Aug. 28, 1934. R. S. BARBER 1,971,896

SHEET HANDLING MECHANISM FOR PRINTING PRESSES

Filed Nov. 2, 1932 2 Sheets-Sheet 1

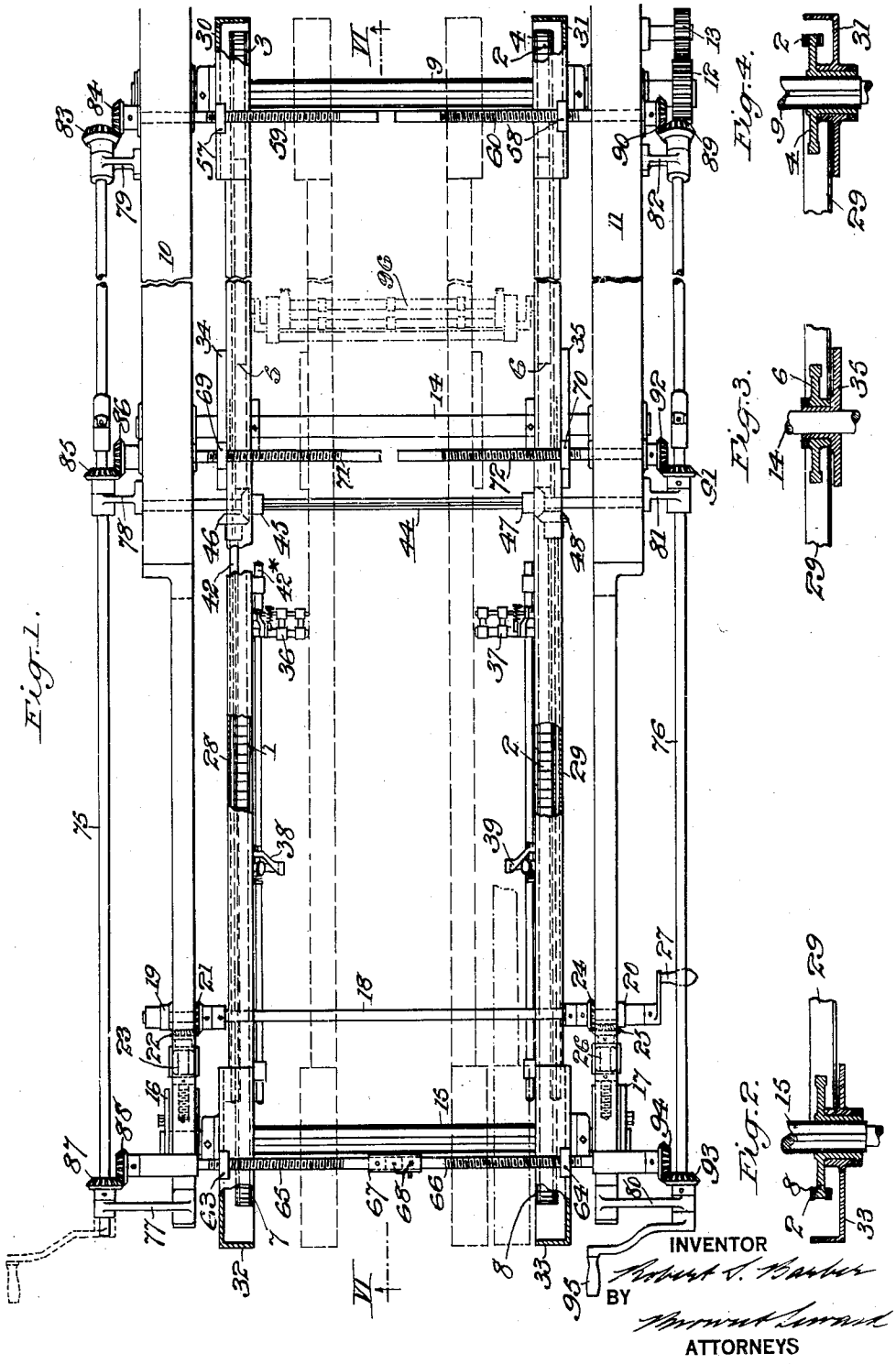


Fig. 1.

