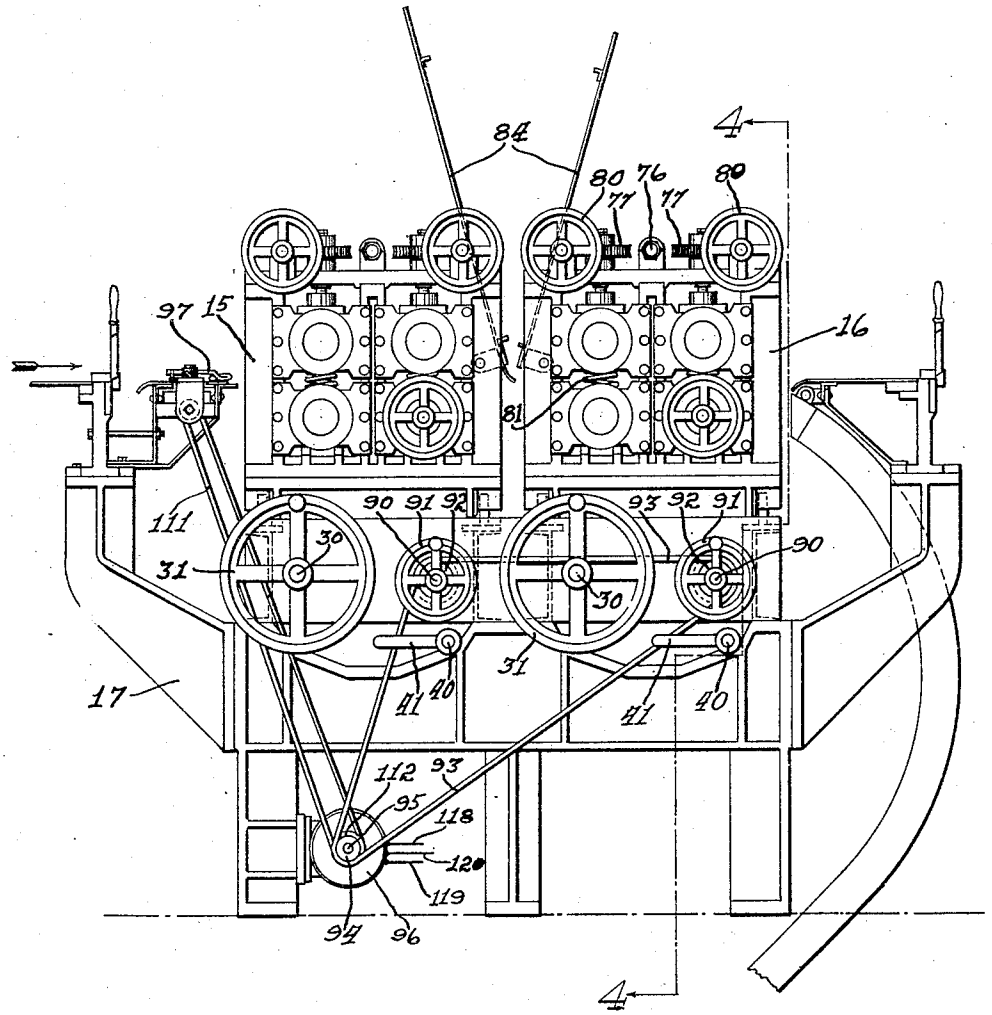
Nov. 22, 1932. R. N. RICHARDS 1,888,436

SHEET TRIMMING AND SCORING MECHANISM

Filed March 26, 1931 5 Sheets-Sheet 1

Fig. 1



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SHEET TRIMMING AND SCORING MECHANISM

