July 20, 1943. R. A. WILLIAMS ET AL 2,324,751

SHEET TRIMMING AND HANDLING DEVICE

Filed March 1, 1941 5 Sheets-Sheet 1

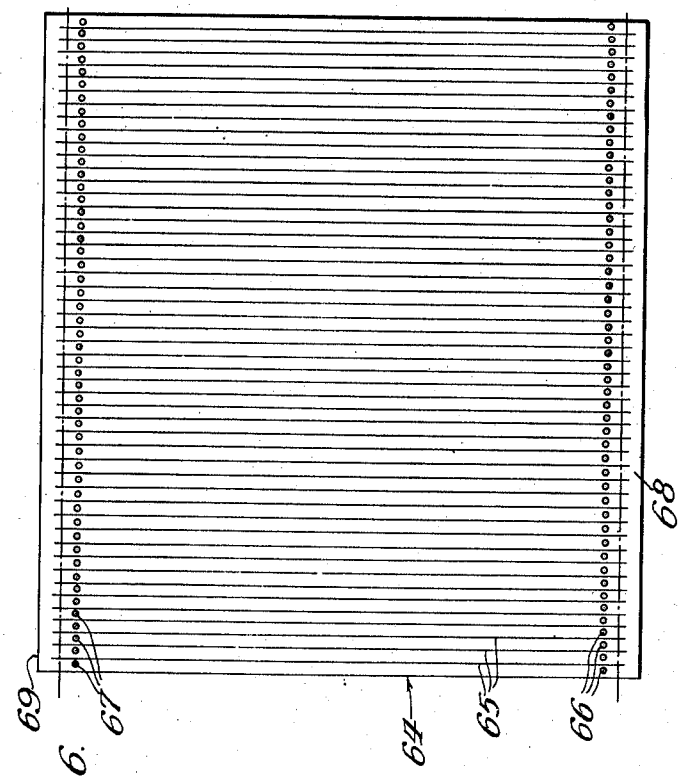


Fig. 6.

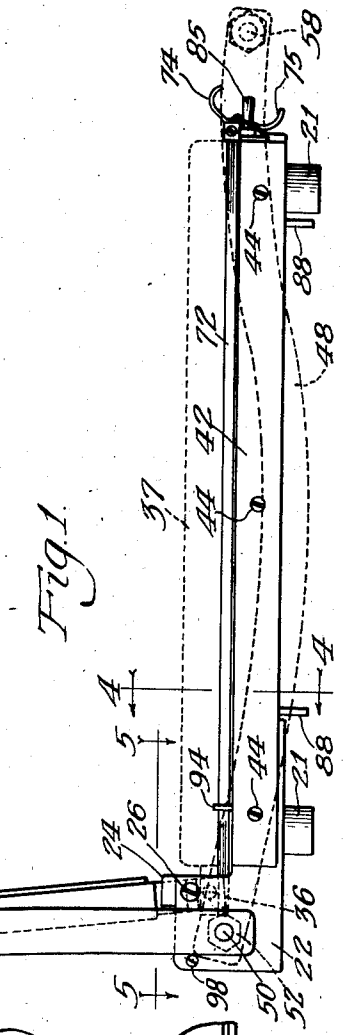


Fig. 1.