Fig. 4.

Fig. 3.

Fig. 2.

INVENTOR
Robert S. Barber
BY
Barrett Smith
ATTORNEYS

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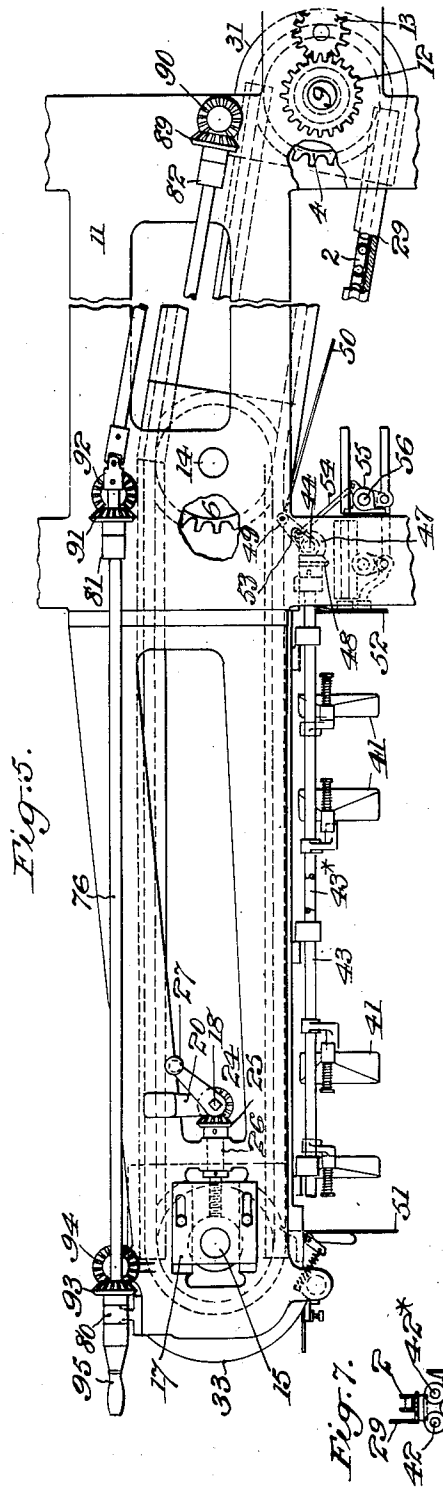


Fig. 5.