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Fig. 2

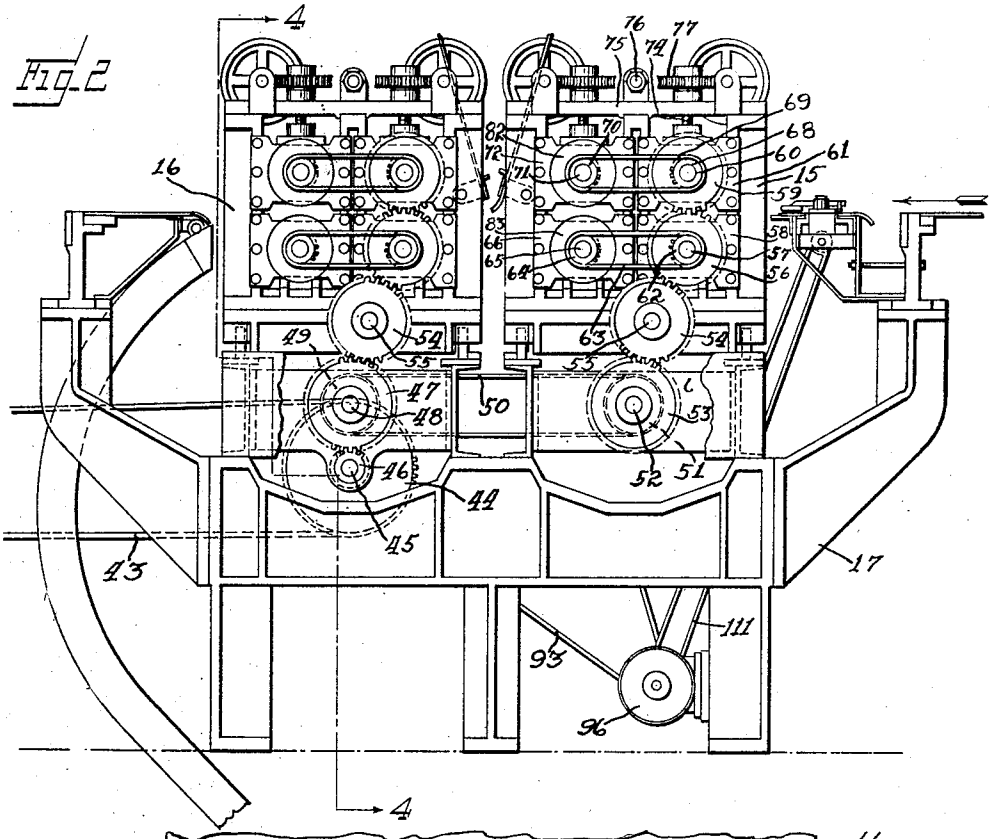
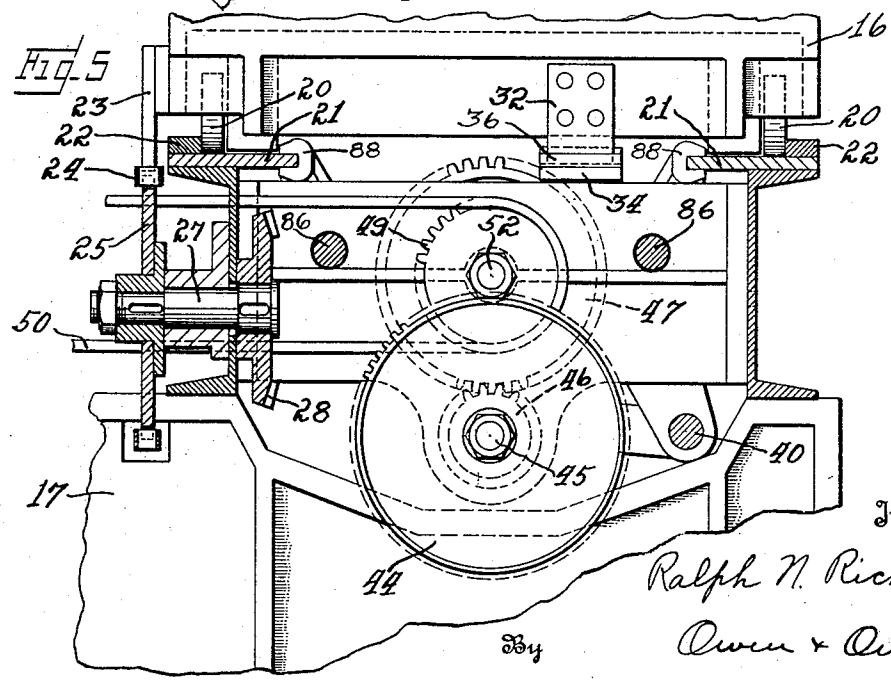


Fig. 5



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SHEET TRIMMING AND SCORING MECHANISM

