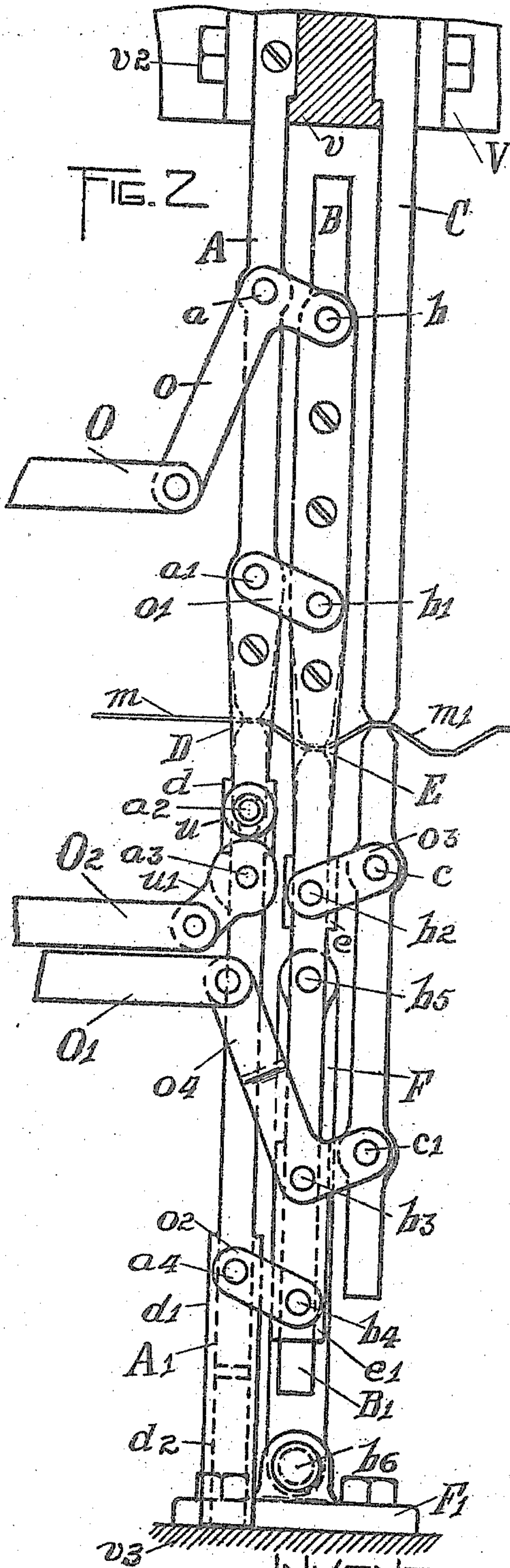
951,630.

Patented Mar. 8, 1910.

2 SHEETS—SHEET 1.



WITNESSES:  
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2 SHEETS—SHEET 2.