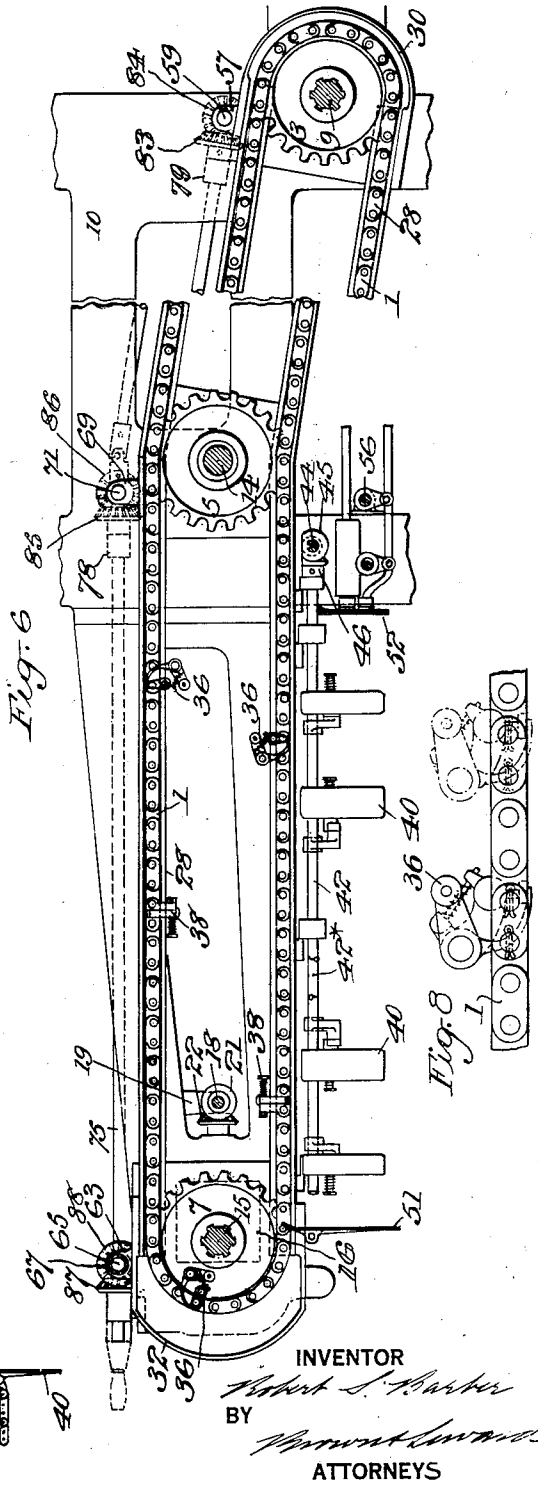


Fig. 6

Fig. 8

Fig. 7.

INVENTOR
Robert S. Barber
BY
Howson & Howson
ATTORNEYS

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SHEET HANDLING MECHANISM FOR PRINTING PRESSES

Robert S. Barber, New London, Conn., assignor to C. B. Cottrell & Sons Company, Westerly, R. I., a corporation of Delaware

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15 Claims. (Cl. 271—79)

The object of my invention is to provide novel means whereby sheets of different sizes within predetermined limits may be successfully handled, said means comprising, broadly, pairs of oppositely disposed coacting grippers which are adjustable both laterally and longitudinally, for handling sheets of different widths and lengths.

My invention more particularly comprises an endless sheet carrier, on the side chains of which pairs of oppositely disposed coacting grippers are mounted for longitudinal adjustment to handle sheets of different lengths, one or both of said chains being laterally adjustable to vary the distance between opposite grippers for bringing the grippers into position to handle sheets of different widths.

A further object of my invention is to provide means whereby the usual gripper bars extending between the side chains may be eliminated and replaced by coacting pairs of side and/or head grippers carried by their respective side chains; thus not only enabling the mechanism to handle sheets of different sizes but also permitting greater speed because of the saving in weight caused by the elimination of the gripper bars.

A practical embodiment of my invention is represented in the accompanying drawings in connection with a sheet delivery mechanism.

Fig. 1 represents the sheet delivery mechanism in top plan with the sheet joggers omitted, the side chains of the endless delivery carriers for the sheets being shown in full lines in position to handle wide sheets; in dotted lines in position to handle much narrower sheets; and in dot-and-dash lines the position of one of the side chains when adjusted relatively to the other side chain to handle narrower sheets.

Fig. 2 represents a detail horizontal section taken at one of the outer heads of the endless sheet carrier.

Fig. 3 represents a similar section taken at one of the intermediate heads of the carrier.

Fig. 4 represents a similar section taken at one of the inner heads of the carrier.

Fig. 5 represents a side view of the delivery carrier shown in Fig. 1.

Fig. 6 represents a longitudinal vertical section taken in the plane of the line VI—VI of Fig. 1, looking in the direction of the arrows.

Fig. 7 represents a detail cross section showing the means for mounting the side joggers on their rock shafts.

Fig. 8 represents a detail enlarged side elevation of one of the side chains showing a set of grippers in full lines in one adjusted position along the chain and in dot and dash lines in another adjusted position along the chain.

The delivery mechanism as shown in the accompanying drawings comprises an endless sheet carrier having its side sprocket chains 1 and 2 spaced apart a sufficient distance to handle sheets up to a predetermined width, which, in this case, would be the maximum width sheets for which the press to which the delivery mechanism is to be applied is designed to print and deliver. These side chains travel around their respective inner end sprockets 3 and 4, intermediate sprockets 5 and 6 and outer end sprockets 7 and 8. The inner end sprockets 3 and 4 are carried by and are slidably interlocked with a cross shaft 9 rotatably mounted in suitable bearings in the side frames 10 and 11 of the delivery mechanism, said cross shaft 9 being driven at the desired speed from the printing press, not shown herein, through the gears 12 and 13. The intermediate sprockets 5 and 6 are movable toward and away from each other along the stationary cross shaft 14 which extends between the side frames 10 and 11 and acts as a cross brace therefor. The outer end sprockets 7 and 8 are carried by and are slidably interlocked with their cross shaft 15 rotatably mounted in suitable bearing boxes 16 and 17, longitudinally adjustable along the side frames 10 and 11 respectively.

