P. B. ABRAMSEN.

MECHANICAL DOUBLER FOR SHEET AND TIN PLATES.

APPLICATION FILED NOV. 10, 1919. RENEWED APR. 8, 1922.

1,434,470.

Patented Nov. 7, 1922.

4 SHEETS—SHEET 1.

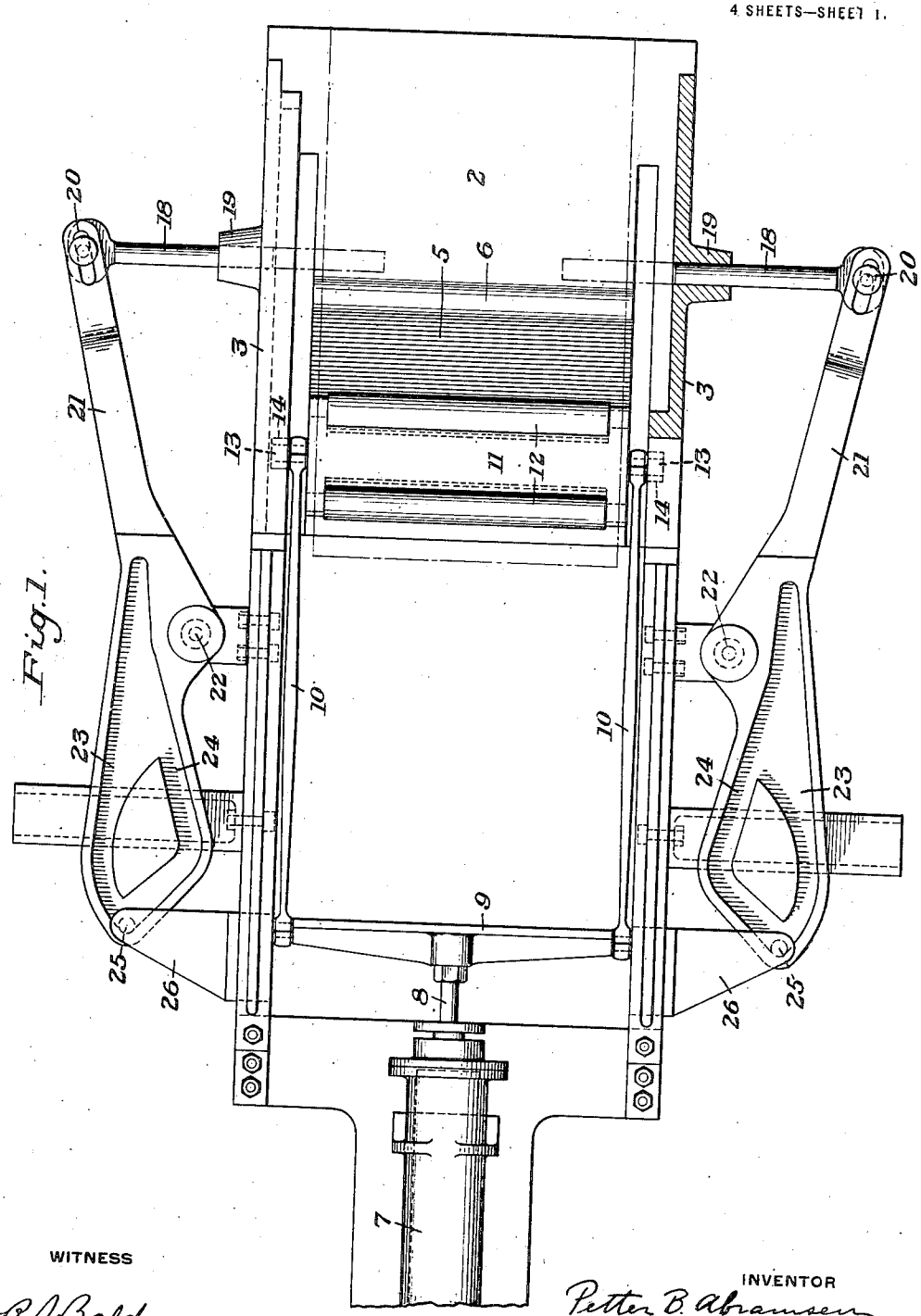


Fig. 1.