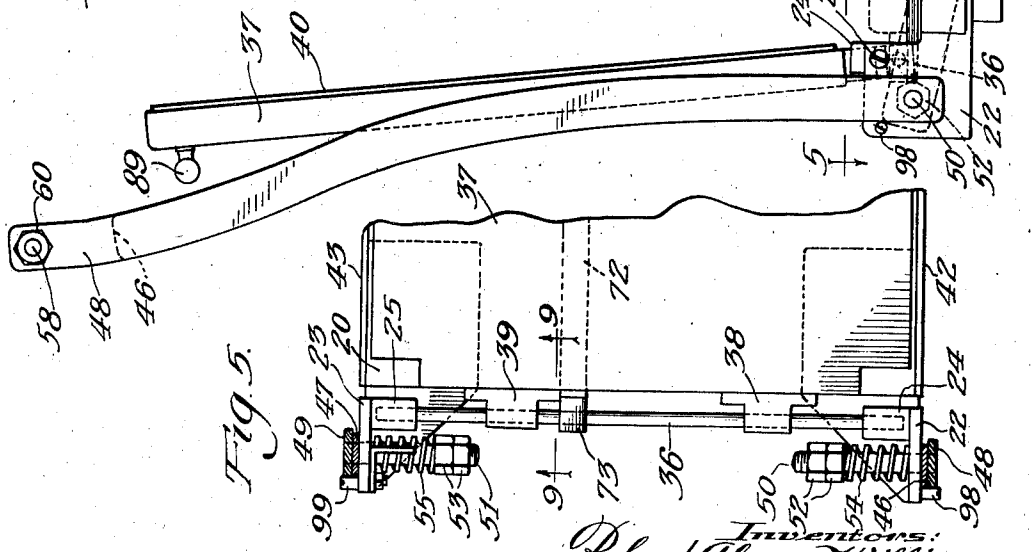


Fig. 5.

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SHEET TRIMMING AND HANDLING DEVICE

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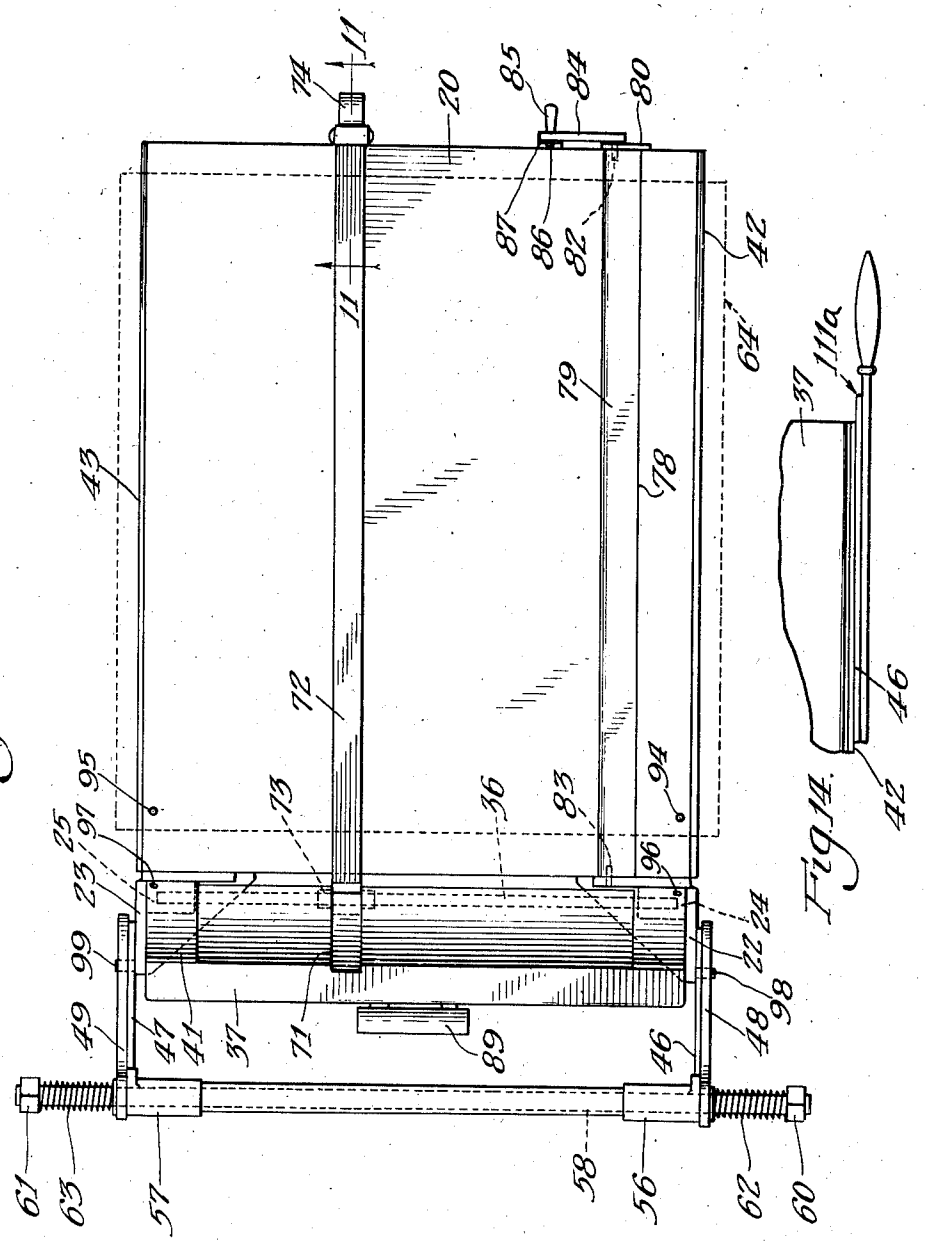


Fig. 2.

