L. C. STEELE.

DOUBLING MECHANISM.

APPLICATION FILED MAY 12, 1909.

952,052.

Patented Mar. 15, 1910.

3 SHEETS—SHEET 1.

FIG. 1

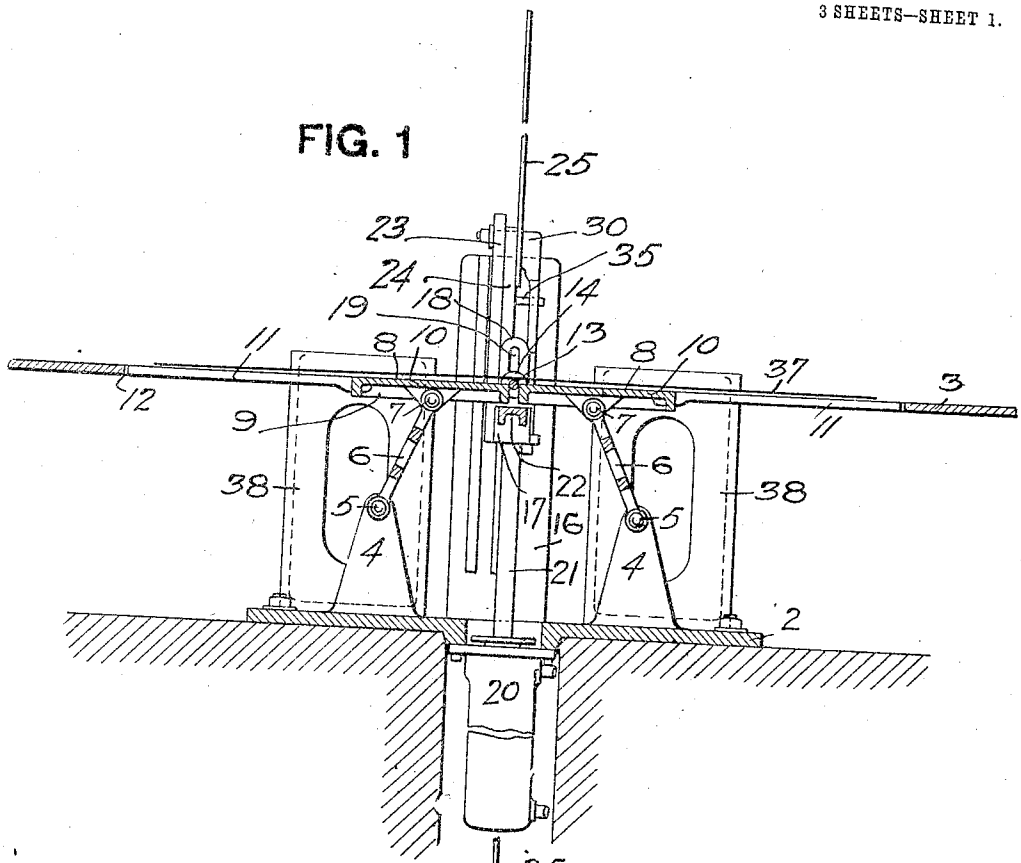
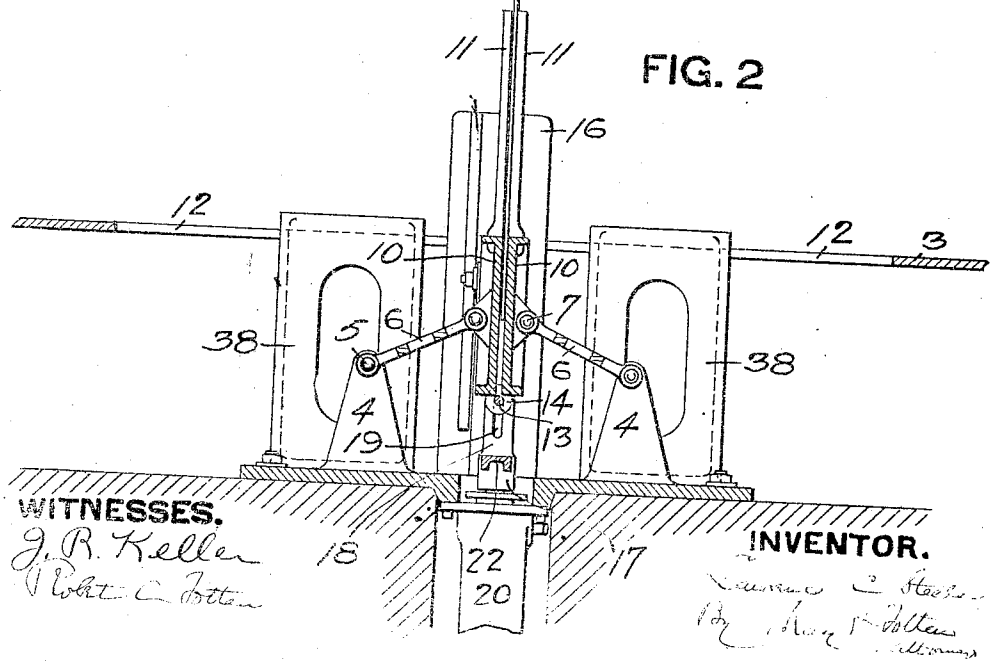