WITNESS

R. A. Balderson

INVENTOR

Petter B. Abramsen

by his attorneys

Bakewell, Byrnes & Parmelee

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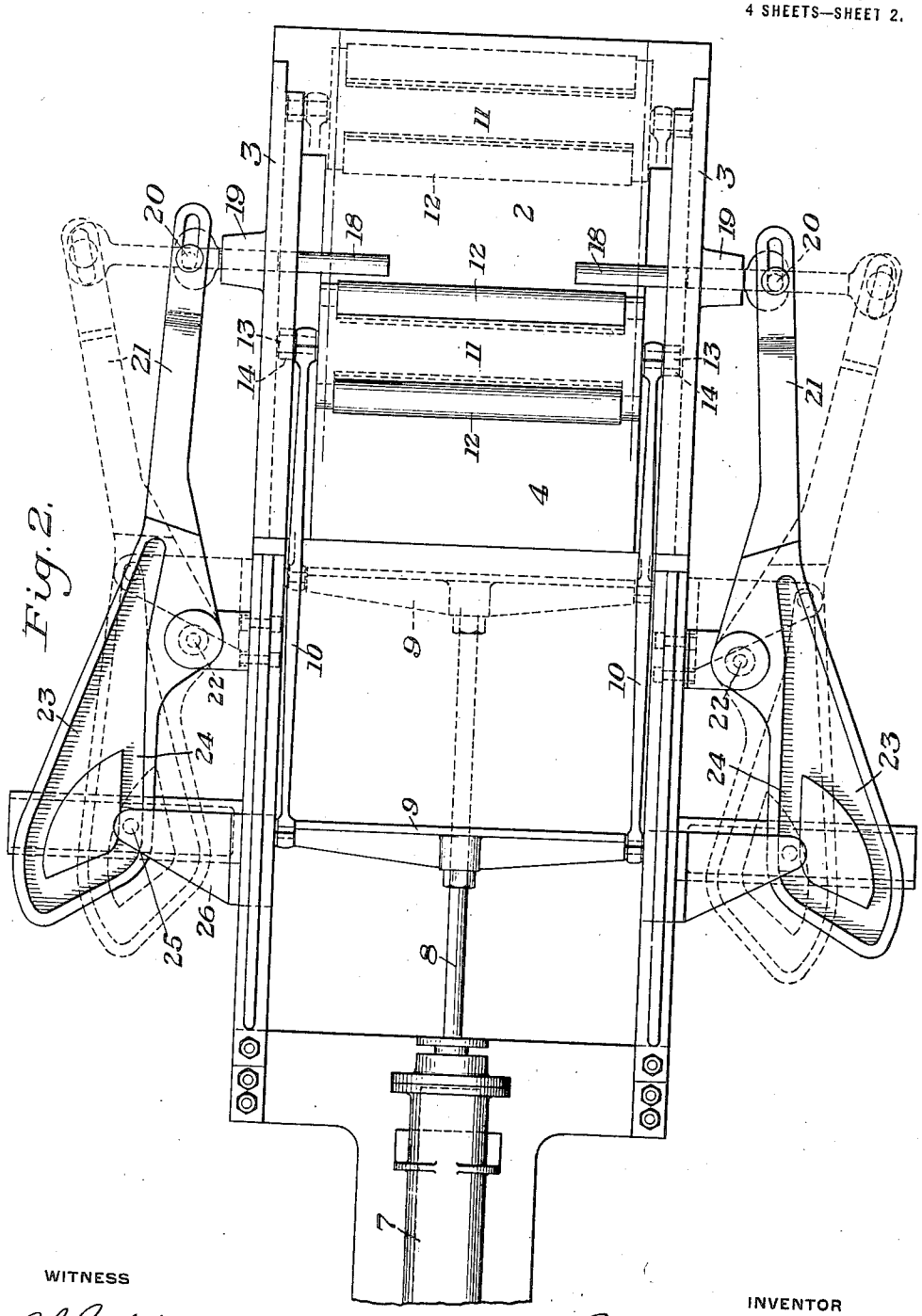


Fig. 2.