Fig. 14.

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SHEET TRIMMING AND HANDLING DEVICE

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Fig. 3.

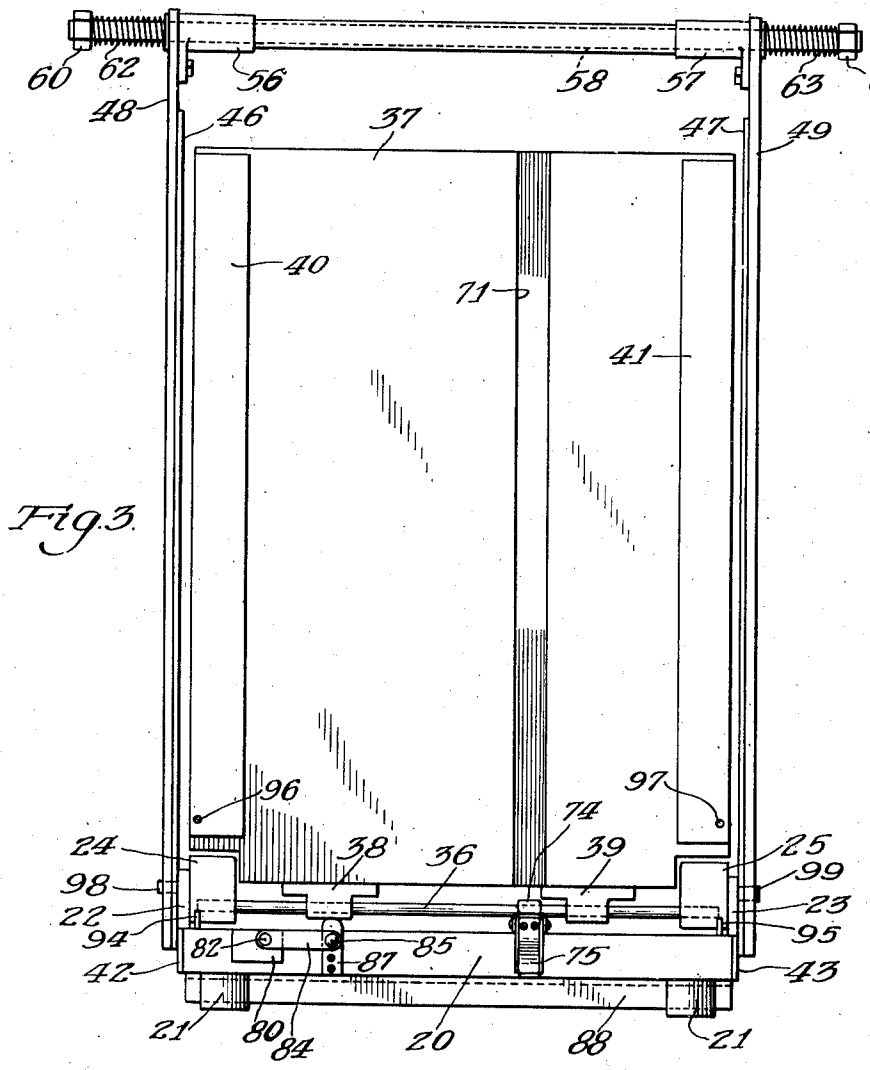
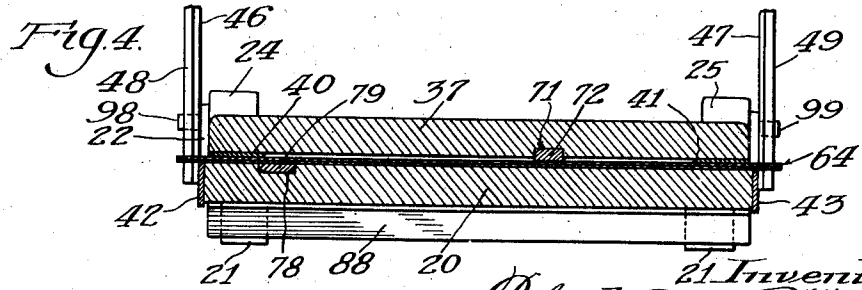


Fig. 4.



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Fig. 7.