The manually operated means which I have shown for simultaneously adjusting these boxes 16 and 17 along the side frames 10 and 11 to tighten the sprocket chains 1 and 2 is as follows:

A cross shaft 18 is mounted in suitable bearing brackets 19 and 20 carried by the side frames 10 and 11, which cross shaft has a bevel gear connection 21, 22 at one side of the machine with a screw shaft 23 mounted against endwise movement in the side frame 10 and engaging the shaft bearing box 16; and another bevel gear connection 24, 25 with a screw shaft 26 mounted against endwise movement in the side frame 11 and engaging the shaft bearing box 17. A crank handle 27 may be used for turning the cross shaft 18 to simultaneously tighten these sprocket chains 1 and 2.

If it should be desired to move one of the sprocket chains 1 or 2 independently of the other, as for instance where it is necessary to remove one of the chains for repairs, etc., this may be accomplished by rendering either the bevel gear connection 21, 22, or the bevel gear connection 24, 25 inoperative, as for instance by removing the pin which locks the bevel gear 21 to the cross shaft

18, or by removing the pin which locks the bevel gear 24 to the said cross shaft 18.

The sprocket chains 1 and 2 run in trackways 28 and 29 respectively, having inner heads 30 and 31 mounted on the hubs of the inner end sprockets 3 and 4 to move laterally therewith along their shaft 9; outer heads 32, 33 mounted on the hubs of the outer end sprockets 7 and 8 to move laterally therewith along their shaft 15; and intermediate heads 34 and 35 mounted on the stationary cross shaft 14, said intermediate heads having hubs on which the intermediate sprockets 5 and 6 are mounted to move laterally therewith along the stationary shaft 14.

The sprocket chains 1 and 2 may be provided with pairs of coating head and/or side grippers adjustably placed along the chains to handle sheets of different lengths. In the present instance I have shown pairs of coacting head grippers 36, 37 and pairs of coacting side grippers 38, 39. The longitudinal positioning of the grippers along the sprocket chains 1 and 2 may be accomplished by detaching the grippers from their respective links and attaching the grippers to other similar links so as to longitudinally space the grippers of each chain the desired distance apart for the length of sheet to be handled.

The sets of side joggers 40 and 41 for the delivered sheets are carried by pairs of longitudinally disposed shafts 42, 42* and 43, 43*, mounted on the trackways 28 and 29 respectively so as to be moved laterally therewith, said shafts 42 and 43 being rocked from a cross shaft 44 having bevel gear connections 45, 46 and 47, 48 with the rock shafts 42 and 43 respectively; it being borne in mind that the bevel gears 45 and 47 are slidably interlocked with the cross shaft 44. This cross rock shaft 44 may be rocked from a source, not shown herein, through the rock arm 49 and rod 50. The usual adjustable front sheet stop is denoted by 51 and the set of back sheet joggers by 52, said back sheet joggers being reciprocated from an arm 53 on the cross shaft 44 through the rod 54 and rock lever 55 on the cross shaft 56.

The manually operated means which I have shown for adjusting one of the sheet carrier chains laterally toward or away from the other sheet carrier chain or for adjusting either of the sheet carrier chains laterally toward or away from the other carrier chain or for simultaneously adjusting both of the sheet carrier chains laterally toward or away from each other, is constructed, arranged and operated as follows:

The inner heads 30 and 31 of the trackways 28 and 29 are provided with screw threaded lugs 57 and 58 which are engaged by the oppositely threaded shanks of the cross shafts 59 and 60, rotatably mounted against endwise movement in suitable bearings in the side frames 10 and 11 respectively.

The outer heads 32 and 33 of the trackways are similarly provided with screw threaded lugs 63 and 64 which are engaged by the oppositely threaded shanks of the cross shafts 65 and 66, rotatably mounted against endwise movement in suitable bearings in the side frames 10 and 11 respectively. The adjacent inner ends of these threaded cross shafts may or may not be locked to rotate together; the device in the present instance being a sleeve coupling 67 embracing the inner ends of both shafts and fast to one shaft, a coupling pin 68 being used for removably securing the other shaft to the coupling when both shafts are to be rotated together.