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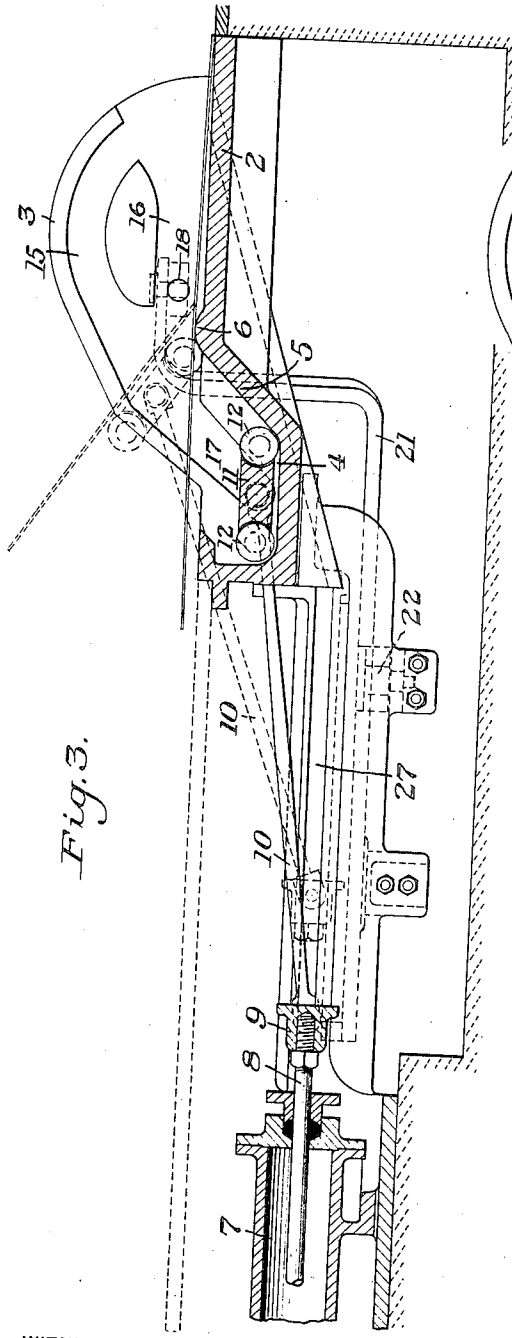


Fig. 3.