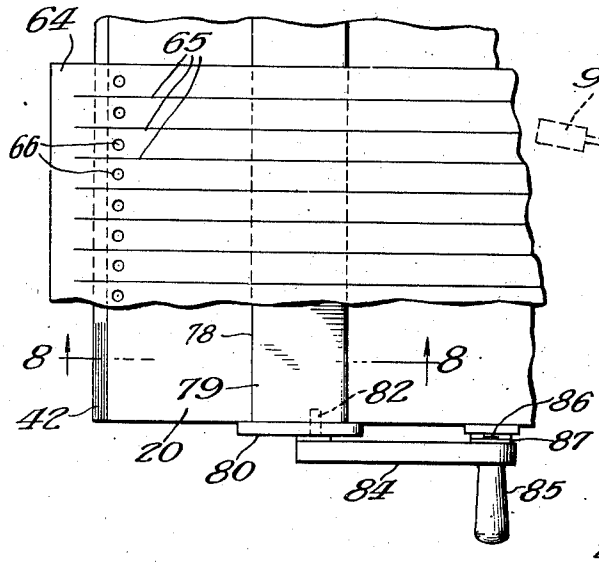


Fig. 8.

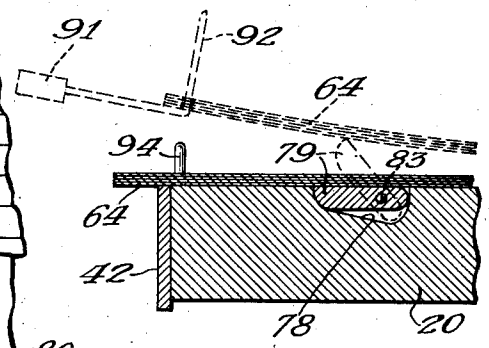


Fig. 10.

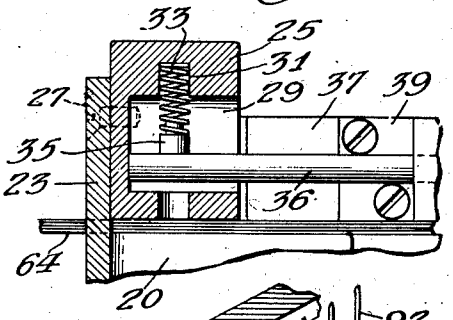


Fig. 9.

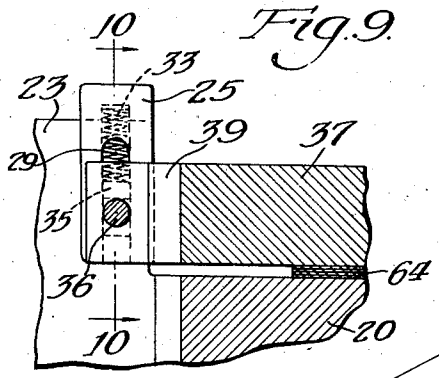
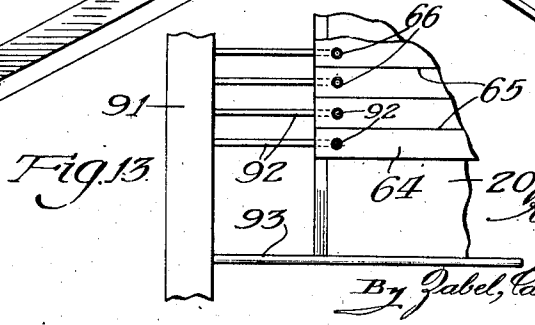


Fig. 12.

Fig. 11.

Fig. 13.



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Fig. 15.