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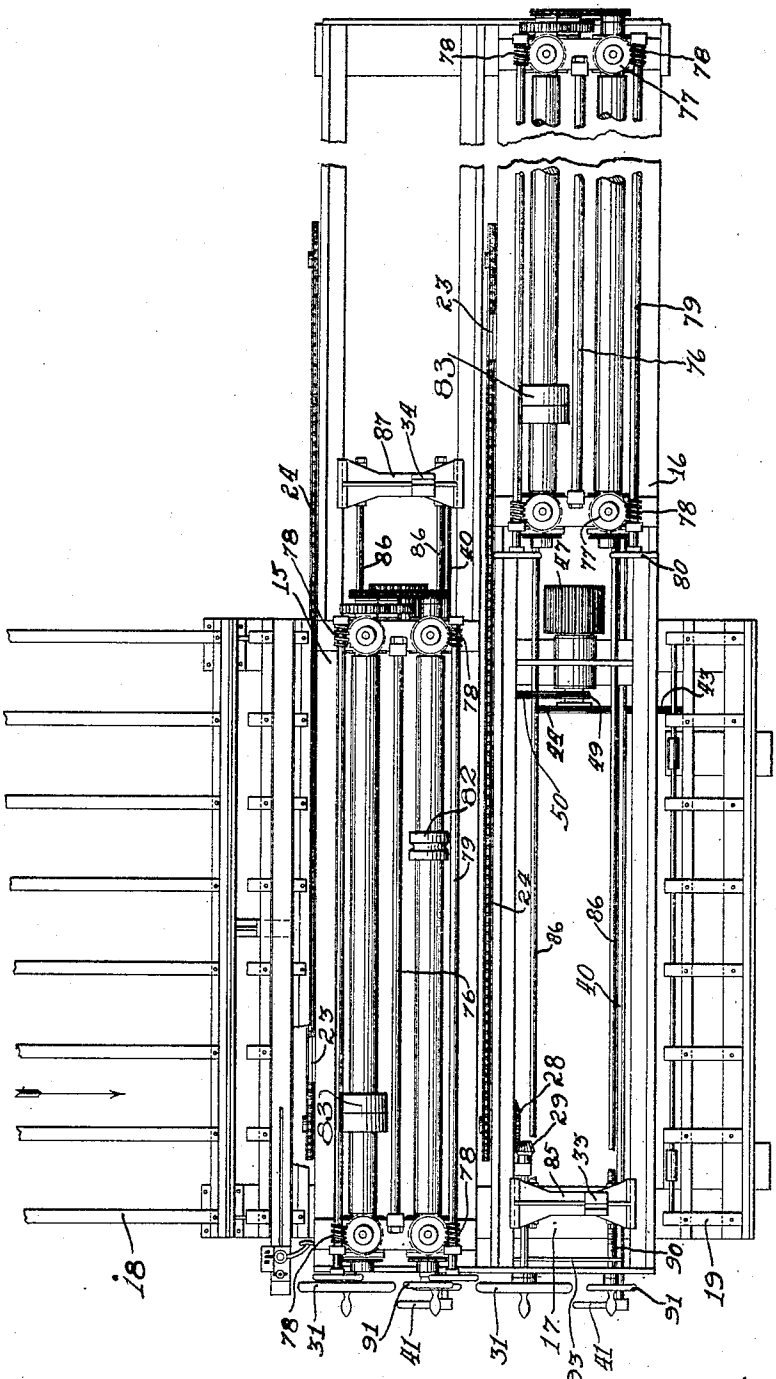


FIG. 3

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SHEET TRIMMING AND SCORING MECHANISM