FIG. 2



WITNESSES.

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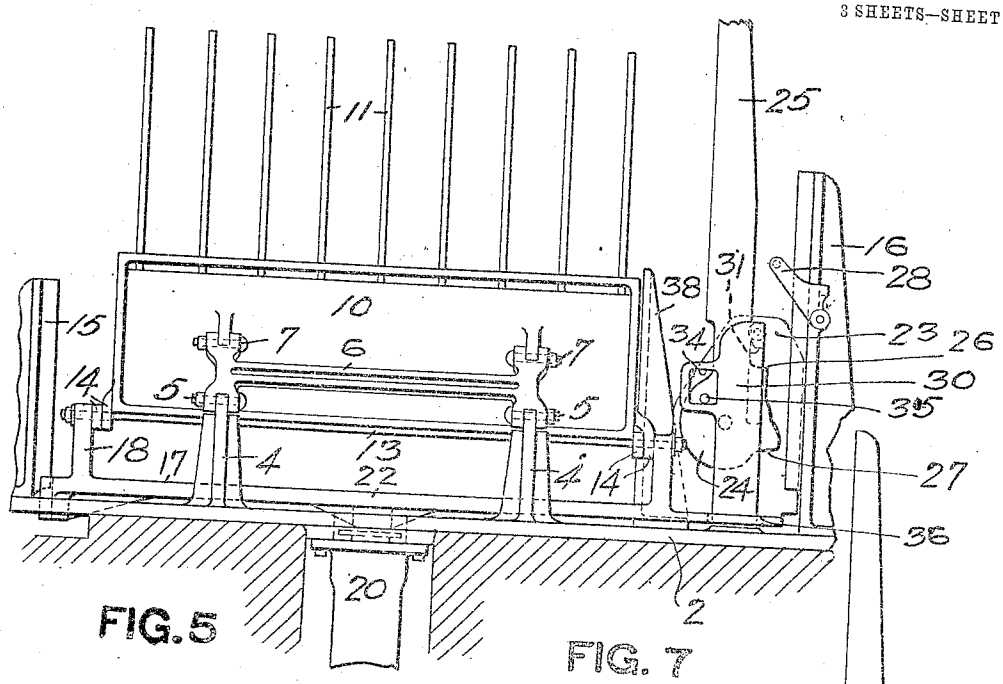