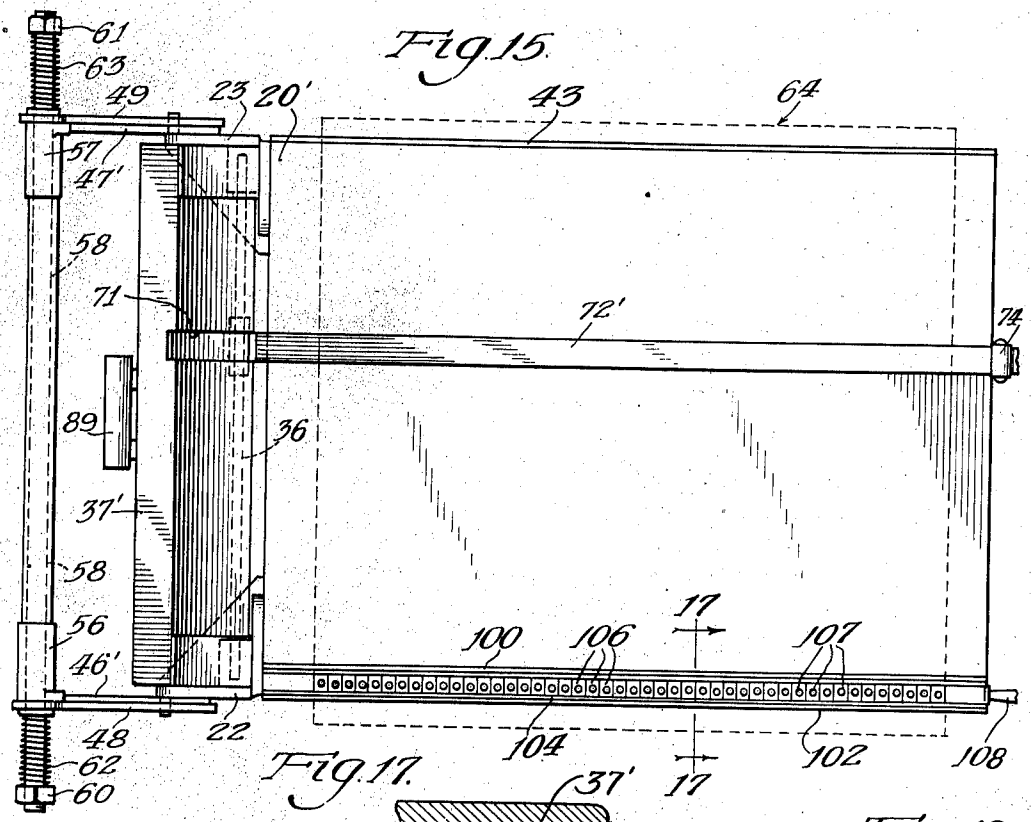


Fig. 17.

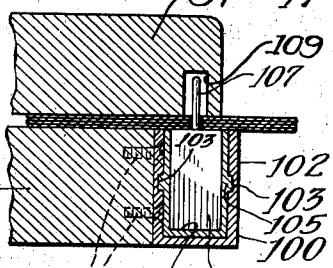


Fig. 16.

Fig. 19.

Fig. 20.

Fig. 18.



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UNITED STATES PATENT OFFICE

2,324,751

SHEET TRIMMING AND HANDLING DEVICE

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Application March 1, 1941, Serial No. 381,270

5 Claims. (Cl. 164—45)

This invention relates to improvements in sheet trimming and handling, and in particular to improvements in preparing master copy for application to duplicating apparatus.

In certain types of control, accounting, and bookkeeping systems, information gathered from a number of sources must be collated. Collation may be greatly facilitated if the information be gathered in the form of written entries on a sheet wherein like entries are made on all the several sheets in the same relative positions. The sheets may then be stacked and cut into strips, all the strips in any group containing all the entries of like kind from all the different sheets. The strips of one group may then be arranged and held in side by side relationship, by suitable means, such as a peg board, and then duplicated. If the entries are originally made in hectograph ink, the strips as finally arranged may be applied to a gelatin pad, and duplicate copies made from the pad according to the well known hectograph process of duplication.

It is often the practice to make the original entries on a sheet which is provided with a number of parallel slits which extend across the sheet from points adjacent to the marginal side edge portions of the sheet. By trimming off the marginal portions to the ends of the slits, the strips are separated from each other.

According to the improvements in sheet trimming and handling which are the subject of this invention, means are provided to trim the edges of the several slitted sheets which are stacked on the apparatus. It is an object of this invention to provide improved cutting means so that both side edges of a stack of sheets may be trimmed. Means are also provided to maintain the slitted sheets stacked in alignment during the trimming operation so that the corresponding entries on the several sheets are positioned directly above one another, as well as to maintain the order of the several groups of strips after the trimming operation and preparatory to the removal thereof from the trimmer. Improved means are also provided for the removal of all the groups of strips as a unit. It is also an object of this invention to facilitate the handling of a great number of strips without destroying their prearranged order.