Filed March 26, 1931 5 Sheets-Sheet 4

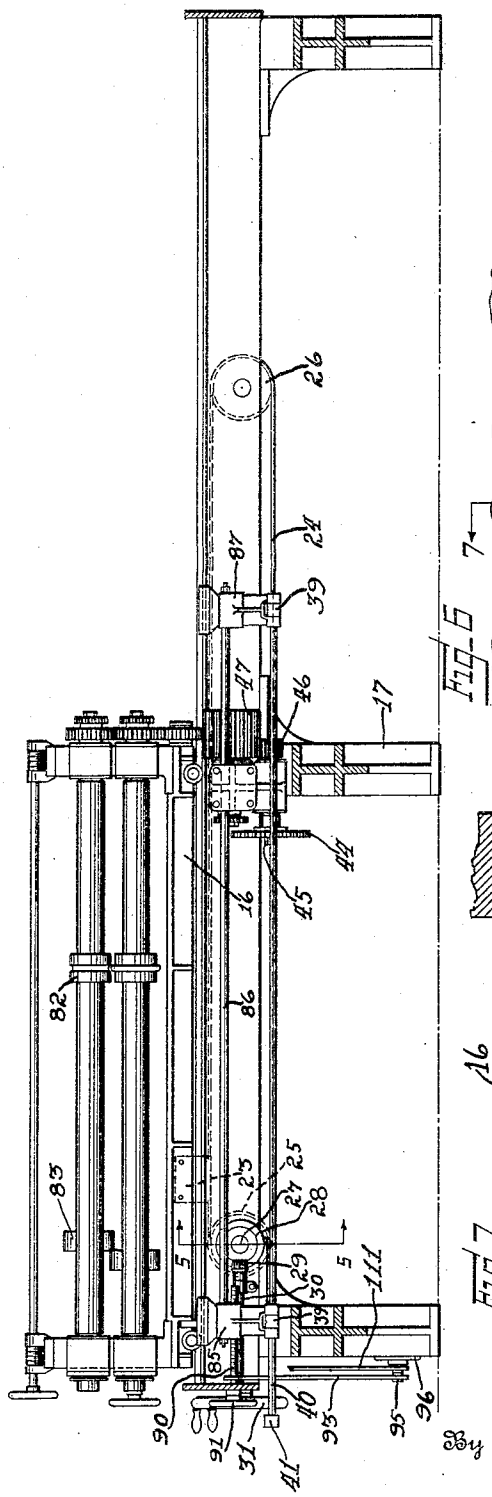


FIG. 4

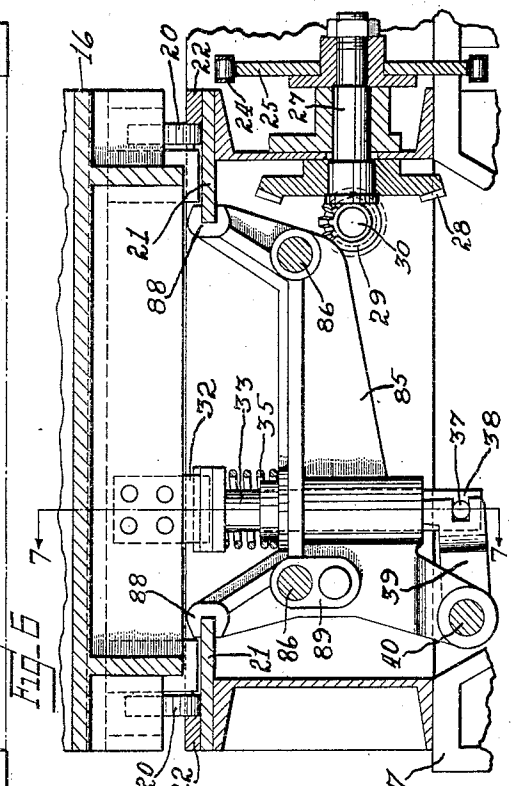


FIG. 5

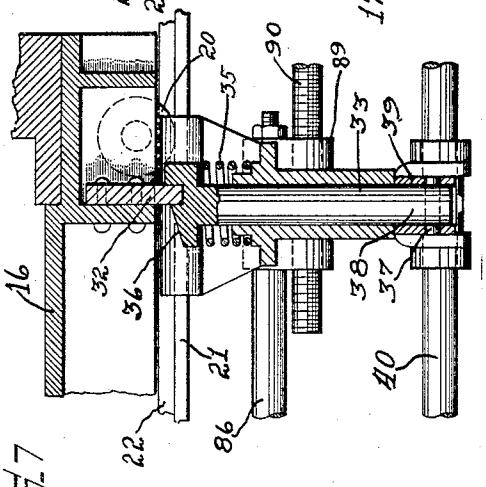


FIG. 7

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SHEET TRIMMING AND SCORING MECHANISM