FIG. 5

FIG. 7

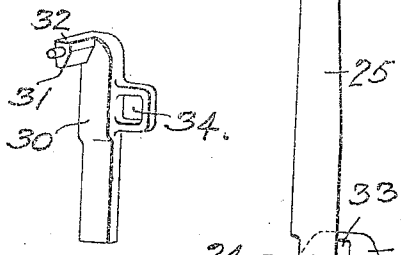
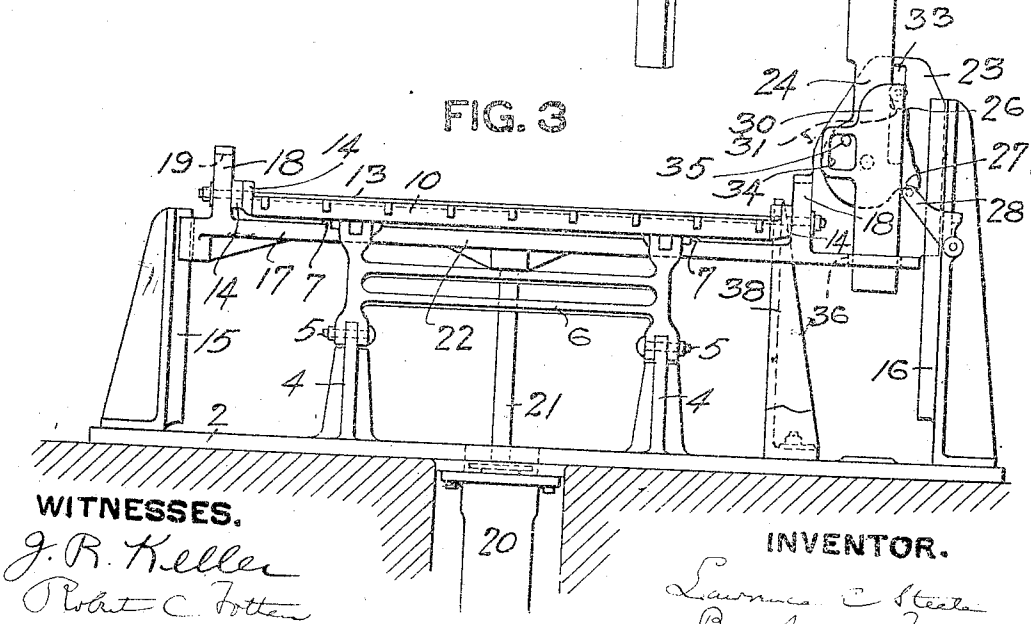


FIG. 3



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3 SHEETS—SHEET 3.