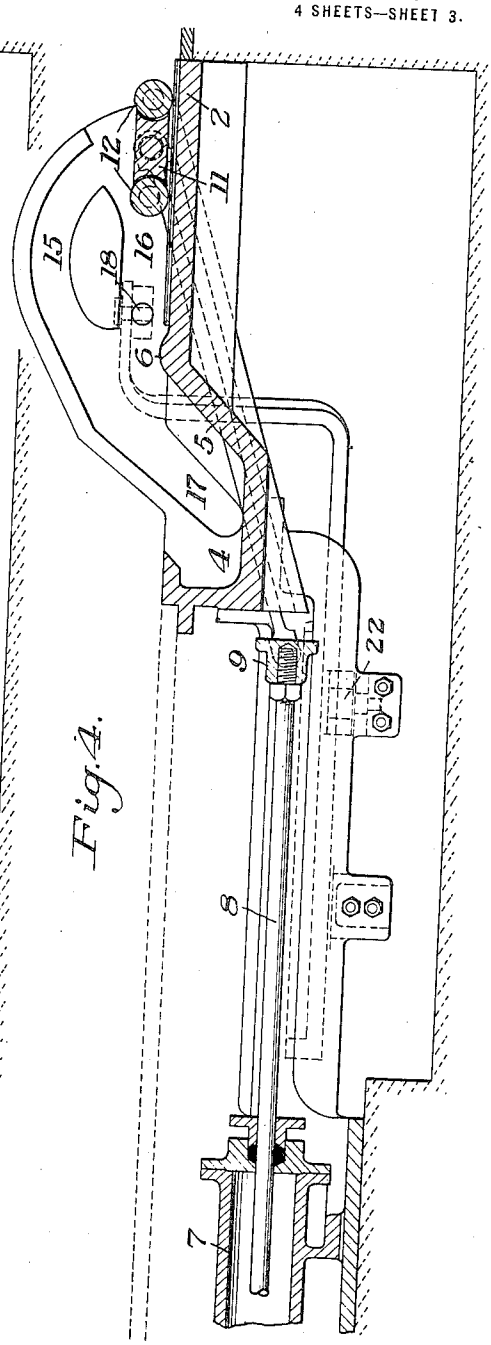


Fig. 4.

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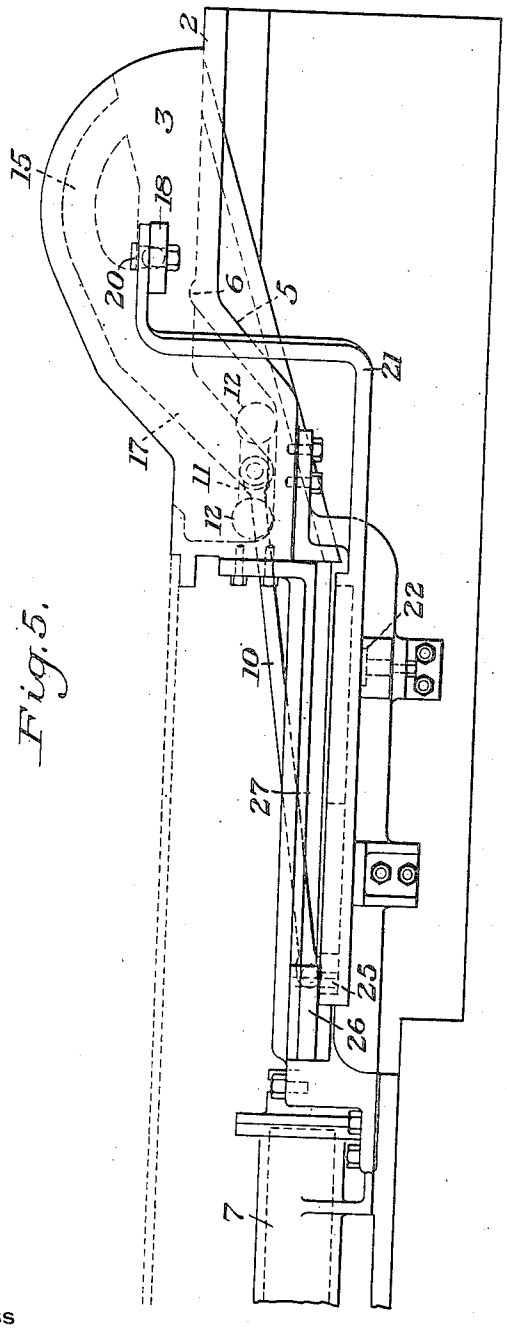


Fig. 5.

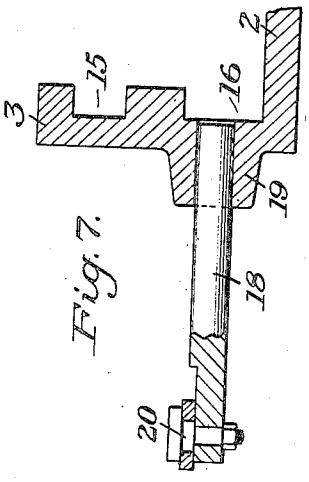


Fig. 7.