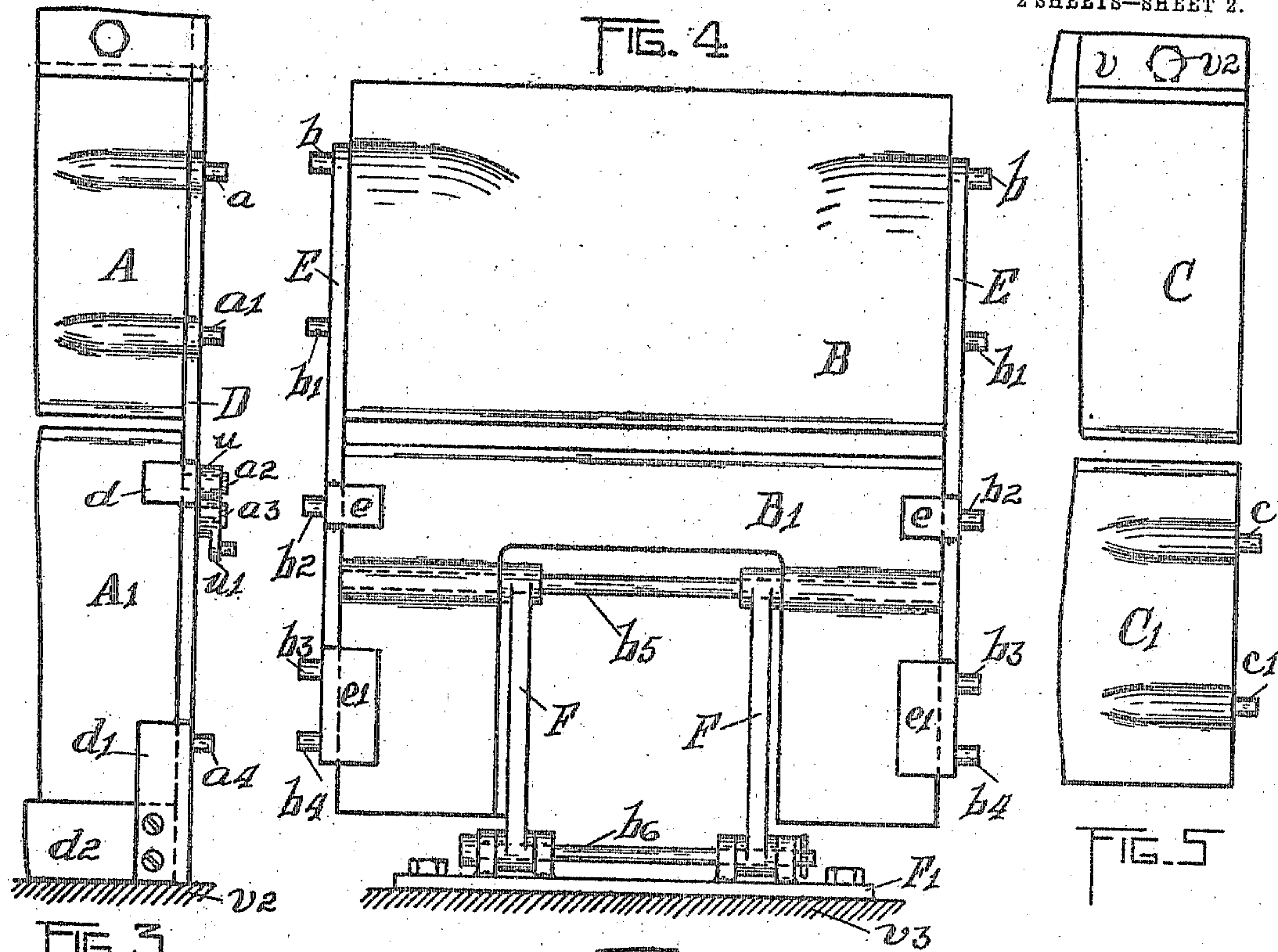


FIG. 3

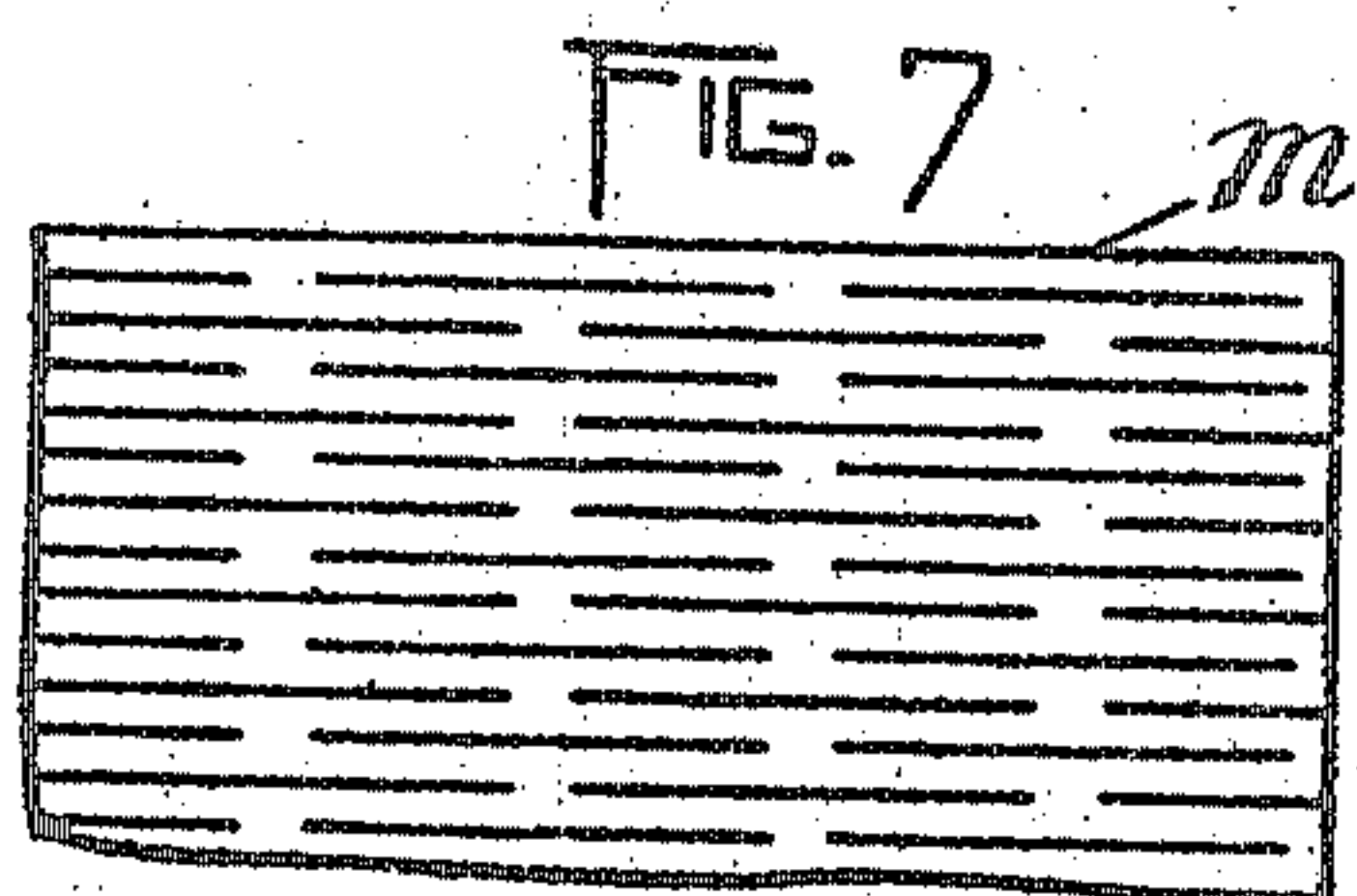


FIG. 7

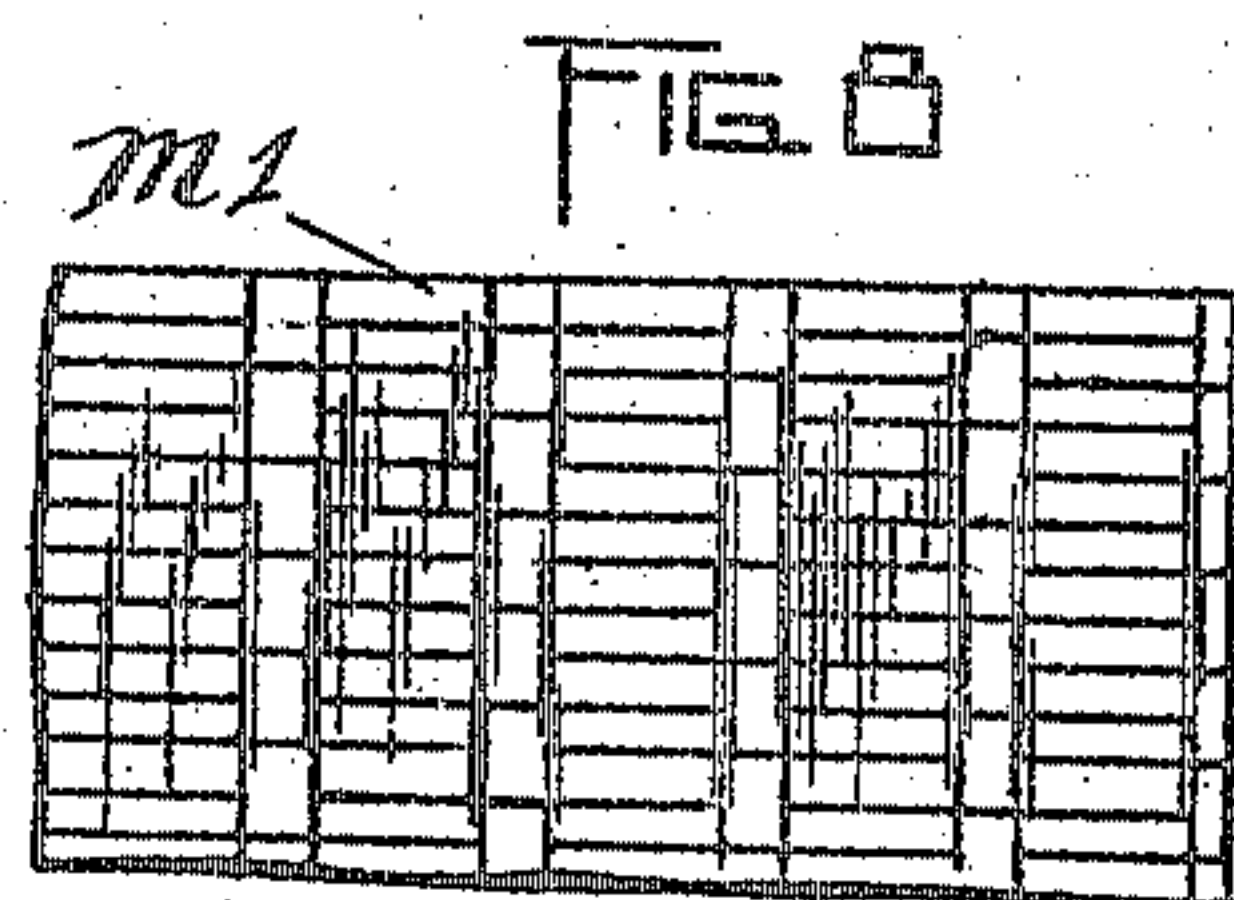


FIG. 8

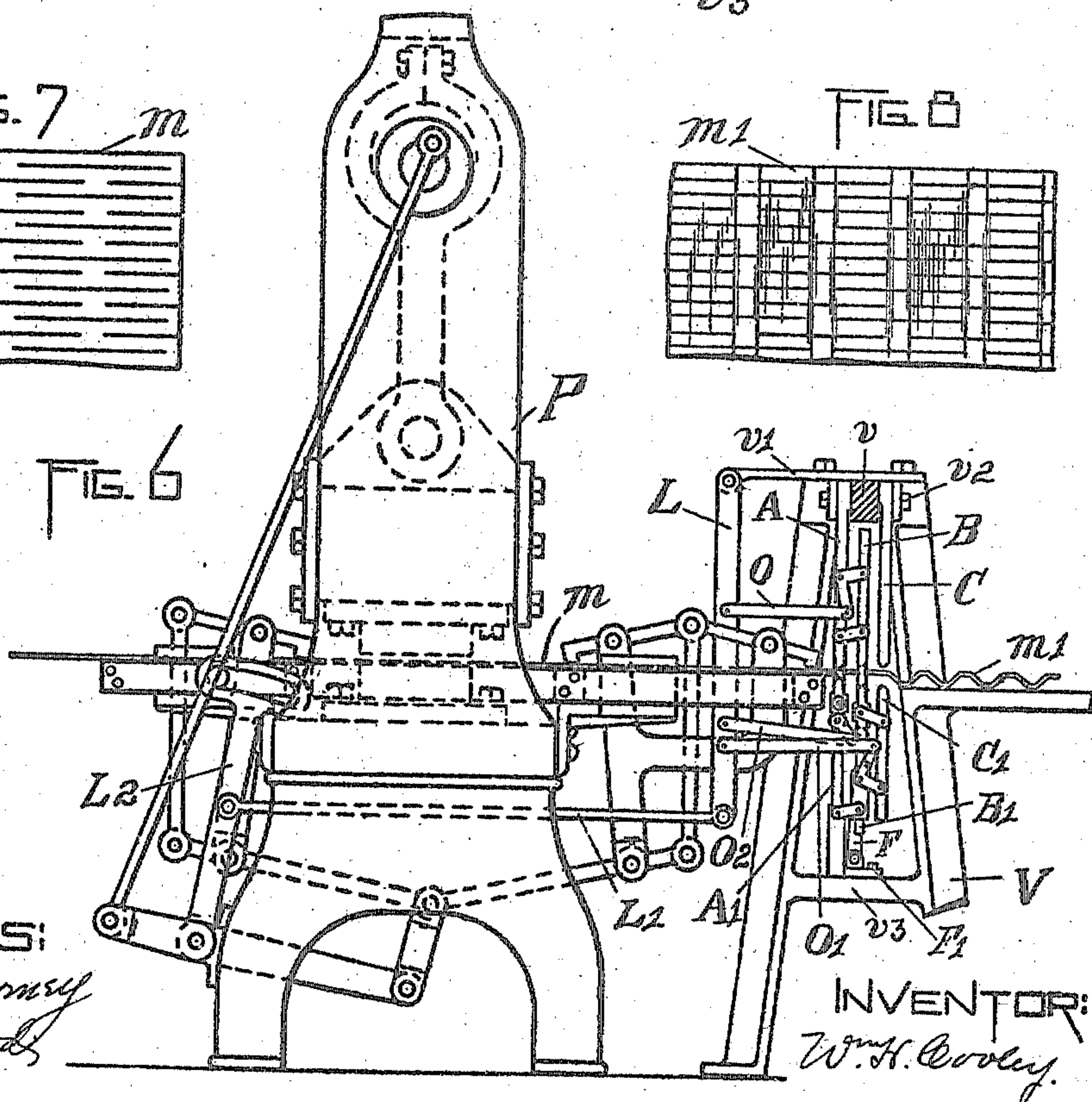


FIG. 6

WITNESSES:

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Lottin Hood

INVENTOR:

W. H. Cooley



# UNITED STATES PATENT OFFICE.

WILLIAM H. COOLEY, OF BROCKPORT, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO STEEL FIREPROOFING COMPANY, OF WHEELING, WEST VIRGINIA, A CORPORATION OF WEST VIRGINIA.

## MACHINE FOR CORRUGATING SHEET METAL.

951,630.

Specification of Letters Patent.

Patented Mar. 8, 1910.

Application filed September 8, 1908. Serial No. 451,998.

*To all whom it may concern:*