Reference is hereby made to the accompanying drawings in which like reference numerals refer to like parts, and in which drawings—

Fig. 1 is a side elevation of a preferred embodiment of this invention, certain parts being shown in a changed position in dotted lines;

Fig. 2 is a plan view of the apparatus shown in Fig. 1;

Fig. 3 is a front elevation of the apparatus shown in Fig. 1;

Fig. 4 is a sectional view taken along line 4—4 of Fig. 1, showing the cutting knives in upright position, but showing the upper clamping board in its lowered position;

Fig. 5 is a section taken along line 5—5 of Fig. 1;

Fig. 6 is a plan view of the slitted sheet which is adapted for trimming by the apparatus shown in Fig. 1;

Fig. 7 is an enlarged plan of the detail of the apparatus as shown in Fig. 2, a slitted sheet being shown overlying the lower clamping board;

Fig. 8 is a section taken along line 8—8 of Fig. 7, certain parts being shown in changed position in dotted lines;

Fig. 9 is an enlarged section of a detail of the apparatus shown in Fig. 5, taken along line 9—9 thereof;

Fig. 10 is a section taken along line 10—10 of Fig. 9;

Fig. 11 is an enlarged section taken along line 11—11 of Fig. 2;

Fig. 12 is a perspective view of the strip removing device;

Fig. 13 is an enlarged plan view similar to Fig. 7, but showing the application of the strip removing device to the trimmer as in Fig. 8;

Fig. 14 is a partial plan view of a modified form of cutter;

Fig. 15 is a plan view similar to Fig. 2 but showing a modified form of this invention;

Fig. 16 is a side elevation of the apparatus shown in Fig. 15, certain parts being broken away;

Fig. 17 is an enlarged section taken along line 17—17 of Fig. 15;

Fig. 18 is a perspective view of the removable channel shown in Fig. 16;

Fig. 19 is a perspective view of one of the blocks shown in Fig. 17; and

Fig. 20 is a perspective view of a modification.

In Figs. 1, 2 and 3, reference numeral 20 designates a base which is in the form of the lower clamping board of a sheet trimmer, the base being provided with suitable feet 21. Brackets 22 and 23 are suitably secured to the base, and carry blocks 24 and 25 which are secured to the brackets by means of screws 26 and 27. The block 25 is provided with a recess 29 as shown in Fig. 10, which extends inwardly from the inwardly facing surface of the block in the form of a slot. An intersecting bore 31 is also provided in the block 25, and a spring 33 is seated in the upper portion of the bore. The spring has secured to it at its lower end a bearing member 35. Similar elements are provided for the block 24. A shaft 36 extends at either end into the recesses of the two blocks, and is engaged by the resiliently mounted bearing members which force the shaft downwardly.

An upper clamping board 37 is pivotally

mounted on the shaft 36 by means of two brackets 38 and 39 which are provided with journals. Clamping strips 40 and 41 are provided on the upper clamping board 37. These clamping strips extend outwardly a short distance from the plane of the surface of the upper clamping board in order that one or more sheets may be securely held between the upper and lower clamping boards. The resilient mounting of the shaft 36 permits a parallel disposition of the clamping elements, regardless of the thickness of the stack of sheets clamped therebetween.

The upper clamping board is provided with a handle 89 so that it may be conveniently raised and lowered. Both the upper and lower clamping boards may be preferably made of wood. Reinforcing cross members 88, in the form of short lengths of angle iron may be provided, as shown in Fig. 4 for the lower clamping board.

Stationary shearing blades 42 and 43 are secured to the opposite side edges of the lower clamping board 20 by means of screws 44. Pivoted blades 46 and 47 are provided for cooperation with the stationary blades 42 and 43. It will be seen that after one or more sheets are securely clamped between the upper and lower boards 37 and 20 the blades 46 and 47 may be rotated downwardly so as to trim the edges of said sheets.

The blades 46 and 47 are mounted on arms 48 and 49, the arms being provided with studs 50 and 51 which extend inwardly through the brackets 22 and 23. Lock nuts 52 and 53 are threaded onto the ends of the studs 50 and 51, and springs 54 and 55 are confined between the lock nuts and the brackets so as to urge the arms and their associated blades inwardly against the brackets. Stop pins 98 and 99 are secured to the brackets 22 and 23 to hold the arms in a raised position.

Sleeves 56 and 57 are secured to the outer ends of the arms 48 and 49, and extend inwardly therefrom. A hand bar 58, provided with threaded ends, extends through the sleeves 56 and 57 so that the two blades may be maintained in parallel relationship and operated as a unit. Nuts 60 and 61, or other suitable retaining means, are provided at the ends of the bar 58 to provide a means by which springs 62 and 63 may be confined on extended portions of the bar 58.