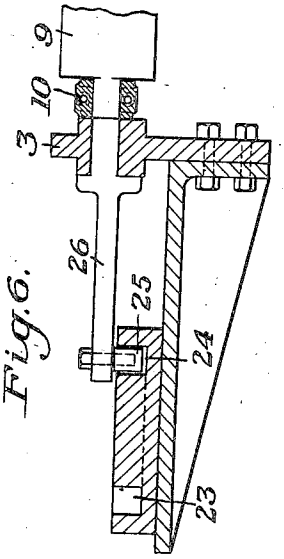


Fig. 6.

WITNESS

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Patented Nov. 7, 1922. 1,434,470

UNITED STATES PATENT OFFICE.

PETTER B. ABRAMSEN, OF DORMONT, PENNSYLVANIA.

MECHANICAL DOUBLER FOR SHEET AND TIN PLATES.

Application filed November 10, 1919, Serial No. 336,773. Renewed April 8, 1922. Serial No. 550,791.

To all whom it may concern:

Be it known that I, PETTER B. ABRAMSEN, a subject of the King of Norway, residing at Dormont, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Mechanical Doublers for Sheet and Tin Plates, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figures 1 and 2 are plan views of a doubler embodying my invention; Figure 1 being partly in horizontal section and the two views showing some of the parts in different positions;

Figures 3 and 4 are longitudinal sections of the parts in different positions;

Figure 5 is a side elevation of the doubler; and

Figures 6 and 7 are detail sectional views hereinafter more fully described.

My invention has relation to doublers for sheet and tin plates, and is designed to provide a simple and efficient mechanical doubler by means of which the work may be readily and accurately performed.

The nature of my invention will be best understood by reference to the accompanying drawings, in which I have shown the preferred embodiment thereof and which will now be described, it being premised, however, that various changes can be made in details of construction and arrangement and combination of the several parts, without departing from the spirit and scope of my invention as defined in the appended claims.

In the drawings, the numeral 2 designates a flat table upon which the sheets are placed to be folded, the sheets being successively delivered in any usual or suitable manner. This table is provided with side plates or brackets 3, suitably secured thereto. At the rear end of the working portion of the table, there is formed a transversely extending pocket or depression 4, having an inclined forward wall 5, leading up to the table surface. Preferably a ridge 6 is formed at the junction of the table surface with this inclined surface, the reason for which will presently appear. 7 designates a double-acting hydraulic cylinder, whose plunger 8 is connected to a cross head 9. The opposite end portions of this cross head are connected by the pitmans 10, with a folder which comprises a body portion 11, of general I-shape in plan view, and having rollers 12, journaled at the front and rear sides thereof, the journal seats being provided in the ends of said body. The pitmans 10 are connected to the pins or trunnions 13, at opposite ends of this body, and these pins or trunnions are extended to form journals for the small rollers 14. The inner faces of the side plates or brackets 3 are provided with cam tracks for the rollers 14, each of these tracks consisting of an upper branch 15, and a lower branch 16, the two branches merging into each other at each end. At the rear end, the merged portions of the tracks extend downwardly to about the level of the bottom of the pocket 4, as shown at 17.

18 designates members over which the sheet or plate is folded. These members are in the form of pins arranged to be projected inwardly over the table 2 at opposite sides thereof, in order that the sheet or plate may be bent around them, after which they are withdrawn. The side plates 3 of the table are provided with suitable guides 19 for these members.

Reciprocation of these members can be effected in various ways from the movement of the cross head 9. In the particular construction which I have illustrated, each of the members 18 has a pin-and-slot connection at 20 with the forwardly extending arm 21 of a lever pivoted at 22. The opposite rearwardly extending arm of this lever has a cam track somewhat similar to the cam tracks 15 and 16, before described; that is to say, each of these tracks has the two branches 23 and 24 merging at each end and adapted to be engaged by pins 25 or the like, carried on lugs 26, which are attached to the cross head 9, and slide in slots 27 in the side frames 3.

