W. L. JENKINS.

TIN SHEET DOUBLING MACHINE.

APPLICATION FILED OCT. 16, 1909. RENEWED AUG. 16, 1913.

1,090,786.

Patented Mar. 17, 1914.

6 SHEETS—SHEET 1.

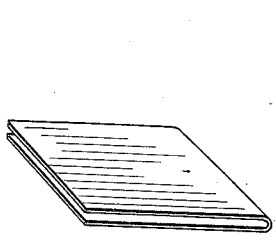


Fig. 3



Fig. 2

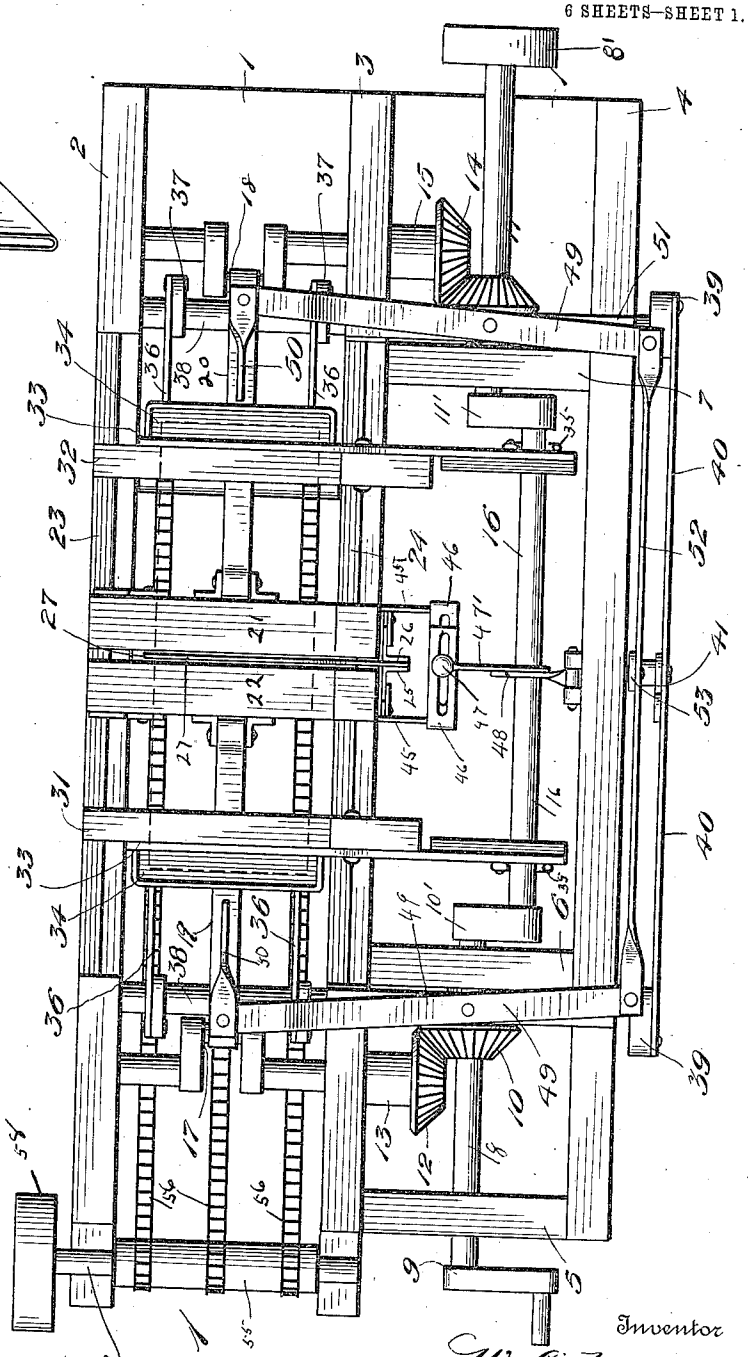


Fig. 1

Witnesses

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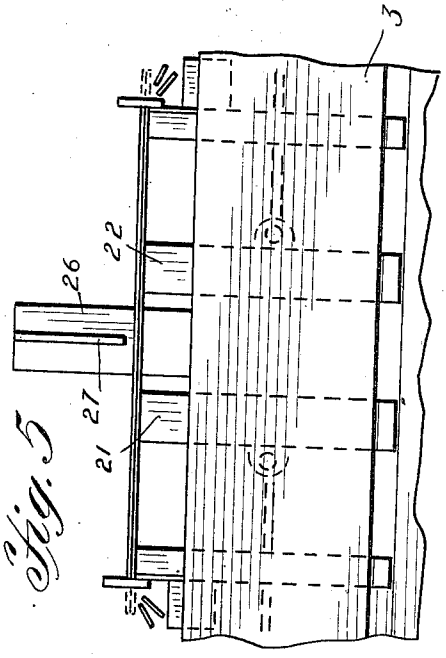