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Fig. 8

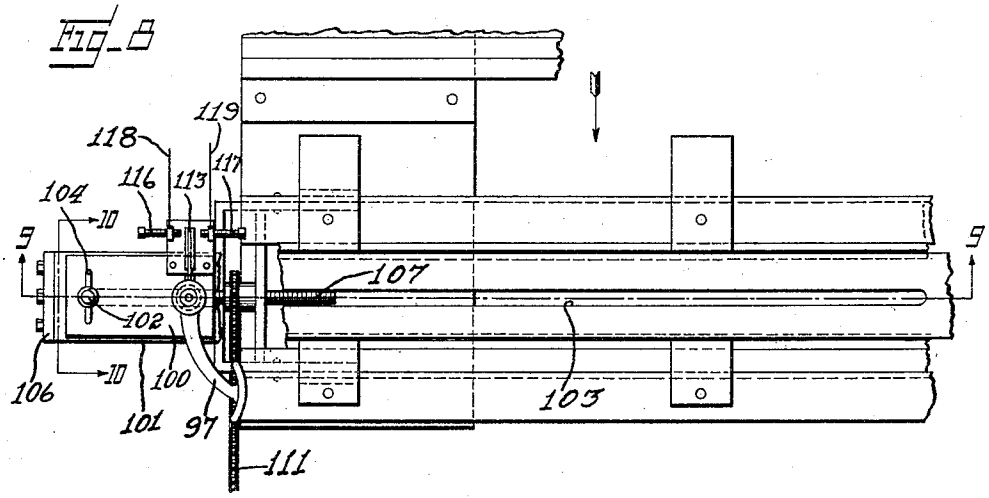


Fig. 9

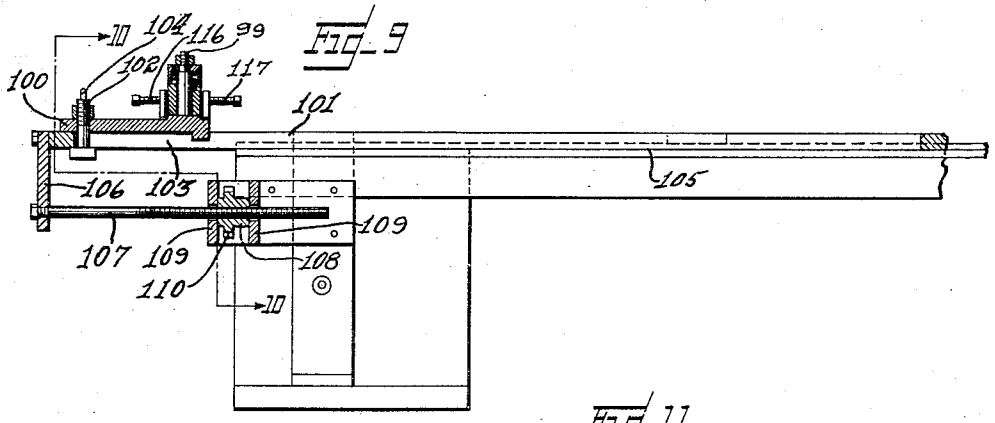


Fig. 10

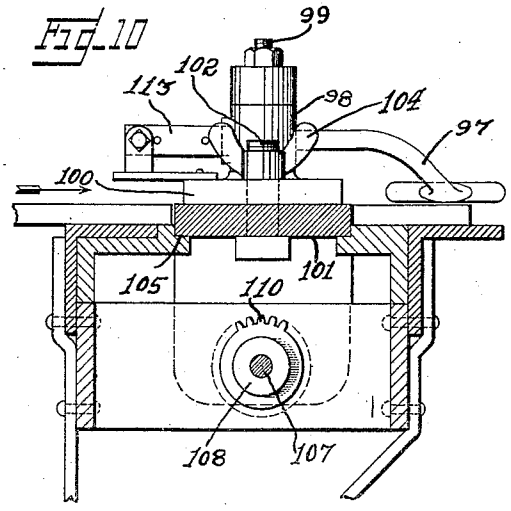
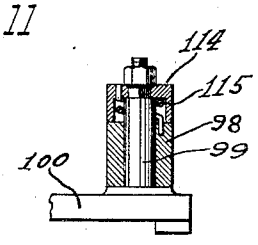


Fig. 11



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Patented Nov. 22, 1932 1,888,436

UNITED STATES PATENT OFFICE

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SHEET TRIMMING AND SCORING MECHANISM

Application filed March 26, 1931. Serial No. 525,351.

This invention relates to mechanism for trimming and scoring a traveling sheet or web of paper or similar material, or for performing other similar operations.

One of the objects of the invention is to provide means whereby the mechanism may, with little delay, be arranged for different runs involving various widths or various spacing between the lines of scoring, creasing or the like.

Another object of the invention is to provide means whereby the mechanism is caused to follow lateral deviations in the sheet or web, so that it is necessary to allow only a very narrow margin in the width of the same for trimming and a very small percentage of the stock is wasted.

With the above and other objects in view, which will be more particularly explained in the detailed description which follows, the present embodiment of the invention includes a plurality of units, one of which may be disposed in operative position in the line of travel of the sheet or web, while another unit in inoperative position is being prepared for the next run. Under certain conditions as hereinafter explained however, it may be expedient to place the two units in position for simultaneous operation.

The invention will be more particularly explained in oonnection with the accompanying drawings, in which

Figure 1 is a side elevation of the invention.

Figure 2 is an elevation of the invention as viewed from the opposite side.

Figure 3 is a plan view with parts broken away, one unit being in operative position and the other unit in inoperative position.

Figure 4 is a sectional view taken on the line 4—4 of Figures 1 and 2.

Figure 5 is an enlarged sectional view taken on the line 5—5 of Figure 4.

Figure 6 is a sectional view taken in the same plane as Figure 5 but looking in the opposite direction.

Figure 7 is a sectional view taken on the line 7—7 of Figure 6.

Figure 8 is a plan view of a portion of the invention, illustrating the follower mechanism.

Figure 9 is a sectional view taken on the line 9—9 of Figure 8.

Figure 10 is a sectional view taken on the line 10—10 of Figures 8 and 9.

Figure 11 is a detail sectional view of the spring holding means for the follower.

As illustrated in the drawings, there are two units 15 and 16, each including mechanism for trimming and scoring, or creasing a sheet of material as it passes therethrough. These units are adapted to be selectively adjusted in operative position above a bed 17 which is disposed in a line of paper box making machinery or other machinery for handling sheet material. In the present instance the sheet is fed over a rack or table 18 through the mechanism mounted on the bed 17 and thence to or over a receiving rack or table 19.

Each of the units 15 and 16 is supported on wheels or rollers 20 which are guided for movement on tracks 21 between side rails 22. A plate or bracket 23 is secured in depending relation to the frame of each unit 15 and 16 and is connected with a sprocket chain 24 which is guided about sprocket wheels 25 and 26 to shift the unit into or out of operative position. The sprocket wheel 25, by which the chain 24 is driven, is secured to a stud shaft 27 journaled in a side rail of the bed 17. A beveled gear 28 also secured to the shaft 27 meshes with a beveled pinion 29 secured to a shaft 30 which may be rotated by means of a hand wheel 31 to shift the unit 15 or 16 to the desired position.

Each of the units 15 and 16 has a depending lug 32 secured thereto as shown in Figures 5 and 7, which is engageable with a latch

bolt 33 to lock the unit in operative position or with a similar latch bolt 34 to lock the unit in inoperative position. Each of these latch bolts is yieldingly held in its uppermost or locking position by a spring 35 and is provided with an inclined face 36 over which the depending end of the lug 32 rides into locking position. For depressing the latch bolt 33 or 34 to release the unit, the lower end of each bolt is provided with lugs 37 which engage notches 38 in a bifurcated arm 39 secured to a shaft 40. Each shaft 40 is provided at its front end with a lever arm 41 by which the shaft may be manually rocked to release the unit. It is to be noted that the shaft 40 extends through the unit and is connected to both latch bolts 33 and 34 so that the unit is released from either operative or inoperative position by the same movement of the lever 41.