The operation is as follows: The sheet or plate to be folded is fed on to the table in the position substantially as illustrated in Figure 3, with the advanced end portion thereof extending over and across the pocket 4. At this time, the cross head 9 is in its retracted position and the folding member rests on the bottom of said pocket, as shown in Figure 3. The hydraulic cylinder is then actuated to move the cross head forwardly. This causes the folding member to move upwardly on the inclined surface 5, and into contact with the under side of the sheet, raising the latter to the position shown in

dotted lines in Figure 3. During this forward movement of the cross head, the levers 21 are moved from the position shown in full lines in Figure 1 to the position shown in full lines in Figure 2, thereby projecting the members 18 over the table, as shown in full lines in Figure 2. When the folding member reaches the position shown in dotted lines in Figure 3, the roller 12 thereof contacts with the ridge, and said device swings on its central pivotal connections with the pitmans 10, whereby as the rollers 13 move forwardly in the upper branches 15 of the cam tracks in the side plates, the folding member turns over and downwardly, thereby doubling the sheet over the members 18, and down upon itself, reaching the position shown in full lines in Figure 4.

The cylinder 7 is then reversed and the folding device moves backwardly over the sheet, thus smoothing down the fold, the rollers 13 now traveling in the lower branches 16 of the cam slots. During this rearward movement of the cross head, the members 18 are retracted. As the folding device moves over the ridge 6, this ridge acts to put an increased pressure on the plate and thus complete the fold. This increased pressure results from the elevation of the roller 12, which is in engagement with the ridge, thereby rotating the folder about the trunnions 13 and forcing the other roller 12 into closer engagement with the material being folded. When the folding device is again in the pocket 4, the folded sheet is removed from the table and the parts are then ready for the next operation.

A comparison of Figures 1 and 2 will make clear the manner in which the levers 21 are actuated to operate the members 18 in timed relation to the movement of the folder. During the forward movement of the cross head, the pins 26 move in the inner branches 24 of the cam tracks in said levers, thus swinging the forward arms of said levers inwardly. During the reverse movement of the cross-head, these pins travel in the outer branches 23 of said cam tracks, and thus move the levers to retract the members 18.

It will be readily understood that the folding device is not necessarily of the form which I have herein shown and described. I prefer, however, to use a device of the character which will have relatively widely separated points of contact with the plates or sheets to be folded so as to exert a holding action and overcome the tendency of the sheets or plates to curl, as is the case where there is a limited or line contact therewith. This tendency is counteracted by the use of a folder such as herein disclosed, due to the simultaneous operation on the material at separated points whereby there is an effectual holding of the sheets at different points longitudinally thereof.

The advantages of my invention will be apparent from the foregoing, since it provides a mechanical doubler composed of few parts which are constructed and arranged to operate in a simple and positive manner and to rapidly and accurately double and fold the sheets or plates.

I claim:

1. In a doubler for sheet and tin plates, the combination with a table, a combined folding and holding device arranged to reciprocate on said table and normally lying below the level thereof, reciprocating members adapted to be projected inwardly over said table from the sides thereof and about which the sheets or plates are doubled, and a motive device operatively connected to the folding and holding device and to said members to operate them in timed relation to each other, said combined folding and holding device having a plurality of longitudinally spaced portions for simultaneous contact with the material being operated upon, substantially as described.

2. A mechanical doubler for sheet and tin plate comprising a table having a transverse pocket or recess therein over which the sheets to be doubled may be fed, a combined folding and holding device normally lying in said recess or pocket, the latter having an inclined wall leading upwardly to the table surface and over which the folding and holding device is movable, means for reciprocating said folding and holding device, and fold-determining members adapted to be alternately projected over and retracted from position above said table, together with means for actuating said members in timed relation to the movement of the folding and holding device, said device having a plurality of longitudinally spaced portions for simultaneous contact with the material being operated upon, substantially as described.

3. In a mechanical doubler, the combination with a table having a recess or pocket extending transversely of the table and having an inclined wall extending forwardly and upwardly to the table surface, of a folding device comprising a carriage having a plurality of rollers journaled on different transverse axes therein and adapted to travel up said incline and over said table, means for reciprocating said carriage, and means for guiding the carriage in its movement, substantially as described.