Fig. 5

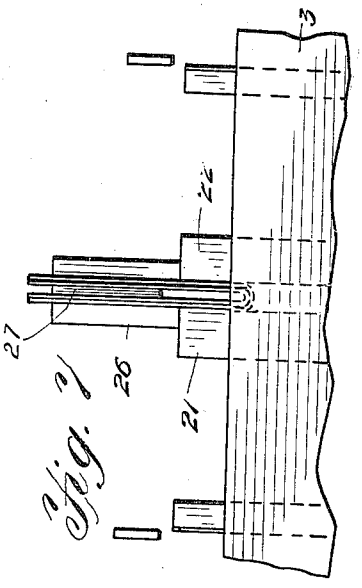


Fig. 7

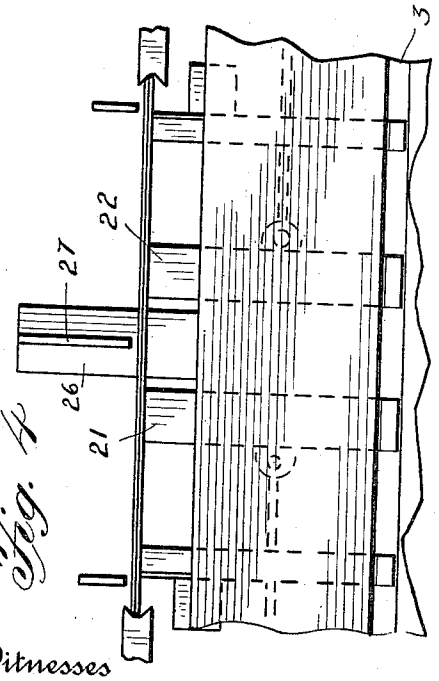


Fig. 4

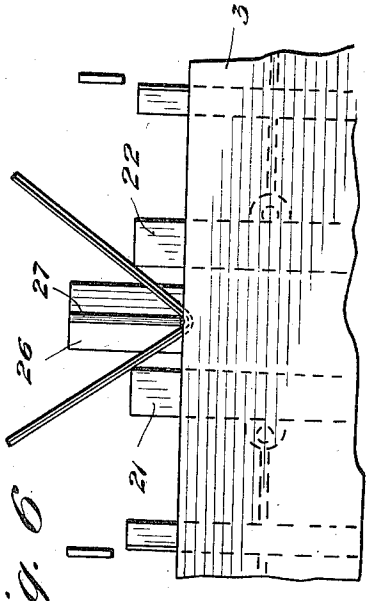


Fig. 6

Witnesses

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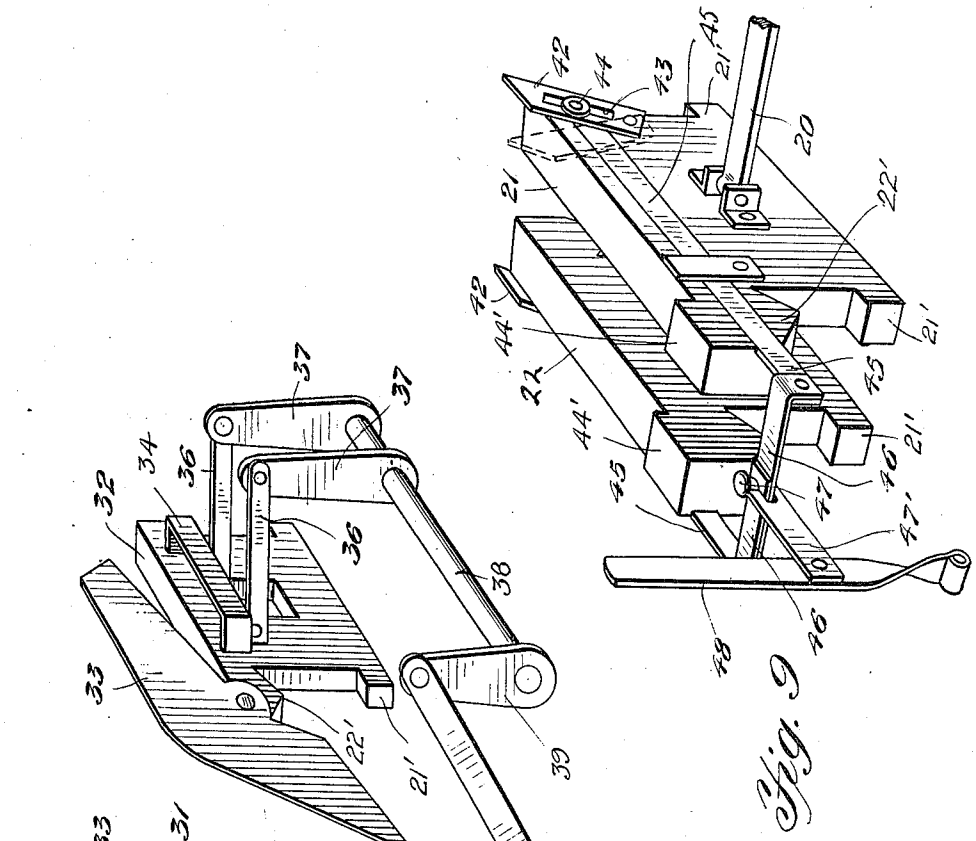