FIG. 4

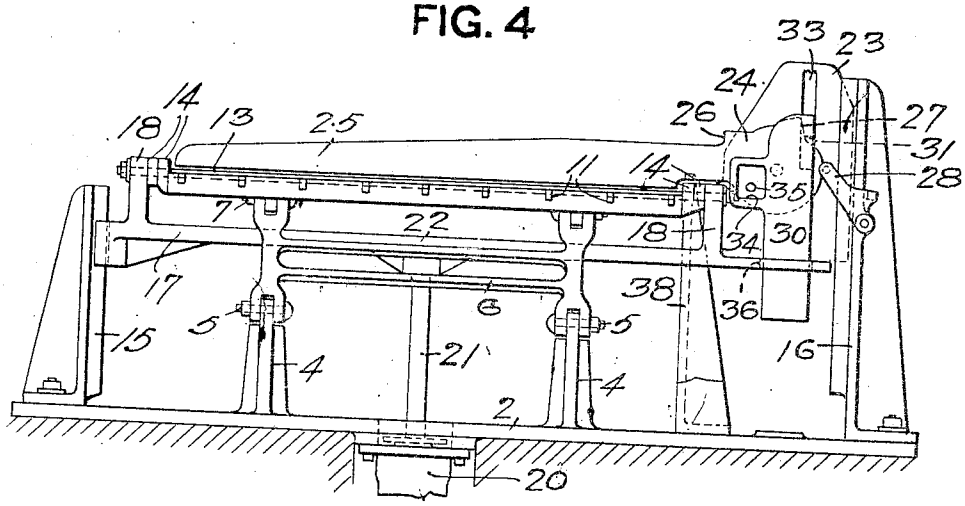
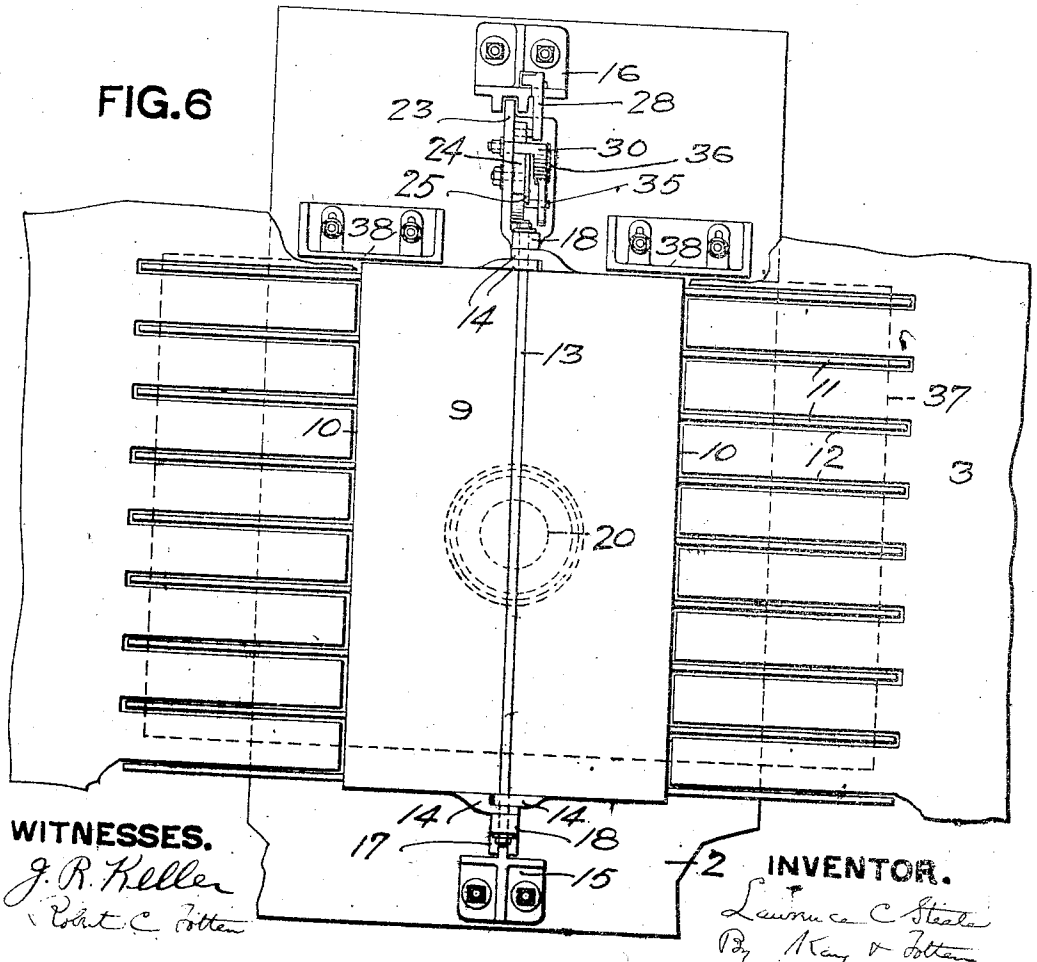


FIG. 6



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UNITED STATES PATENT OFFICE.

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DOUBLING MECHANISM.

952,052. Specification of Letters Patent. Patented Mar. 15, 1910.

Application filed May 12, 1909. Serial No. 495,544.

To all whom it may concern:

Be it known that I, LAWRENCE C. STEELE, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Doubling Mechanism; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to doubling mechanism for use in the doubling of sheets of metal or other material which may be conveniently doubled or folded by said machine.