4. In a mechanical doubler for sheet and tin plate, the combination with a table having a transversely extending recess or pocket therein, of a combined folding and holding device normally lying within said recess or pocket, means for reciprocating said folding and holding device over said table and substantially parallel thereto, and means for causing said device to tilt or swing as it is moved in a forward direction, said device

having a plurality of longitudinally spaced portions for simultaneous contact with the material being operated upon, substantially as described.

5. In a mechanical doubler, a folding device comprising a tilting carriage, said carriage having a plurality of roller members journaled on different transverse axes therein, and means for reciprocating the carriage, substantially as described.

6. In a mechanical doubler, a table having a transversely extending recess or pocket, the forward wall of said pocket being inclined upwardly and forwardly to the table surface and there being a transversely extending ridge at the junction of said surfaces, substantially as described.

7. In a mechanical doubler, the combination with a table having side guides provided with cam tracks, of a doubling device comprising a carriage adapted to engage the material being operated upon at a plurality of longitudinally spaced lines and having guiding means engaging the cam tracks, and means for reciprocating the carriage, and means for causing the carriage to swing about the central transverse axis thereof as it is moved, substantially as described.

8. In a mechanical doubler, a table a tilting doubling folding device co-operating therewith, said device having spaced rollers forming separated points of roller contact with the sheet or plate to be doubled, and means for reciprocating said device, substantially as described.

9. In a mechanical doubler, a table and a doubling and folding device co-operating therewith, said device comprising a transverse carriage, and actuating members in and between which said carriage is pivoted, said carriage having members for contact with the sheet at different points longitudinally thereof, together with means for reciprocating the same over the table in a plane substantially parallel thereto, substantially as described.

10. In a mechanical doubler, a table and a doubling and folding device co-operating therewith, said device comprising a transverse carriage, and actuating members in and between which said carriage is pivoted, said carriage having members for contact with the sheet at different points longitudinally thereof, together with means for causing the carriage to swing on its pivot at a predetermined point in its movement, substantially as described.

11. A mechanical doubler having a combined doubling, folding and holding device, and means for imparting a reciprocating and also a swinging movement to said device, substantially as described.

12. A mechanical doubler, comprising a doubling and folding member, means for reciprocating said member, and means whereby said member is caused to swing upwardly and over on its forward movement, and to move backwardly in a substantially straight line for a portion of its rearward movement, said member having means for holding the material being doubled during said backward movement, substantially as described.

13. In a mechanical doubler, a reciprocating cross head, a doubling, folding and holding member connected thereto, a motive device for reciprocating said head, and fold-determining members also having an actuating connection with said cross head, substantially as described.

14. In a mechanical doubler, a reciprocating cross head, a doubling and folding member connected thereto, a motive device for reciprocating said head, and fold-determining members also having an actuating connection with said cross head, said connections comprising levers carrying said fold-determining members, and engaged by the cross-head, substantially as described.

15. A mechanical doubler having a table and reciprocating fold-determining members movable laterally over the table from opposite sides thereof, together with a combined doubling, folding and holding member operated in timed relation to said members, substantially as described.

16. In a mechanical doubler, a doubling and folding device reversible about a transverse axis, and having means on opposite sides of said axis for engaging the material being doubled, substantially as described.

17. In a mechanical doubler, a folding device comprising a carriage reversible about a central transverse axis, and roller members journaled in said carriage on opposite sides of said central axis, substantially as described.

18. In a mechanical doubler, a folding device comprising a carriage reversible about a central transverse axis, a plurality of roller members journaled on opposite sides of said axis, and means for operating said carriage, substantially as described.

19. In a mechanical doubler, the combination with a table having guides provided with cam tracks, of a doubling device comprising a carriage having guiding means engaging the cam tracks, means for operating the carriage, means for causing the carriage to swing about the central transverse axis thereof as it is operated, and means carried by said carriage on opposite sides of said axis for engaging the material being operated upon, substantially as described.

In testimony whereof I have hereunto set my hand.

P. B. ABRAMSEN.