Fig. 9

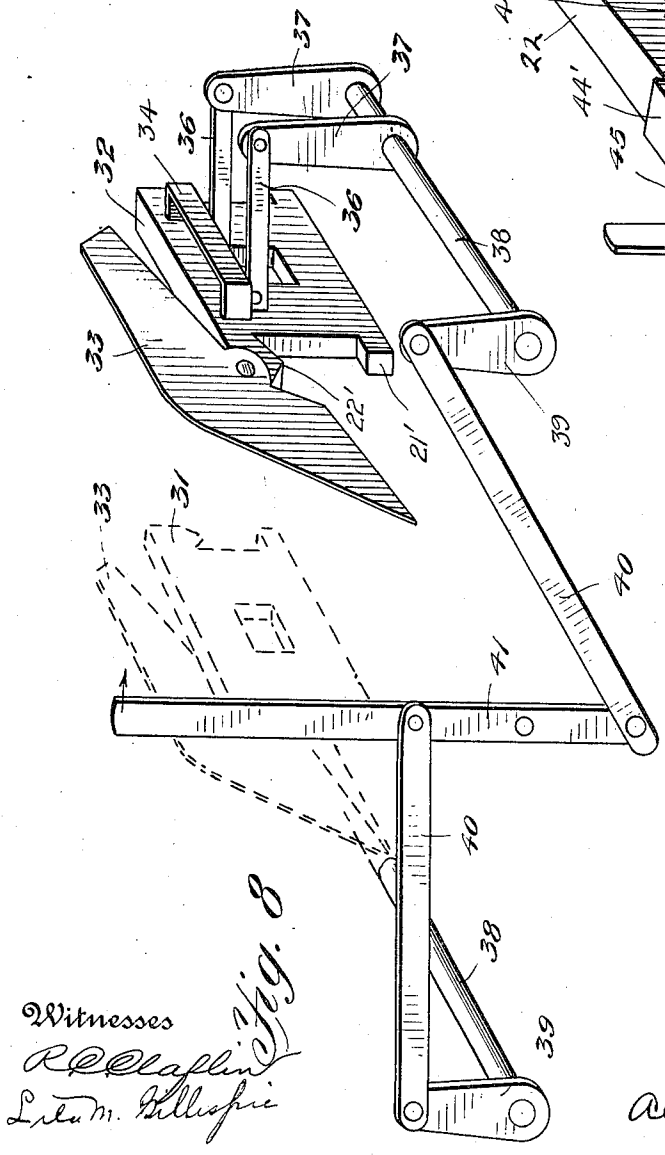


Fig. 8

Witnesses

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6 SHEETS—SHEET 4.

Fig. 11

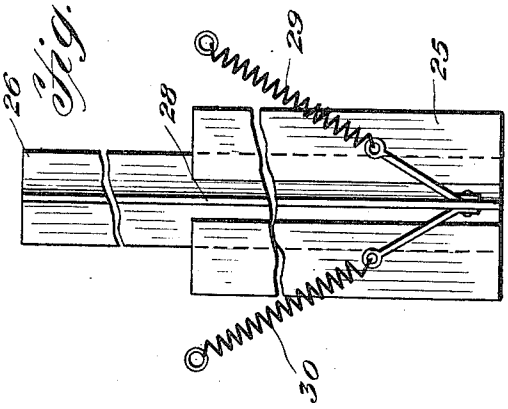
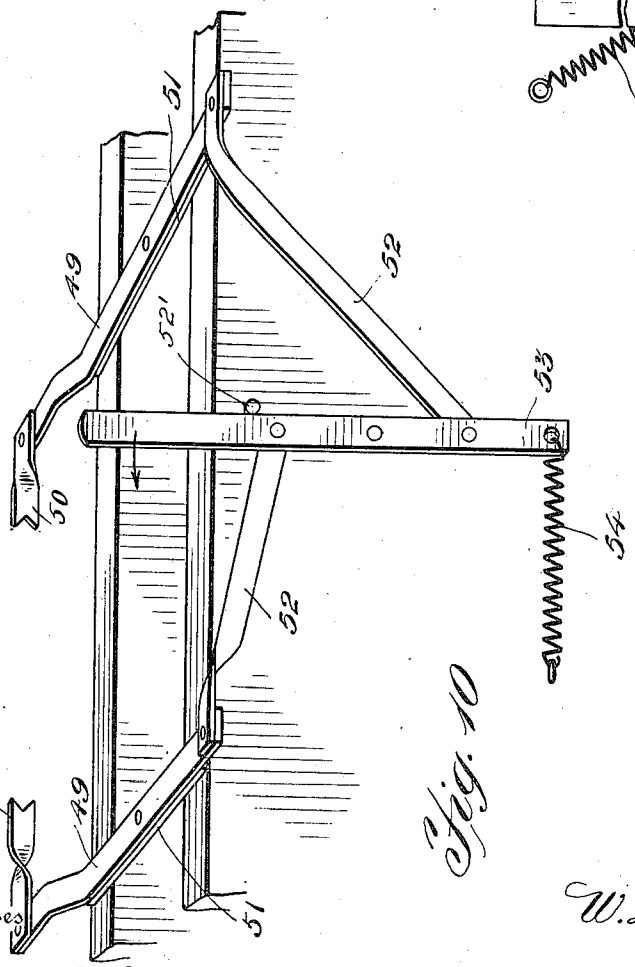


Fig. 10



Witnesses

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6 SHEETS—SHEET 5.