Be it known that I, WILLIAM H. COOLEY, a citizen of the United States, and a resident of Brockport, in the county of Monroe and State of New York, have invented a new and Improved Machine for Corrugating Sheet Metal, of which the following is a specification.

This invention relates to means for corrugating sheet metal after the same has been cut preparatory to expansion, and while it is quite immaterial by what means the metal may have been cut, still, that embodiment of my present invention shown in the accompanying drawings and herein described is more especially adapted to use in connection with a reciprocating press carrying series of cutters arranged to form in the metal alternating rows of slits, and in the accompanying drawings I have shown my invention as applied to an ordinary press such as may be readily adapted to the purpose of cutting the metal in this way.

An essential feature of my present invention consists in providing means for forming the sheet metal, after it has been cut, corrugations extending transversely of the direction of the cuts and of the direction of the feed of the metal through the machine, the corrugating mechanism being so proportioned and actuated as to press adjacent rows of the keys or bonds in relatively opposite directions in order that the metal may be expanded by engaging the metal at such keys and forcing or drawing the keys in substantially straight lines and in directions substantially transverse to the general plane of the corrugated sheet.

The accompanying drawings illustrating my invention are as follows:—Figures 1 and 2 show right hand edge views of my corrugating apparatus with the parts shown in Fig. 1 in their initial position, while in Fig. 2 they are shown in the position which they assume just at the completion of the formation of a corrugation in the sheet of metal. Fig. 3 is a view, as seen from the left, of the right hand portion of the members A and A<sup>1</sup> of Fig. 1. Fig. 4 is a view of the members B and B<sup>1</sup>, as seen from the left in Fig. 1, while Fig. 5 is a similar view of the right hand portion only of the members C and C<sup>1</sup> of Fig. 1. Fig. 6 is a side view of a press such as may be readily adapted to forming

the cuts in the metal in the manner indicated diagrammatically in Fig. 7, showing a portion of such a cut sheet, while Fig. 8 shows a portion of a sheet of the cut metal after having been corrugated.

Similar letters refer to similar parts throughout the several views.