The mechanism of either unit 15 or 16, when in operative position, is adapted to be driven by a sprocket chain 43 connected to the same source of power which drives the box making machinery or other machinery with which the unit may be associated. The sprocket chain 43 passes over a sprocket wheel 44 which is secured to a shaft 45 journaled in the bed 17. A pinion 46 secured to the shaft 45 drives a gear 47 which is secured to the shaft 48 also journaled in the bed 17. A sprocket wheel 49 secured to the shaft 48 is connected by a sprocket chain 50 to a similar sprocket wheel 51 secured to a shaft 52 on which is secured a gear 53 similar to the gear 47, so that both gears 47 and 53 are driven simultaneously and equally. Each unit 15 and 16 has a main driving gear 54 secured on a shaft 55 and adapted to mesh with gear 47 or 53, as the case may be, whenever the unit is shifted into operative position.

The mechanism of each unit comprises a gear 56 secured to one of the lower roller shafts 57 and driven by the gear 54. The shaft 57 is journaled at each end in a bearing box 58 which is secured to the frame of the unit. The gear 56 meshes with a gear 59 secured to the shaft 60 of the cooperating upper roller which is journaled in an adjustable bearing box 61. The shaft 57 also has a sprocket wheel 62 secured thereto which is connected by a sprocket chain 63 to sprocket wheel 64 secured to the shaft 65 of the other lower roller which is journaled in a bearing box 66 secured to the frame of the unit. The shaft 60 has a sprocket wheel 68 secured thereto and connected by a sprocket chain 69 to a similar sprocket wheel 70 secured to a shaft 71 which is journaled in an adjustable bearing box 72. The roller shafts 60 and 71 may be adjusted vertically by means of screws 74 which are supported in a bracket 75 at either end of the unit. The two brackets 75 of each unit are connected by a tie rod 76 and each screw 74 has a worm gear 77 secured thereto which is rotated by means of a worm 78 on a shaft 79. Each shaft 79 extends from end to end of the unit, having a worm 78 at each end, so that both ends of the roller are adjusted simultaneously and equally by means of a hand wheel 80 secured to the end of the shaft.

The upper or adjustable rollers are partially supported by springs 81 to facilitate their adjustment. Minor adjustments of the rollers may be effected without interfering with the meshing of the gears 56 and 59. The upper rollers may also be raised high enough to permit the adjustment of the trimming knives, the scoring and creasing devices to the proper positions on the rollers in accordance with the article to be made. In the present instance, the scoring or creasing elements are indicated at 82 and the trimmer is indicated at 83 in Figure 4.

When the machinery is operated with only one of the units in operative position the space left vacant by the absence of the other unit may be bridged by an apron 84, shown in Figure 1, which is pivotally mounted on each unit and may be swung either to bridging position or to an idle position as shown in Figure 1. In some cases, however, it may be desirable to form creased or folding lines in the sheet so close together that the creasing elements cannot be set on the same pair of rollers. In such cases it is necessary to use two units simultaneously, making one crease as the sheet passes through one of the units and making the other crease as the sheet passes through the other unit.

After the unit 15 or 16 has been moved into operative position and locked by the latch bolt 33, it is desirable to adjust the same accurately with reference to the edge of the sheet which is to be worked upon. For this purpose the latch bolt 33 is mounted in an adjustable carriage 85 which is rigidly connected by tie rods 86 to a similar carriage 87 supporting the latch bolt 34. Each carriage 85 and 87 is formed with channels 88 by which it is guided on the rails 21. This adjustment is effected by means of a screw 90 which has a threaded engagement with a sleeve 89 formed on the carriage 85 and which may be operated by a hand wheel 91. The gear 47 is sufficiently elongated so that the desired adjustment may be effected without throwing the roller operating mechanism out of gear therewith. Each screw 90 has a sprocket wheel 92 secured thereto which is connected by a sprocket chain 93 to a similar sprocket wheel 92 secured to the other screw 90, so that both units 15 and 16 are adjusted simultaneously and equally. The sprocket chain 93 also passes about a sprocket wheel 94 secured to the shaft 95 of a reversible motor 96, by means of which the units 15 and 16 may be automatically adjusted dur-

ing their operation in accordance with any lateral deviations which may occur in the traveling sheet.

In connection with the automatic control of the units 15 and 16, a follower arm 97 is mounted in position to engage the edge of the sheet during the travel of the latter through the machine. The follower arm 97 is connected with a sleeve 98 which is journaled on a stud 99 secured to a plate 100. The plate 100 is adjustably secured to a carriage 101 by means of a bolt 102 which extends through a slot 103 in the carriage and is provided with a suitable wing nut 104 or other means for clamping the plate 100 to the carriage. The carriage 101 is guided for travel in a channel 105 formed in the base which supports the follower from the bed 17. The outer end of the carriage 101 has a depending arm or bracket 106 in which a threaded spindle 107 is secured. A nut 108 is threaded on the spindle 107 and is held between plates 109 which are secured to the base which supports the carriage 101. Thus a rotation of the nut 108 will cause the carriage 101 to move outwardly or inwardly.