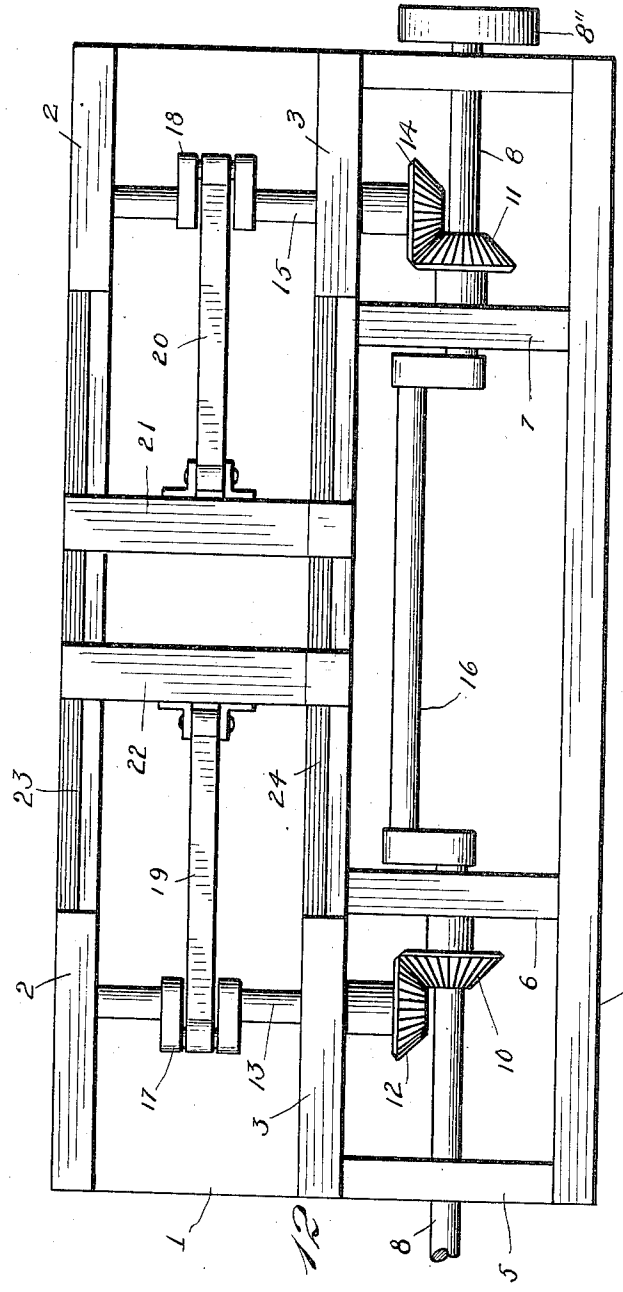


Fig. 12.

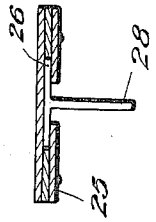


Fig. 13.

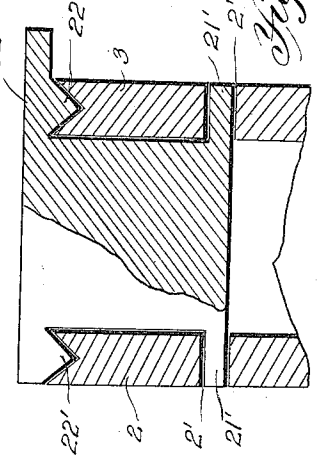


Fig. 17.

Witnesses

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6 SHEETS—SHEET 6.