While my invention may have a wide application the principal object is to provide a machine for the doubling of the packs in the manufacture of sheet metal and to provide a machine which is strong and durable in construction and which exerts sufficient power to quickly and accurately double the packs laid thereon, thereby doing away with the manual labor heretofore generally employed in connection with the doubling of such packs, and greatly reducing the cost.

To these ends my invention consists, generally stated, in doubling mechanism comprising a table composed of two folding members, means for securing the sheet to be doubled along the line of doubling operated by means for raising and lowering said folding members.

Referring to the drawings Figure 1 is a longitudinal section of my improved doubling mechanism; Fig. 2 is a like view showing the mechanism in position for doubling; Figs. 3, 4 and 5 are end views of the machine in different positions; Fig. 6 is a plan view; and Fig. 7 is a detail.

The numeral 2 designates a suitable base or bed-plate which is preferably located below the floor-level 3 in order to bring the doubling table proper flush with the floor-line. Pivoted to the lugs 4 on the bed-plate by means of the pivotal shafts or rods 5 are the arms 6. The arms 6 are arranged on an incline or angle with reference to the bed-plate and the upper ends of said arms are pivoted by means of the pivotal rods 7 to the folding or doubling-members 8 of the table 9. The doubling-members 8 preferably consist of the solid plate-portions 10 and the fingers 11 projecting therefrom, the doubling-members being arranged with reference to the floor level so that the fingers 11 will rest within the recesses 12 formed in the floor plates. In this manner the doubling-table is made flush with the floor so that the packs can be moved directly from the floor onto the doubling-table without interference. The doubling-members 8 are hinged together by means of the rod 13 which passes through the lugs 14 on the doubling members 8.

Supported on the bed-plate 2 are the standards 15 and 16. These standards form the guides for the vertically movable frame 17. The frame 17 has the lugs 18 with the slots 19 formed therein with which the hinged rod 13 engages. This allows for a certain vertical play on the part of the frame 17 without operating the doubling-members as hereinafter fully set forth. To provide for the raising and lowering of the vertically moving frame 17 I employ a hydraulic cylinder 20 whose plunger rod 21 is connected up to the cross-arm 22 of the frame 17. Forming part of the frame 17 is the plate 23. Pivoted to said plate 23 is the divider or holder 24 with the dividing arm 25 carried thereby. While I will refer to this device in the claims and specification as a divider, yet I wish it clearly understood that its further purpose is to hold the sheet down during the doubling operation, as fully hereinafter set forth. The divider 24 has the shoulder or notch 26 and the notch 27 with which a tripping pawl 28 pivoted to the standard 16 is adapted to engage. The dividing arm 25 is held in its upright position by means of the locking-member 30. This locking-member has the shoulder 31 which is adapted to engage the notch 26 of the divider so as to hold the dividing arm in its vertical position. This locking member has a movement independent of the frame 17 by which it is carried and said locking-member has a projection 32 which engages the slot 33 in the plate 23. The locking-member is further provided with the slot 34 to receive the stud or pin 35 carried by the divider 24. The lower end of the locking-member 30 passes through the slot 36 in the vertically movable frame 17 and the end of said locking arm is adapted to contact with the bed-plate 2 or any other suitable stop.

When my improved doubler is in use the pack 37 to be doubled where it is used in connection with the manufacture of sheet metal, is placed upon the table 9 as it comes from