For adjusting the position of the units 15 and 16 in accordance with the position of the follower 97 with respect to the traveling sheet, the nut 108 is formed with a sprocket wheel 110 which is connected by a sprocket chain 111 to a sprocket wheel 112 on the motor shaft 95. The follower arm 97 has a rearwardly projecting circuit closure arm 113 which is normally in neutral position with the follower 97 engaging the edge of the sheet when the latter is in proper position with reference to the trimming and scoring mechanism. A cap 114 is keyed to the stud 99 and is connected to the sleeve 98 by a spring 115 which is adapted to hold the follower with a light pressure against the edge of the sheet. At opposite sides of the circuit closure arm 113 are adjustable terminals 116 and 117 which are connected by conductor wires 118 and 119 respectively to opposite sides of the motor 96 which has a return wire 120. It will be understood therefore, that when the traveling sheet moves toward one side of the machine, the arm 97 will follow it and close a circuit through the conductor wire 118 to the motor 96, causing the latter to rotate in the proper direction to adjust the units 15 and 16 in the same direction as the deviation of the sheet. At the same time the sprocket chain 111 will rotate the nut 108, causing the carriage 101 also to move in the same direction until the circuit to the motor 96 is broken. If the sheet deviates toward the other side of the machine, a circuit will be completed through the conductor wire 119 to the motor and cause the latter to rotate in the opposite direction to adjust the position of the units 15 and 16 and likewise the position of the carriage 101 until the circuit through the motor is again interrupted. Thus, the position of the trimming and scoring mechanism will always be accurately controlled in respect to the position of the traveling sheet so that it is necessary to allow only an extremely narrow edge for trimming.

In setting the machine for any particular work, the trimming and scoring elements on one of the units may be set while the other unit is in operation. Then as the previous run is completed, one unit may be moved out and the other unit moved into position for operation, the final adjustment of the unit being effected by means of the hand wheels 91. The plate 100 is then adjusted and secured by means of a bolt 102 in such a position that the follower 97 engages the edge of the sheet, with the circuit closure arm 113 in neutral position. Then, if the sheet deviates laterally during the run, the unit 15 or 16 which is in operation will automatically follow the same.

While I have shown and described in detail one specific embodiment of the invention, it will be apparent that same may be modified to a considerable extent without departing from the scope of the appended claims.

What I claim is:

1. In a machine for working on a traveling web of sheet material, a bed over which the material is fed, a plurality of machine units, means for separately and selectively shifting said units on said bed into or out of operative position, a follower mounted independently of said units, means normally causing the follower to continuously engage the edge of the traveling sheet as the latter deviates laterally, and means controlled by the follower to shift all of said units laterally and simultaneously as a gang in accordance with the lateral deviation of the sheet.

2. In a machine for working on a traveling web of sheet material, a bed over which the material is fed, a plurality of machine units, means for separately and selectively shifting said units on said bed into or out of operative position, a follower mounted independently of said units, means normally causing the follower to continuously engage the edge of the traveling sheet as the latter deviates laterally, a reversible motor operable to shift all of said units laterally and simultaneously as a gang, and means connected to the follower to close a circuit through said motor in a direction to shift said units in accordance with the lateral deviation of the sheet.

3. In a machine for trimming and creasing sheet material, a bed over which the material is fed, a plurality of machine units each including trimming and creasing rolls, means for selectively shifting any desired selection of units bodily in the direction of the roll axes into position to operate on the sheet,

and means for driving each unit only when it has been thus shifted.

4. In a machine for trimming and creasing sheet material, a bed over which the material is fed, a plurality of machine units each including trimming and creasing rolls for operating on the sheet, means for selectively shifting any desired selection of units bodily in the direction of the roll axes into or out of operative position, and manually releasable means for automatically latching each unit as it reaches its extreme inward or outward position.

5. In a machine for trimming and creasing sheet material, a bed over which the material is fed, a plurality of machine units each including trimming and creasing rolls, means for selectively shifting any desired selection of units bodily in the direction of the roll axes into position to operate on the sheet, manually releasable means for automatically latching each unit in operative or inoperative position, and means for effecting minor adjustment of all of the units as a whole together with the latching means, in a direction at right angles to the direction of travel of the sheet, without releasing said units from the latching means.

6. In a machine for trimming and creasing sheet material, a bed over which the material is fed, tracks disposed at right angles to the direction of travel of the sheet, machine units mounted on said tracks and including trimming and creasing rolls, and means for selectively shifting said units along other tracks into a predetermined position to operate on the sheet or to a predetermined position outside of the path of travel of the sheet, so that while one of said units is in operation the other unit may be set in readiness to be shifted into operative position for a subsequent run.

7. In a machine for trimming and creasing sheet material, a bed over which the material is fed, a plurality of individual machine units each including trimming and creasing rolls, means for selectively shifting said units into a predetermined position to work upon the traveling sheet or to a predetermined position outside of the path of travel of said sheet, means for latching the several units in either extreme position, and means for shifting the latching means together with the units in a direction transverse to the traveling sheet to effect minor adjustment of said unit without unlatching them.