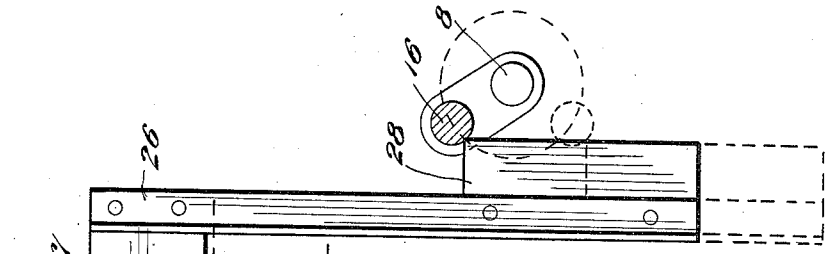


Fig. 15

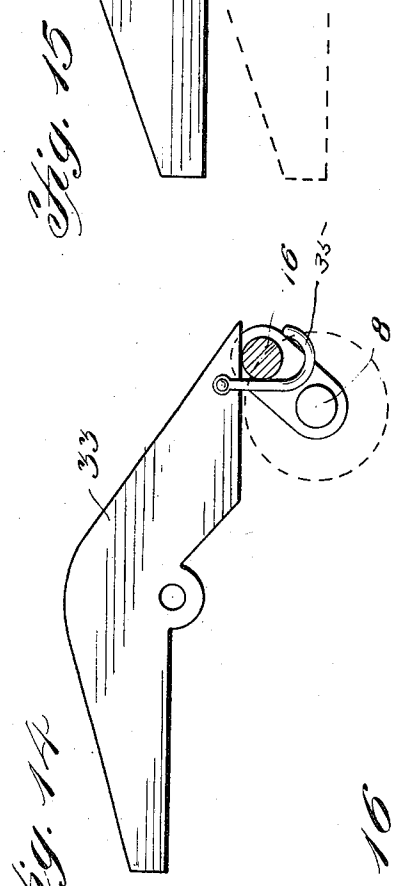


Fig. 17

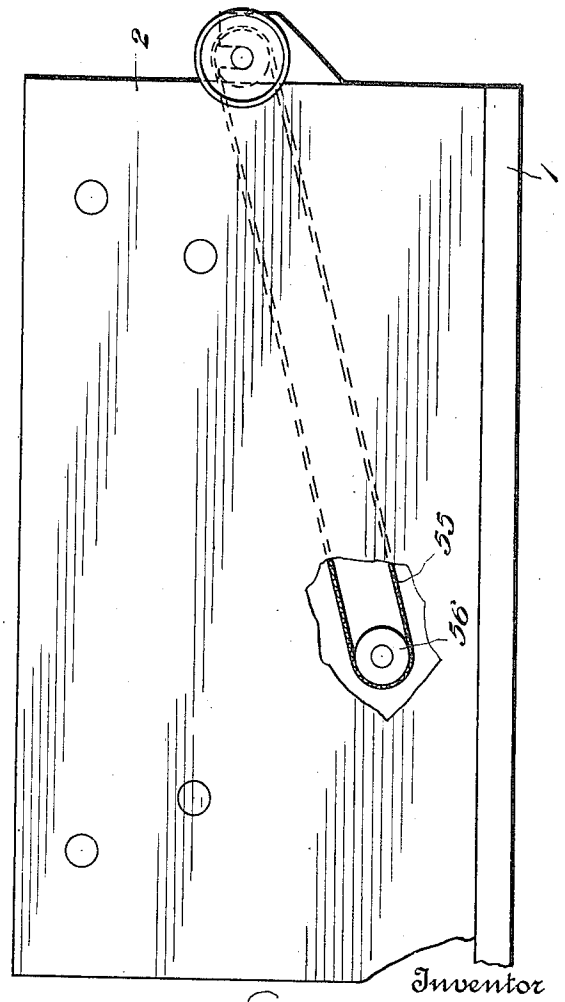


Fig. 16

Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM L. JENKINS, OF NEW CASTLE, PENNSYLVANIA.

TIN-SHEET-DOUBLING MACHINE.

1,090,786. Specification of Letters Patent. Patented Mar. 17, 1914.

Application filed October 16, 1909, Serial No. 523,030. Renewed August 16, 1913. Serial No. 785,125.

To all whom it may concern:

Be it known that I, WILLIAM L. JENKINS, citizen of the United States, residing at New Castle, in the county of Lawrence and State of Pennsylvania, have invented certain new and useful Improvements in Tin-Sheet-Doubling Machines, of which the following is a specification.

This invention relates to the doubling of steel, iron or other metallic plates or sheets and relates particularly to a machine operated by hand or by steam or electric power whereby steel, iron or other metallic plates may be quickly and accurately doubled.

In the present operation of doubling steel, iron and metallic sheets, the process and means of doubling the sheets upon themselves is crude and expensive. The object of the present invention is to provide a means whereby a sheet or a pack of sheets can be quickly and accurately doubled upon thmeselves after having been shorn to the desired size and then delivered from the machine to the heating furnace.

With the above and other objects in view my invention embraces certain combinations and constructions clearly described in the following specification and clearly illustrated in the accompanying drawings in which,

Figure 1 is a top plan view of the machine, Fig. 2 is a detail perspective view of a sheet before being doubled, Fig. 3 is a detail perspective view of a sheet after it has been doubled, Fig. 4 is a view showing the first step in the trimming and doubling of a pack of sheets, Fig. 5 is a view showing the second step in the trimming and doubling of a pack of sheets, Fig. 6 is a view showing the third step in the trimming and doubling of a pack of sheets, Fig. 7 is a detail view showing the final step in the trimming and doubling of a pack of sheets, Fig. 8 is a detail view in perspective on an enlarged scale, showing the operating levers and one of the sheet cutting shears, Fig. 9 is a detail perspective view of a sheet positioning mechanism, Fig. 10 is a detail view of another sheet positioning mechanism, Fig. 11 is a detail view showing the guide for the doubling arm, Fig. 12 is a detail top plan view of a part of the operating mechanism, Fig. 13 is a detail sectional view of a guide, Fig. 14 is a detail side elevation of a cutter or shear and of the doubling member showing the timing thereof relatively to the operating wrist pin, Fig. 15 is a detail view of a modified method of operating the doubling arm, Fig. 16 is a view showing the sheet carrying chain mechanism, Fig. 17 is a fragmental detail sectional view of the sheet carrying block.

Referring to the accompanying drawings illustrating the preferred embodiment of the invention, 1 designates a base which may be of any desired material. On the base 1 a supporting frame consisting of three vertical members 2, 3, and 4 is arranged. At the bottom of the members 2 and 3 intermediate their ends alining slots 2′ and 3′ are formed respectively, as shown in Fig. 18. Between the blocks or members 3 and 4, bearing blocks 5, 6, and 7 are positioned, said blocks being suitably spaced apart from each other to support a cranked shaft 8 which carries on its outer end a crank handle 9. The shaft 8 is provided with gears 10 and 11 located thereon near the ends of said shaft. The gear 10 engages with the bevel gear 12, on the transversely disposed shaft 13 journaled on the supports 2 and 3. The gear 11 engages with a gear 14 on a transverse shaft 15 journaled on the supports 2 and 3.

The shaft 8 is provided with a double crank consisting of members 10′ and 11′ having a wrist pin 16 longer than the distance between the knives 33, when they are separated the greatest distance. The shafts 13 and 15 are provided with cranks 17 and 18 respectively, which are engaged by pitmen 19 and 20, which pitmen are connected to jaws 21 and 22. The jaws 21 and 22 are formed with V-shaped guides 22′ movable in V-shaped grooves 23 and 24 formed on the tops of the members 2 and 3. These blocks or knife carriers are also formed at their bottom with oppositely arranged terminal lugs 21′ working respectively in the elongated slots 2′ of the members 2 and 3 whereby they serve to prevent the upward movement of said blocks.

The grooves 23 and 24 are located intermediately of the ends of the members 2 and 3 so that abutments are formed on said members for the jaws 21 and 22 which are moved by the action of the crank operated pitmen 19 and 20 thereon. One end of the shaft 8 is provided with a wheel 8′ for balancing the movement of said crank on the operating mechanism.