the rolls and it is accurately adjusted on said table by means of the gages 38 which engage the edges of the pack along one side. When the pack has been properly laid upon the table the power is applied through the hydraulic cylinder to lower the frame 17. As said frame is lowered the shoulder 27 on the divider 24 moving in engagement with the pawl 28 throws the dividing arm out of engagement with the locking-member 30 and the dividing arm falls by its own weight down onto the pack along the line on which the pack is to be doubled. This initial descent of the frame 17 without moving the doubling members 8 of the table is effected through the play given to said table by the slots 19. With the hinge-rod 13 in engagement with the upper ends of the slots 19 a further downward movement of the frame will act on the hinge-rod 13 so as to cause the doubling-members 8 to fold up into the position indicated in Fig. 2. The inclined lever-arms 6 act to force the doubling-members toward each other on the principle of a toggle and a powerful force is exerted to double the pack. The dividing arm remains in its horizontal position bearing against the upper face of the pack so as to prevent the pack from rising and permit the doubling members to double or fold the pack along the line of the dividing arm. The locking-member has its shoulder 31 in engagement with the divider when the arm 25 is lowered and said locking member acts to lock said arm in this position and secure it against upward movement. When the frame has almost reached the limit of its downward movement the doubling members will have doubled the pack to such an extent as to make the presence of the dividing arm unnecessary and provision is now made for withdrawing said arm before the doubling is entirely completed. In releasing the dividing arm the locking-member has dropped of its own weight the projection 32 descending within the slot 33 in the plate 23. Accordingly as the frame descends the lower end of the locking member 30 comes in contact with the bed-plate 2 and the stud 35 on the divider 24 is lowered until it strikes the lower end of the slot 34. The still further downward movement of the frame with the pin in contact with the locking-member will act to lift the dividing arm to its vertical position and where it is again engaged by the locking member to hold it in said position. The doubling members 8 have by this time been folded to the full extent and the pack 37 has been doubled between said members. The frame 17 is now raised by the hydraulic cylinder and the doubling table resumes its normal position while the pawl 28 again engages the notch 27 of the divider 24. The doubler pack is now removed from the table and another pack is brought on when the operation just described is repeated.

By my improved apparatus I provide for the quick and accurate doubling of the packs, the lowering of the frame by the hydraulic cylinder through the lever action of the arm 6, giving a strong doubling movement with a minimum expenditure of power. The dividing arm when lowered is securely locked against upward movement and furnishes a strong resistance to the upward movement of the pack and at the same time forms a narrow knife-like bending edge so that the pack is brought close together along the bending line and no further hammering or other pressing of the pack along the line of bend is required after the pack is removed from the doubler. Furthermore, I provide for the withdrawal of the dividing arm before the doubling is completed, but only when the presence of the dividing arm is not of further assistance.

What I claim is:

1. In a doubling machine, the combination of swinging doubling members, means for operating the same, and means operated by the first means for securing the sheet to be doubled along the line of doubling.

2. In a doubling machine, the combination of hinged doubling members, means for operating the same, and means operated by the first means for securing the sheet to be doubled along the line of doubling.

3. In a doubling machine, the combination of swinging doubling members, means for operating the same, a divider, and means operated by the first means for raising and lowering said divider.

4. In a doubling machine, the combination of swinging doubling members, means for operating the same, a divider, and means operated by the first means for bringing said divider into operative position and for withdrawing the same before the doubling operation is completed.

5. In a doubling machine, the combination of doubling members, means for operating the same, a gravity-divider, means for advancing and withdrawing same, and means for locking said divider.

6. In a doubling machine, the combination of doubling members, a movable frame, a divider carried thereby, means for moving said frame to operate said doubling members, and means operated by the frame for advancing and withdrawing said divider.

7. In a doubling machine, the combination of doubling members, a movable frame, and means for moving said frame to operate said doubling members, a divider carried by said frame, a locking member carried by said frame engaging said divider, and means for releasing said locking member by the movement of said frame.

8. In a doubling machine, the combina-

tion of doubling members, a movable frame, means for moving said frame to operate said doubling members, a locking member carried by said frame having movement independent thereof, and means for releasing said locking member by the movement of said frame.

9. In a doubling machine, the combination of doubling members, a movable frame, means for moving said frame to operate said doubling members, a divider pivotally mounted on said frame, and means for advancing and withdrawing said divider by the movement of said frame.

10. In a doubling machine, the combination of doubling members, a movable frame, a pivotally mounted divider on said frame, means for moving said frame to operate said doubling members, and a locking member on said frame adapted to lock said divider in position.