8. In a machine for trimming and creasing sheet material, a bed over which the material is fed, a plurality of individual machine units each including trimming and creasing rolls, means for selectively shifting said units bodily in a direction at right angles to the travel of the sheet to a predetermined working position or to a predetermined position outside of the path of travel of said sheet, and means to cause a unit which is in operation to follow lateral deviations of the sheet.

9. In a machine for trimming and creasing sheet material, a bed over which the material is fed, a plurality of machine units each including trimming and creasing rolls, means for separately and selectively shifting said units bodily in a direction at right angles to the travel of the sheet to or from a predetermined operative position, and means for simultaneously effecting a limited lateral adjustment of all of said units as a gang.

10. In a machine for working on a traveling web of sheet material, a plurality of machine units each comprising a carriage with rolls mounted therein to receive the traveling sheet between them, means for separately and selectively shifting said units in a direction at right angles to the travel of the sheet to or from a predetermined operative position, a reversible motor, means operable by said motor independently of said shifting means for simultaneously adjusting said units laterally in either direction, and means for energizing said motor to shift said units in accordance with lateral deviations of the sheet.

11. In a machine for working on a traveling web of sheet material, mechanism including a carriage with shaping rolls mounted therein to receive the traveling sheet between them, means for selectively shifting said mechanism to a predetermined position to act on said sheet or to another predetermined position at one side of the sheet, a follower mounted independently of said mechanism for engaging the edge of the sheet, a reversible motor, means operable by the motor simultaneously to adjust said mechanism and said follower laterally, and means controlled by said follower for energizing said motor in accordance with lateral deviations of said sheet.

12. In a machine for working on a traveling web of sheet material, a plurality of machine units each comprising a carriage with rolls mounted therein to receive the traveling sheet between them, means for separately and selectively shifting said units in a direction at right angles to the travel of the sheet to or from a predetermined operative position, a follower mounted independently of said units, and means controlled by said follower to adjust said units laterally in accordance with lateral deviations of said sheet.

13. In a machine for working on a traveling web of sheet material, a plurality of machine units each comprising a carriage with rolls mounted therein to receive the traveling sheet between them, means for separately and selectively shifting said units in a direction at right angles to the travel of the sheet to or from a predetermined operative position, a follower mounted independently of

said units, means normally causing the follower to continuously engage the edge of the traveling sheet as the latter deviates laterally, and means controlled by the follower to shift all of said units laterally and simultaneously as a gang in accordance with the lateral deviations of the sheet.

14 In a machine for working on a traveling web of sheet material, a plurality of tracks at right angles to the direction of travel of the sheet, machine units mounted on said tracks, means for selectively shifting said units on said tracks into operative position or to a position outside of the path of the sheet, limit latches for automatically latching each of said units as it reaches the limit of its movement in either direction, and unitary latch releasing means for each unit.

15. The combination with means for feeding a web of sheet material, of a plurality of units selectively shiftable into position to work on the web as it is fed, a reversible motor operable to shift the working unit laterally with reference to the travel of the web, the respective circuits for the motor having opposed terminals, a follower mounted independently of either unit, means normally holding the follower against the edge of the traveling web, a circuit closer connected with the follower and located between said terminals, said follower being movable in response to lateral deviation of the web to move the circuit closer from or through neutral position to close either circuit through the motor and thereby cause the working unit to follow the lateral deviation of the web, and means to shift the follower in synchronism with the working unit.

16. The combination with means for feeding a web of sheet material, of a plurality of units selectively shiftable into position to work on the web as it is fed, a follower, a carriage supporting the follower independently of either unit, means for initially adjusting the carriage in accordance with the width of the web to cause the follower to engage the edge thereof, means causing the follower thereafter to continuously engage the edge of the traveling web as the latter deviates laterally, means controlled by the follower to shift the working unit in accordance with the lateral deviation of the web, and means to shift the follower in synchronism with the working unit.

17. The combination with means for feeding a web of sheet material, of a plurality of units selectively shiftable into position to work on the web as it is fed, a follower, a carriage supporting the follower independently of either unit, means for initially adjusting the carriage in accordance with the width of the web to cause the follower to engage the edge thereof, means causing the follower thereafter to continuously engage the edge of the traveling web as the latter deviates laterally, a reversible motor operable to shift the working unit laterally, means connected to the follower to close a circuit through the motor in a direction to shift the working unit in accordance with the lateral through the motor in a direction to shift the follower in synchronism with the working unit.

In testimony whereof I have hereunto signed my name to this specification.

RALPH N. RICHARDS.

CERTIFICATE OF CORRECTION.

Patent No. 1,888,436. November 22, 1932.

RALPH N. RICHARDS.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 5, line 72, claim 17, strike out the words "through the motor in a direction" and insert instead "deviation of the web, and means"; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 17th day of January, A. D. 1933.

(Seal)

M. J. Moore,
Acting Commissioner of Patents.