One side of the support 3 is provided with a guide 25, which is vertically disposed thereon, and in said guide a doubling lever works. Said lever carries on its upper end a doubling arm or tongue 27 which extends over the member 3. The doubling lever 26 is normally held at its highest limit of movement by springs 29 and 30, which are connected at their lower ends to the tongue 28 carried by the lever 26 and at their upper ends to the support 3.

On the outer sides of the jaws 21 and 22 supporting blocks or knife carriers 31 and 32 are arranged, said knife carriers being provided with suitable guides for guiding the movement of the same over the support 3. The blocks 31 and 32 are formed with the V-shaped tenons 22′ at their top, similarly to the jaws 21 and 22, and also with the bottom oppositely-arranged terminal lugs 21′ disposed in said elongated slots 2′, as aforesaid. The blocks 31 and 32 carry pivoted trimming knives or shears 33, which work against the upper edges of said blocks 31 and 32, and are normally held inclined at opposite points so as to be engaged by the wrist pin of the crank 8. These blocks are also provided with receptacles 34 for the reception of the ends of the sheet to be trimmed. The outer ends of the knives or shears are provided with hooks or catches 35 pivoted thereon, which are adapted to engage with the wrist pin 16. The movable supporting blocks or knife carriers 31 and 32 are adjustable by means of pitmen 36 which are connected with the cranks 37 formed on shafts 38. One end of each of the shafts 38 is provided with a crank 39 and said cranks are connected by means of pitmen 40 with the operating lever 41 which is pivoted to the support 4.

By manually operating lever 41 the knives or shears move toward or away from each other. The knives or shears are preferably of the kind known as alligator shears although other species of shears may be used in their places. Between the knife carrying blocks 31 and 32 are disposed arms 42 pivotally mounted on the jaws 21 and 22 respectively. The arms or dogs 42 are formed with slots 43 through which project pins 44.

The pins 44 are secured to the ends of the rods 45 which work in the grooves formed in the sides of the jaws 21 and 22, each of which jaws is provided with an abutment or shoulder 44′ against which the sheet abuts. The rods 45 are provided with cross arms 46 which are slotted and are connected together by means of pins 47. The cross arms 46 are connected to a rod 47′ having connection with the lever 48 whereby the pivoted adjusting arms 42 may be manipulated.

In order to center the pack of sheets to be doubled the machine is provided with a lever mechanism for the purpose. This mechanism embraces a pair of cross arms 49 carrying bifurcated sheet engaging arms 50 pivotally connected to the rods 51 which are secured to the members 3 and 4. The arms 49 are connected to pitmen 52 which are operated by means of a lever 53 pivoted to the support 4 and held against the stop 52′ in its normal inoperative position by spring 54.

Either of the levers may be operated by a foot attachment pivotally connected thereto. After the pack of sheets has been doubled it is dropped onto a conductor which consists of a series of parallel endless chains 56 operating the rollers 55 one of which is operated by a shaft 57 on which is mounted a pulley wheel 58 as is clearly shown in Fig. 16.

It will be noticed that lever arm 42 carried by said jaws 21 and 22 and the bifurcated arms 50 mounted upon the levers 49 serve as a gaging means for the sides and ends of the sheet to be folded. If now, a sheet be placed upon the jaws 21 and 22 so as to rest at its ends upon the knife carrying blocks 31 and 32, the lever arms 42 may be adjusted so as to force one side of the sheet against the shoulders 44′ of the jaws 21 and 22 while the bifurcated arms 50 may be adjusted against the ends of said sheets and thereby prevent endwise displacement. It will also be noticed that a cycle of the wrist pin 16 disposed between the cranks 10′ and 11′ will afford ample time for the wrist pin to successively engage the inclined knife members 33 and doubling member 26. The shaft 8, will by crank 9, be rotated so as to set in motion the wrist pin 16, and through the miter wheels 12 and 14 will rotate the transverse shafts 13 and 15 respectively thereby causing the cranks 17 and 18 of said shafts to retract the pitmen 19 and 20 connected respectively to said jaws 21 and 22; which jaws are arranged to come to rest at the tongue 27 of the doubling member 26 and the wrist pin 16 will thus occupy the position shown in full lines in Fig. 17 and the cranks 17 and 18 of the transverse shafts 13 and 15 respectively will be in the position shown clearly in Fig. 1.

As the crank handle 9 is turned to rotate the shaft 8 during one-half of the cycle of the wrist pin 16 the cranks 17 and 18 of the shafts 13 and 15 rotate a one-half revolution and draw open the jaws 21 and 22 to their fullest extent and as said jaws are moved to open position the wrist pin 16 will have engaged the inclined ends of the knife members 33 to actuate them. As the wrist pin 16 completes its cycle the cranks 17 and 18 will complete their revolution on the shafts 13 and 15 thereby moving the jaws 21 and 22 until they come to rest at the doubling member 26 and as this movement takes place the wrist pin will engage the lug 28 of the

doubling member 26 and cause the tongue 27 of said member to engage the sheet supported on the jaws 21 and 22 and the knife carriers 31 and 32 so as to bow said sheets between the jaws before they are closed. The tongue 27 will move to engage the sheet against the tension of the springs 29 and 30 respectively and as the crank wrist pin will operatively engage the lug 28 of the doubling member 26 only during one-fourth of its cycle following the first one-half of its cycle the springs 29 and 30 will recoil as soon as said wrist pin is disengaged from the lug in time for the jaws 21 and 22 which are to move to closed position to engage the tongue 27 as it is maintained in normal position. From this it will be seen that in the act of doubling the sheet or pack of sheets the doubling member 26 is so arranged as to bow the sheets between the jaws 21 and 22 and then to resume its normal position, so that the jaws may, as they move to closed position, complete the doubling of the sheet or sheets.