The intermediate heads 34 and 35 of the trackways 28 and 29 are similarly provided with screw threaded lugs 69 and 70 which are engaged by the oppositely threaded shanks of the cross shafts 71 and 72, rotatably mounted against endwise movement in suitable bearings in the side frames 10 and 11 respectively.

Longitudinally disposed shafts 75 and 76 are rotatably mounted in bracket bearings 77, 78, 79 and 80, 81 and 82 respectively, carried by the side frames 10 and 11. The shaft 75 has a bevel gear connection 83, 84 with the cross shaft 59, a bevel gear connection 85, 86 with the cross shaft 71, and a bevel gear connection 87, 88 with the cross shaft 65. Similarly, the longitudinally disposed shaft 76 has a bevel gear connection 89, 90 with the cross shaft 60, a bevel gear connection 91, 92 with the cross shaft 72 and a bevel gear connection 93, 94 with the cross shaft 66. A crank handle 95 may be applied to the outer end of the shaft 75 or the shaft 76, as required.

When the oppositely threaded cross shafts 65 and 66 are coupled together, both sheet carrier chains are simultaneously moved laterally toward or away from each other by manipulating the crank handle 95 to adjust the sheet grippers to handle sheets of different widths. If it is desired to move one only of the carrier chains toward or away from the other carrier chain, the coupling pin 68 is removed and the crank handle 95 applied to the shaft 75 or 76 to move either the carrier chain 1 toward or away from the carrier chain 2, or vice versa. Under this last condition it will also be seen that both of the carrier chains may be independently moved laterally to bring them into the desired position laterally of the press as well as into the desired position for handling sheets of a predetermined width, such condition being permitted by rotating both the shaft 75 and the shaft 76 the desired amount. It will also be seen that while the oppositely threaded cross shafts are uncoupled either one of the sheet carrier chains may be adjusted laterally and then the corresponding oppositely threaded cross shafts may be coupled together, to obtain a further simultaneous movement of the two carrier chains toward or away from each other.

From the above description it will be seen that not only may the grippers be adjusted longitudinally for handling sheets of different lengths but also that the grippers may be adjusted laterally, either together or independently, or first independently and then together, to bring the grippers into the desired position for handling sheets of different widths within the limit of the press to which the mechanism is applied and in line with the path of the sheets from the press, all of these results being accomplished without the use of the heavy and cumbersome gripper bars hereinbefore considered necessary in sheet delivery mechanisms employing endless carriers when the sheets, on different runs of the press, may vary as to their widths.

For any predetermined size sheet that is slit, a head gripper bar 96 such as that shown in dot-and-dash lines on Fig. 1 would be employed.

While I have shown and described my invention in connection with a sheet delivery mechanism, it is evident that the invention, except for the jogging means, may be utilized in connection with sheet handling mechanism of any character.

It is also evident that various changes may be resorted to in the contstruction, form and arrangement of the several parts without departing from the spirit and scope of my invention, and hence I do not intend to be limited to the par-

ticular embodiment herein shown and described, but

What I claim is:

1. An endless sheet carrier comprising, side chains, oppositely disposed coacting grippers mounted on said chains, and means for simultaneously adjusting the chains laterally in parallelism toward and away from each other or for adjusting one of the chains toward and away from the other chain, for permitting the grippers to handle sheets of different widths.

2. An endless sheet carrier comprising side chains, oppositely disposed coacting grippers mounted on said chains, means for simultaneously adjusting the chains laterally in parallelism toward and away from each other or for adjusting one of the chains toward and away from the other chain, for permitting the grippers to handle sheets of different widths, and means for positioning the grippers carried by each chain greater or lesser distances apart for permitting the grippers to handle sheets of different lengths.

3. An endless sheet carrier comprising, side chains, oppositely disposed coacting grippers mounted on said chains, and means for simultaneously adjusting the chains laterally in parallelism toward and away from each other or for adjusting either one of the chains toward and away from the other chain, for permitting the grippers to handle sheets of different widths.