Referring to Fig. 6,—at *m* is seen a sheet of the metal after having been cut in the manner indicated in Fig. 7. This sheet of metal *m* is fed intermittently through the press P shown in side view in Fig. 6 by means of feeding mechanism shown in outline in such figure. In this machine a feeding lever L<sup>2</sup> is reciprocated to the right and to the left the proper distance to actuate the feeding and gripping mechanisms to properly feed the sheet of metal *m* through the press. The side frame pieces V comprise the supporting means for the corrugating mechanism having secured between them at their upper ends the cross arm *v* to which is rigidly secured, by means of the bolts *v*<sup>2</sup>, the fixed members A and C of the corrugating mechanism. Horizontal arms, of which there are two, one only being shown, *v*<sup>1</sup>, are secured across the upper ends of the members V and extend to the left toward the body of the press and on their left hand ends are pivotally secured the upper ends of the levers L, the lowers ends of which articulate with the right hand ends of connecting links L<sup>1</sup>, the left hand ends of which articulate with the reciprocating feeding levers L<sup>2</sup> of the press P. The lower end of the corrugating mechanism is supported upon a plate F<sup>1</sup> extending between and resting upon the cross connections *v*<sup>3</sup> extending between the sides of each frame member V. The sheet of metal *m* is fed intermittently to the corrugating members A, A<sup>1</sup>, B, B<sup>1</sup>, C and C<sup>1</sup> and such members are constructed and operated in the manner more fully illustrated in Figs. 1, 2, 3, 4 and 5, to which reference is now made.

Rigidly secured on the left hand side of the cross bar *v* is seen the fixed plate A, such plate having studs *a* and *a*<sup>1</sup> extending outwardly therefrom. On the right and left hand edges of this plate A are secured, by means of screws as seen, the guiding plates D having the guiding lugs *d* and *d*<sup>1</sup> formed thereon, and these lower guiding lugs *d*<sup>1</sup> are secured to a foot piece *d*<sup>2</sup> extend-



ing between the plates D, of which there are two, forming a pair, only one being seen in Figs. 1, 2 and 3.

The plate A<sup>1</sup> has a slight vertical movement between the guiding lugs *d* and *d*<sup>1</sup>, which, it should be noted, extend on both the left and right hand sides of such plate, as seen in Figs. 1 and 2. Through a suitable slot in the plates D there extend studs *a*<sup>2</sup>, one only of which is seen in the drawings, and such slots are adapted to permit a vertical movement of the plate A<sup>1</sup>, and upon such studs *a*<sup>2</sup> are secured suitable rollers *u*, by means of which this plate A<sup>1</sup> is supported from cam rollers *u*<sup>1</sup> revolvably supported on the studs *a*<sup>3</sup> extending outwardly from and secured in the plates D. These cam rollers *u*<sup>1</sup> have thereon arms forming cranks in which there are secured studs or pins upon which the right hand ends of the connecting links O<sup>2</sup> articulate in such a way that when such links O<sup>2</sup> are drawn to the left, as seen in Figs. 1 and 2, the plate A is forced upwardly so as to clamp the sheet of metal *m* between its upper edge and the lower edge of the plate A. Studs *a* extend outwardly from this plate A and bell crank levers *o* are pivotally supported thereon, such levers articulating at their lower ends with the connecting links O and at their right hand ends upon studs *b* extending outwardly from the plate B and through the plates E secured on the outer edges of such plate B. A pair of connecting links *o*<sup>1</sup> articulating upon studs *a*<sup>1</sup> and *b*<sup>1</sup> serve to keep the plates A and B in parallel planes for any relative movements of such plates. A similar pair of connecting links *o*<sup>2</sup> articulating upon studs *a*<sup>4</sup> and *b*<sup>4</sup> projecting outwardly from the plates D and from the plates E serve to keep the lower ends of such plates E parallel with the plates A and A<sup>1</sup>. On these plates E are secured guiding ears or lugs *e* and *e*<sup>1</sup>, permitting such plates E to slide vertically upon the plate B<sup>1</sup> and this plate B<sup>1</sup> is supported upon a rod or shaft *b*<sup>5</sup> secured therein on each side of the opening through the center portion of such plate B<sup>1</sup>. A pair of links F, as seen in Figs. 1, 2 and 4, articulate at their lower ends upon a shaft or rod B<sup>6</sup> secured in suitable ears projecting upwardly from the plate F<sup>1</sup> and at their upper ends upon the rod or shaft *b*<sup>5</sup> and form a support for the plate B<sup>1</sup>, permitting the plate B<sup>1</sup> to have a slight movement to the right or to the left but always in a vertical plane parallel with the plane of the plates A and A<sup>1</sup>, while at the same time the plate B may be moved to or from the plate B<sup>1</sup> by the operation of the bell crank levers *o* by means of the connecting links O. The studs *b*<sup>2</sup>, *b*<sup>3</sup> and *b*<sup>4</sup> project outwardly from the plates E and on the studs *b*<sup>2</sup> there articulate the connecting links *o*<sup>3</sup>, the other ends of which articulate upon studs *c* secured in the