In practice the pack of sheets will be disposed upon the frame of the machine and a single sheet or an appropriate member of sheets will then be placed upon said jaws 21 and 22 and the knife carrying blocks 31 and 32, so that it bears against the shoulders 44′ of the jaws 21 and 22; the lever arm 42 will be disposed against the opposite sides thereof in the manner above explained and the bifurcated arms 50 will be actuated by the lever 48 to engage the ends of said sheet so that the edges of the latter may be accurately gaged, the knife carrying blocks 31 and 32 will then be disposed so as to set off an equidistant line upon the sheet or sheets with respect to the doubling member 26, whose tongue 27 may act as a center.

It is obvious that the knife members 33 when actuated by the wrist pin 16 as hereinbefore described will clip the opposite ends of the sheet or pack of sheets so that the same may be accurately doubled by the member 26. The knives will be actuated so as to cut the ends of the sheets as the jaws 21 and 22 are opened and immediately thereafter the doubling member will be actuated so as to cause the tongue 27 thereof to bow said sheet between the jaws 21 and 22 as is clearly shown in Fig. 6; the tongue 27 is retracted by the springs 29 and 30 respectively and the jaws 21 and 22 will move to closed position against the sides of the folded sheets. The bending or doubling will be thereby facilitated and simplified owing to the fact that the jaws move to closed position after the tongue 27 has resumed its normal position by virtue of which the tongue will be spaced from the line of fold or bend of each of the sheets. The closed position of the jaws relatively to the tongue 27 of the doubling member 26 is shown in Fig. 7, and the crank handle 9 will be further turned to again open the separated jaws 21 and 22 thereby allowing the folded sheet or sheets to drop between said jaws upon the endless carrier 55 thereunder. This operation of doubling can be quickly repeated by connecting the pulley 8 to any suitable operating mechanism.

I claim and desire to secure by Letters Patent:

1. A device of the character described comprising oppositely arranged supports for a sheet, sliding jaws moving between said supports, means for slidably and successively opening and closing said jaws, a doubling member having a tongue at the top and a lug at the bottom, means engaging said lug to cause said tongue to bow said sheet between said jaws before the latter are closed, and means for spacing said tongue from the line of fold of said sheet before said jaws have closed against the bowed sheet.

2. A device of the character described comprising oppositely arranged supports for a sheet, sliding jaws likewise between said supports, a reciprocating member having a tongue at one end and a lug at the other, means for slidably and successively opening and closing said jaws, and means for actuating said lug to cause said tongue to bow said sheet between said jaws before they are closed.

3. A device of the character described comprising a frame, oppositely arranged jaws slidably mounted on said frame and supporting a sheet, means for slidably and successively opening and closing said jaws, a doubling member having a tongue at one end and an outwardly extending lower part, and means acting in time with said first-named means engaging said outwardly-extending part to actuate said tongue, said tongue when actuated bowing said sheet between said jaws and coming to rest before they are closed.

4. A device of the kind described comprising a frame, oppositely arranged supports for a sheet upon a frame, jaws slidably mounted upon said frame, a doubling member having a tongue, means for slidably opening and closing said jaws and for actuating said tongue before the jaws close, and means for causing said tongue to come to rest before said jaws close, said tongue when actuated bowing said sheet between said jaws before they close.

5. In a doubling machine in combination with means for gaging the ends of a sheet, laterally movable jaws formed each at one end with a shoulder against which the side of a sheet bears, longitudinal bars sliding at the sides of said jaws, upstanding lever members pivoted to said jaws at the end opposite said shoulders and pivotally connected to said longitudinal members to bear against

the opposite side of the sheet, when said bars are actuated, means for actuating said bars and means reciprocating at right angles between said jaws to double said sheet.

6. In a doubling machine in combination with means for gaging the ends of a sheet, laterally movable jaws formed each at one end with a shoulder against which the side of a sheet bears, longitudinal members sliding at the sides of said jaws, upstanding lever members pivoted to said jaws at the ends opposite said shoulders and to said bars, means actuating said bars to actuate said lever to hold the opposite side of a sheet against movement, an upright bar having a web and means actuating said web to fold said sheet before said jaws close.

7. In a doubling machine in combination with means for gaging the ends of a sheet, jaws formed at one end with a shoulder against which the side of a sheet bears, longitudinal members sliding at the sides of said jaws, upstanding lever members pivoted to said jaws at the end opposite said shoulders and pivotally connected to said longitudinal bars, and bearing against the opposite ends of said sheet when said bars are actuated, means for actuating said bars, means for successively opening and closing said jaws, a doubling member having a web and means controlling said last named means actuating said web to bow said sheet between said jaws before they are closed.

8. In a doubling machine in combination with means for gaging the ends of a sheet, jaws formed at one end with a shoulder against which the side of a sheet bears, longitudinal members sliding at the sides of said jaws, upstanding lever members pivoted to said jaws at the end opposite said shoulders and pivotally connected to said longitudinal bars, and bearing against the opposite ends of said sheet when said bars are actuated, means for actuating said bars, means for successively opening and closing said jaws, a doubling member having a reciprocating tongue, said tongue moving against said sheet to bow it before said jaws have closed, and means controlling said last named means for actuating said tongue, the latter coming to rest before the jaws have closed.