It will be seen that the springs 62 and 63 urge the arms 48 and 49 toward each other, so that as the assembly comprising the two blades and the hand bar 58 is rotated downwardly, the pivoted blades are resiliently urged against the stationary blades 42 and 43 to insure proper shearing action. The resilient mounting of the pivoted studs 50 and 51 permits this relative motion between the arms 48 and 49.

In Fig. 6 is shown one of the several sheets which are operated upon by the trimmer. The sheet 64 is provided with a plurality of transverse slits 65 which extend from one side to the other, but leave connecting marginal portions 68 and 69 which serve to hold the sheet together as a unit. A series of holes 66 and 67 are provided along the side edges of the strips which are formed by the slits 65. The lower clamping board is provided with a peg 94 at one side thereof, and a peg 95 at the other side thereof, these pegs being preferably mounted toward the rear portion of the lower clamping board 20. Recesses 96 and 97 are provided in the upper clamping board 37 to accommodate the pegs 94 and 95 when the upper board is lowered into the position shown in Fig. 4.

It will be seen that one or more sheets 64 may be stacked on the lower board 20, the pins 94 and 95 serving by engagement with corresponding openings 66 in the sheets to align the sheets so that the respective strips of one sheet overlie the corresponding strips of another sheet. After the upper clamping board has been brought down into operative position, the operator grasps the hand bar 58 and rotates it downwardly into the dotted line position shown in Fig. 1. This severs the connecting marginal portions 68 and 69 from the sheets 64 so that what was formerly a stack of sheets is now a plurality of stacks or groups of strips which are provided at either end with perforations. The strips are securely held in their aligned positions by means of the clamping members 40 and 41 on the upper clamping board.

A longitudinal groove 71 is provided in the upper clamping board which is adapted to receive a clamping bar 72, the rear end of the bar being provided with a bearing 73 which engages the shaft 36. The forward end of the clamping board is provided with a finger piece 74 for lifting the same, as well as with a spring clip 75 adapted for engagement with a suitable projection 76 which may be secured to the lower clamping board 20 by means of the screws 77.

A longitudinal groove or recess 78 is also provided in the lower clamping board 20 adjacent one edge thereof as shown in Figs. 7 and 8. A lifting bar 79 is rotatably mounted in this groove by means of pins 82 and 83 which are non-rotatably secured thereto at the front and rear ends thereof. Pin 82 extends through and is journalled in a plate 80 which is secured to the front edge of the lower clamping board. Pin 83 is journalled in a portion of the bracket 22. A crank 84 is secured to the pin 82, the crank being provided with a suitable handle 85 so that the lifting bar 79 may be rotated out of the plane of the lower clamping board 20 as shown by dotted lines in Fig. 8. A pin or detent 86 may be provided on the crank 84 for cooperation with an apertured spring piece 87 in order that the crank and the lifting bar may be locked releasably in the flush position.

After the edges have been trimmed from the sheet 64 as described above, the upper clamping board 37 may be raised to its upright position. The clamping bar 72 however will remain in its lowered position by virtue of the engagement of the spring clip 75 with the projection 76. Thus the groups or stacks of strips are held in their relative positions even though the upper clamping board has been removed. While the groups of stacks are thus held, manipulation of the crank 84 will serve to elevate the ends of the groups of stacks at the right in Fig. 2 above the surface of the lower clamping board 20, as shown in Fig. 3.

When the strips are thus maintained in their elevated position, the strip removing device 90 shown in Fig. 12 may be applied to the strips so that the bent-up fingers 92 may be inserted through the respective apertures 66 of the several groups of strips. The strip removing device 90 comprises a bar 91 to which the bent-up fingers 92 are secured, the fingers being spaced from one another along the bar by a distance equal to the space of the apertures 66 from one another. A positioning member 93 extends outwardly from the bar 91 to facilitate the positioning of the fingers with respect to the apertures, the application of the strip removing device to the fingers

being shown in Figs. 8 and 13. By means of the lifting bar **79** it will be seen that all of the strips may readily be hooked into the fingers **92**, after which the spring clip **75** is released and the clamping bar **72** elevated so that all the groups of strips may be removed from the lower clamping board as a unit.

Each group of strips may then be separately removed from the strip removing device, and the strips of that group may then be positioned in side by side relationship on a peg board or other suitable holding device for duplication.