outer edges of the plate C<sup>1</sup>. On the studs *b*<sup>3</sup> there articulate bell crank levers *o*<sup>4</sup>, their upper ends making pivotal connection with the right hand ends of the connecting links O<sup>1</sup>, while their other ends articulate upon studs *c*<sup>1</sup> projecting outwardly from the plate C<sup>1</sup>, whereby, by the movement of the connecting link O<sup>1</sup> to the left, the plate C<sup>1</sup> is moved upwardly so as to clamp the metal against the fixed plate C, the upper end of which is rigidly secured to the cross bar *c* extending between the sides of the frame for the corrugating mechanism. These links O and O<sup>1</sup> and O<sup>2</sup> articulate at their left hand ends with the levers L, which operate the feeding mechanism of the cutting machine or press in the manner already described.

The proportion of the parts, as just above described, is such that as the feeding mechanism feeds the sheet of metal *m* to and through the press intermittently, each advance of said sheet to the right being the length of one of the cuts indicated diagrammatically in Fig. 7, and also the length of a space between two cuts in any continuous row of such cuts.

When the parts of the corrugating mechanism are in the position indicated in Fig. 1, the plates A and C are separated by a distance equal to the length of one of such cuts and the plate B is located in the center between them. The bell crank levers are so proportioned that when the parts are moved to the positions indicated in Fig. 2, the sheet of metal *m* is corrugated, as indicated in Figs. 1, 2, 6 and 8 at *m*<sup>1</sup>, in such a way that in expanding the metal the same may be engaged at the keys or bonds and drawn in straight lines, and it is preferable that the sheet be so corrugated that the outline or contour of the corrugations conform to the outline of a series of connecting bars extending between two adjacent transversely extending series of meshes in the expanded metal.

What I claim is:

1. In a machine for the purpose described, in combination with means for advancing the sheet between each operation of the corrugating members a distance equaling the original length of the portion of the sheet to be corrugated at each such operation; corrugating mechanism comprising means, fixed relative to the direction of the advancement of the sheet, for engaging the body of the sheet adjacent to and on the rear side of the corrugation to be formed therein; means for engaging the sheet at substantially the center of such corrugation to be formed; means for engaging the sheet at the forward side of such corrugation to be formed; means for moving the two outside engaging means and the centrally disposed engaging means in relatively opposite directions to form the corrugation and mechanism for moving the



outside engaging means and the centrally disposed engaging means relatively toward each other to compensate for the shortening of the sheet as it is being corrugated.

5 2. In a machine for the purpose described, in combination with means for advancing the sheet between each operation of the corrugating members a distance equaling the original length of the portion of the sheet  
10 to be corrugated at each such operation; corrugating mechanism comprising means, fixed relative to the direction of the advancement of the sheet, for engaging the body of the sheet adjacent to and on the rear side of  
15 the corrugation to be formed therein; means for engaging the sheet at substantially the

center of such corrugation to be formed; means for engaging the sheet at the forward side of such corrugation to be formed; means  
for moving the two outside engaging means 20 and the centrally disposed engaging means in relatively opposite directions to form the corrugation and supports for such engaging means permitting such outside engaging means and such centrally disposed engaging  
25 means to move relatively toward each other to compensate for the shortening of the sheet as it is being corrugated.

WM. H. COOLEY.

Witnesses:

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OSBORNE F. GURNEY.