11. In a doubling machine, the combination of doubling members, a moving frame, means for moving said frame to operate said doubling members, a pivotally mounted divider on said frame, a gravity locking member adapted to engage said divider in its raised and lowered position.

12. In a doubling machine, the combination of doubling members, a movable frame, means for moving said frame to operate said doubling members, a divider pivotally mounted on said frame, a locking member engaging said divider, and means for tripping said divider by the movement of said frame.

13. In a doubling machine, the combination of doubling members, a movable frame, means for moving said frame to operate said doubling members, a pivotally mounted divider on said frame having a notch therein, a locking member engaging said notch, and means for tripping said divider by the movement of said frame.

14. In a doubling machine, the combination of doubling members, a movable frame, means for moving said frame to operate said doubling members, a pivotally mounted divider on said frame, a locking member engaging said divider, and a tripping pawl engaging said divider to trip the same by the movement of said frame.

15. In a doubling machine, the combination of doubling members, a movable frame, means for moving said frame to operate said doubling members, a pivotally mounted divider on said frame, a movable locking member engaging said divider to hold it in its upper position, means for releasing said divider by the movement of said table, and said locking member engaging said divider in its advanced position.

16. In a doubling machine, the combination of doubling members, a movable frame, means for moving said frame to operate said doubling members, said frame having a certain amount of movement independent of the movement of said doubling members in moving said frame, a divider carried by said frame, means for advancing said divider by the independent movement of said frame, and means for withdrawing said divider before said doubling members complete their doubling movement.

17. In a doubling machine, the combination of a suitable base or bed plate, arms pivotally mounted thereon, doubling members to which said arms are pivoted, hinged connections between said doubling members, a movable frame, means for moving said frame to operate said doubling members, and means for securing the sheet to be doubled along the line of doubling.

18. In a doubling machine, the combination of a suitable base or bed plate, inclined arms pivotally mounted thereon, doubling members to which said arms are pivoted, hinged connections between said doubling members, a movable frame, means for moving said frame to operate said doubling members, and means for securing the sheet to be doubled along the line of doubling.

19. In a doubling machine, the combination of a suitable base or bed plate, lever arms pivoted thereon, doubling members pivoted to said arms, a hinge rod connecting said doubling members, a movable frame having slots engaging said hinge rod, and a divider adapted to engage the outer face of the sheet to be doubled.

20. In a doubling machine, the combination of a suitable base or bed plate, guides thereon, a movable frame in said guides, hinged doubling members supported on said bed plate, means for moving said frame to operate said doubling members, and a divider adapted to engage the outer face of the sheet to be doubled.

21. In a doubling machine, the combination of doubling members, a movable frame, a fluid operated cylinder, connections between said fluid operated cylinder and said frame, means for operating said doubling members by the movement of said frame, and a divider adapted to engage the outer face of the sheet to be doubled.

22. In a doubling machine, the combination of doubling members, a movable frame, means for raising and lowering said frame to operate said doubling members, a pivotally mounted divider carried by said frame, a locking member adapted to engage said divider, means for releasing said locking member by the movement of said frame, and means for withdrawing said divider by engagement with said locking member.

23. In a doubling machine, the combination of doubling members, a movable frame, means for moving said frame to operate said doubling members, a pivotally mounted

divider carried by said frame, a movable locking member engaging said divider, a projection on said divider in the path of said locking member, and a stop or abutment with which said locking member engages.

24. In a doubling machine, the combination of doubling members, a movable frame, means for moving said frame to operate said doubling members, a divider pivotally mounted on said frame, a movable locking member on said frame adapted to engage said divider, a projection on said divider engaging a slot opening formed in said locking member, and a stop or abutment in the path of said locking member.

25. In a doubling machine, the combination of doubling members, means for operating the same, a gravity-divider, and means for releasing said divider and raising the same.

In testimony whereof, I the said LAWRENCE C. STEELE, have hereunto set my hand.

LAWRENCE C. STEELE.

Witnesses:
ROBERT C. TOTTEN,
JOHN F. WILL.