4. An endless sheet carrier comprising side chains, oppositely disposed coacting grippers mounted on said chains, means for simultaneously adjusting the chains laterally in parallelism toward and away from each other or for adjusting either one of the chains toward and away from the other chain, for permitting the grippers to handle sheets of different widths, and means for positioning the grippers, carried by each chain, greater or lesser distances apart for permitting the grippers to handle sheets of different lengths.

5. In a sheet handling mechanism, two parallel endless trackways, side chains traveling therein, oppositely disposed coacting grippers mounted on said chains and means for adjusting one or both of the trackways laterally for the purpose set forth, said means comprising two side frames, oppositely disposed and threaded cross shafts mounted in the side frames against endwise movement and engaging their respective trackways, means for removably coupling two opposite cross shafts together, and two longitudinally disposed hand shafts mounted on the side frames and geared to their respective cross shafts.

6. In a sheet handling mechanism, two side frames, cross shafts mounted in the side frames, pairs of oppositely disposed sprockets mounted on the cross shafts and slidably interlocked therewith, trackways mounted on said sprockets, endless side chains in said trackways passing around their respective sprockets, oppositely disposed coacting grippers mounted on said chains, and means for simultaneously moving both said trackways and their chains and sprockets laterally in parallelism toward and away from each other or for moving one of said trackways and their chains and sprockets toward or away from the other trackway and its chain and sprockets, for permitting the grippers to handle sheets of different widths.

7. In a sheet handling mechanism, two side frames, cross shafts mounted in the side frames, pairs of oppositely disposed sprockets mounted on the cross shafts and slidably interlocked therewith, trackways mounted on said sprockets, endless side chains in said trackways passing around their respective sprockets, oppositely disposed coacting grippers mounted on said chains, and means for simultaneously moving both said trackways and their chains and sprockets laterally in parallelism toward and away from each other or for moving either one of said trackways and their chains and sprockets toward or away from the other trackway and its chain and sprockets, for permitting the grippers to handle sheets of different widths.

8. An endless sheet carrier comprising, side chains, oppositely disposed grippers mounted on said chains, means for simultaneously adjusting the tension of the chains and means for adjusting the distance between the chains, for the purpose set forth.

9. In a sheet handling mechanism, an endless sheet carrier comprising, side chains, oppositely disposed grippers mounted on said chains, means for adjusting the tension of the chains and means for adjusting the distance between the chains for the purpose set forth, said tension adjusting means including side frames, a chain shaft, bearing boxes therefor adjustable in the side frames, screw shafts mounted in the side frames and engaging said boxes and a hand operated cross shaft geared to said screw shafts.

10. An endless sheet carrier comprising, oppositely disposed coacting grippers traveling in parallel paths, oppositely disposed coacting side joggers and means for adjusting the distance between opposite grippers and between opposite joggers, for handling sheets of different widths.

11. An endless sheet carrier complrising, oppositely disposed coacting grippers traveling in parallel paths, oppositely disposed coacting side joggers and means for simultaneously adjusting the distance between opposite grippers and between opposite joggers, for handling sheets of different widths.

12. An endless sheet carrier comprising, side chains, oppositely disposed coacting grippers mounted on said chains, oppositely disposed coacting side joggers and means for adjusting the distance between the chains and between opposite joggers, for handling sheets of different widths.

13. An endless sheet carrier comprising, side chains, oppositely disposed coacting grippers mounted on said chains, oppositely disposed coacting side joggers and means for simultaneously adjusting the distance between the chains and between opposite joggers, for handling sheets of different widths.

14. In a sheet handling mechanism, two parallel endless trackways, side chains traveling therein, oppositely disposed coacting grippers mounted on said chains, oppositely disposed coacting side joggers mounted on said trackways and means for adjusting the distance between the trackways and thereby opposite grippers and opposite joggers, for handling sheets of different widths.

15. In a sheet handling mechanism, two parallel endless trackways, side chains traveling therein, oppositely disposed coacting grippers mounted on said chains, oppositely disposed coacting side joggers mounted on said trackways and means for simultaneously adjusting the distance between the trackways and thereby opposite grippers and opposite joggers, for handling sheets of different widths.

ROBERT S. BARBER.