9. A doubling machine comprising jaws formed each at one end with a shoulder, a lever arm pivotally mounted at the opposite end of each jaw, between which and said shoulder a sheet is gaged laterally, means for adjustably gaging the ends of a sheet, means for adjusting said lever arms, means for successively opening and closing said jaws, knife carrying blocks receiving a sheet and between which said jaws move, means for adjusting said knife blocks, a member having an upper tongue, and a lower lug at its opposite side, means actuating said lug to cause said tongue to bow said sheet before the jaws have closed, and for actuating said knives to clip the ends of a sheet before the sheet is bowed.

10. A doubling machine comprising jaws formed each at one end with a shoulder, a lever arm pivotally mounted at the opposite end of each jaw between which and said shoulder a sheet is laterally gaged, adjustable end gages for said sheet, adjustable end supports for said sheet, means for successively opening and closing said jaws, a member having an upper tongue, and a lower lug, knife members mounted on the end supports actuated in time with said means to clip the ends of a sheet, and means controlling said first named means engaging said lug to cause said tongue to bow said sheet between said jaws before they have closed.

11. A doubling machine comprising jaws formed each at one end with a shoulder, a lever arm pivotally mounted at the opposite end of each jaw between which and said shoulder a sheet is laterally gaged, means for adjustably gaging the ends of a sheet, means for adjusting said lever arms, means for successively opening and closing said jaws, knife carrying blocks supporting a sheet between which said jaws move, means for adjusting said knife blocks, a member having an upper reciprocating tongue, a lower lug formed at the opposite side of said member, said tongue moving against said sheet to bow it between said jaws before they close, and means actuating said lug to cause said tongue to operate before said jaws close and said knives to clip the ends of a sheet before the sheet is bowed, said tongue coming to rest before said jaws have closed.

12. A doubling machine comprising jaws formed each at one end with a shoulder, a lever arm pivotally mounted at the opposite end of each jaw between which and said shoulder a sheet is laterally gaged, means for adjustably gaging the ends of a sheet, means for adjusting said lever arms, means for successively opening and closing said jaws, knife carrying blocks supporting a sheet and between which said jaws move, means for adjusting said knife blocks, a member having an upper reciprocating tongue, a lower lug formed at the opposite side of said member, said tongue moving against said sheet to bow it between said jaws before they close, knife members mounted on said blocks actuated in time with said second-named means to clip the ends of a sheet, and means controlling said second-named means and engaging said lug to actuate said tongue, the latter coming to rest before said jaws have closed.

13. A doubling machine comprising jaws formed each at one end with a shoulder, a lever arm pivotally mounted at the opposite

end of each jaw between which and the shoulder a sheet is laterally gaged, end gages for said sheet, end supports for said sheet, means for successively opening and closing said jaws, a member having an upper reciprocating tongue and having a lower lug, said tongue moving against said sheet to bow it between said jaws before they close, knife members mounted on the end supports acting in time with said other means to clip the ends of the sheet, means controlling said first-named means actuating said lug to actuate said tongue, the latter coming to rest before said jaws have closed.

14. A doubling machine comprising a frame, slidable jaws mounted on said frame, shafts mounted on said frame having intermediate cranks coupled by a wrist pin, transverse shafts at right angles to the ends of said other shafts and driven thereby and having cranks, a vertically disposed member having an upper spring engaging tongue, laterally movable jaws, laterally movable end supports over which and said jaws a sheet rests, means for pivotally gaging the edges of said sheet, pitmen pivotally connecting said jaws and the cranks of the transverse shafts, a crank handle on said first named shaft for simultaneously actuating said transverse shafts to cause said pitmen to open and close the jaws as the wrist pin moves, knives pivoted to said end supports normally inclined in open position and actuated by the moving wrist pin to closed position, and a lug on said vertical member engaged by said wrist pin before said jaws close to cause said tongue against the tension of said spring to bow said sheet.

15. In a doubling machine in combination with a frame, oppositely arranged knife carriers slidably mounted thereon, means intermediate said carriers for doubling said sheet, means mounted on said frame for actuating said doubling means, outwardly projecting members pivoted at the sides of the carriers, a lever pivoted at the side of said frame, means actuated by said lever and engaging said members for adjusting said carriers, and means for gaging the sheet supported on said carriers.

16. In a doubling machine in combination with a frame, oppositely arranged knife carriers slidably mounted thereon, jaws slidably mounted on the frame between said carriers, means mounted in said frame for successively opening and closing said jaws, a vertically-movable member mounted on the frame, a tongue on said member for doubling a sheet before said jaws close, shoulders on said jaws at one end, lever arms at the other end between which and the shoulders a sheet is laterally gaged, transversely disposed levers on said frame carrying bifurcated arms at right angles relatively to said carriers between which the sheet is terminally gaged, a lever mounted at the side of said frame for drawing said bifurcated arms toward or away from said carriers, crank members transversely disposed over the frame and pivotally connected to the sides of the carriers, a lever at the side of the frame for causing said crank members to move said carriers toward or away from said jaws, means for adjusting said first named lever arms and means, acting in time with said first-named means, for operating said knives.

In testimony whereof I affix my signature, in presence of two witnesses.

WILLIAM L. JENKINS.

Witnesses:
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