A modification of this invention is shown in Fig. 14, wherein the trimming device is provided with a single cutter **111a**, rather than the two cutters which are joined together by the hand bar **58** as shown in the preceding figures. If desired, a single cutter such as that shown in Fig. 14 may be provided for each side of the trimming board, so that first one edge of the sheets may be trimmed and then the other edge.

A further embodiment of this invention is shown in Fig. 15, wherein the lower clamping board **20'** is provided with modified means for removing the several groups of strips as a unit. A channel **100** is secured to the lower clamping board **20'** by means of suitable screws **101**, the outer wall **102** of the channel forming the shearing edge which corresponds to the stationary shearing blade **42** of Fig. 1. The inner surfaces of the walls of the channel **100** are provided with longitudinal grooves **103** and an inner channel **104** is provided with longitudinally disposed tongues or ribs **105** which cooperate with the grooves **103**, the inner channel being slidably disposed within the channel **100** so that it may readily be removed therefrom. A handle **108** is provided for the inner channel **104** to facilitate removal thereof.

Blocks **106**, provided with pegs **107**, are removably disposed in the inner channel **104**, so that the inner channel, together with the blocks, may be removed from the lower clamping board **20'** as a unit. It will be noted that a longitudinal recess **109** is provided in the upper clamping board **37'** to accommodate the pegs **107**.

A modified construction is shown in Fig. 20 wherein the blocks **106** are provided with grooves **110**, and the inner channel **104** is provided with corresponding tongues or ribs **111**. This permits the inner channel to be handled more freely, and maintains the blocks flush with the surface of the lower clamping board.

In operation, it will be seen that after the edges of the sheets have been trimmed, each group of strips is engaged by one of the pegs **107**. After the clamping bar **72'** has been removed, the operator, by means of the handle **108** removes the inner channel **104** so that all the groups of strips are removed as a unit. The operator may then remove the blocks **106**, one by one, together with the groups of strips associated therewith and pass them out to the different duplicating machine operators for simultaneous arrangement on several peg boards.

In this modification, it is not necessary to provide the peg **95** at the right hand side of the lower clamping board inasmuch as a series of pegs **107** serve to align the several sheets squarely with respect to the clamping board **20'** and the pivoted shearing blades **46'** and **47'**.

It will be seen that although only a few preferred embodiments of this invention have been herein shown and described, various modifications and changes may be made therein without departing from the spirit of this invention. The above description and drawings are illustrative only and this invention is to be limited only by the appended claims.

We claim:

1. A method of forming groups of strips of paper in stacked relationship from sheets made up of strips connected together at their ends by integral sheet portions but separated by slitting at their intermediate portions and of handling the same in groups by engagement with registering openings in the strips, which comprises the steps of stacking a plurality of the partially slitted sheets above one another so that the partially formed strips are in alignment with each other and the openings in the strips are registered, trimming both edges of said sheets while maintaining the same in aligned relationship so as to divide each sheet into a plurality of separate strips, and removing each of the resulting groups of strips as a unit by engagement with said registered openings.

2. An apparatus of the class described comprising a base member provided with a horizontal surface adapted to receive a sheet of paper, means adapted by engagement with a sheet near the side edges thereof to clamp the sheet against said base member, shearing blades mounted along the two side edges of said base to trim the side edges of said sheet while it is clamped against said surface, means connecting said blades so they may be operated in unison, and auxiliary clamping means adapted by engagement with an intermediate portion of the sheet to maintain said sheet in position after removal of said first mentioned clamping means whereby a further operation may be performed thereon.

3. A sheet trimming device comprising a sheet receiving base, stationary shearing blades secured to the side edges thereof, pivotally mounted trimming blades for cooperation therewith, a transversely positioned shaft movable vertically toward and from said base at one end thereof, and a clamping board mounted on said shaft so as to swing toward and from the base and adapted in its lowered position to maintain a stack of sheets in alignment on said base during operation of said trimming blades.

4. An apparatus of the class described comprising a base provided with a surface for receiving a plurality of apertured strips of paper so as to be readily removable therefrom by the use of a device having a plurality of fingers spaced for engaging the openings in said strips, and means movably mounted on said base adapted in one position to hold the end portions of said strips elevated above said base in order to facilitate the engagement thereof by said strip removing device.

5. A sheet trimming and handling device comprising a base provided with a strip receiving surface, a removable channel disposed in said base, a series of blocks removably disposed in said channel, said blocks being provided with pegs which extend above said surface to engage apertured strips of paper, means to clamp said apertured strips of paper against said base, and means to trim the edges of said apertured strips of paper while clamped.

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