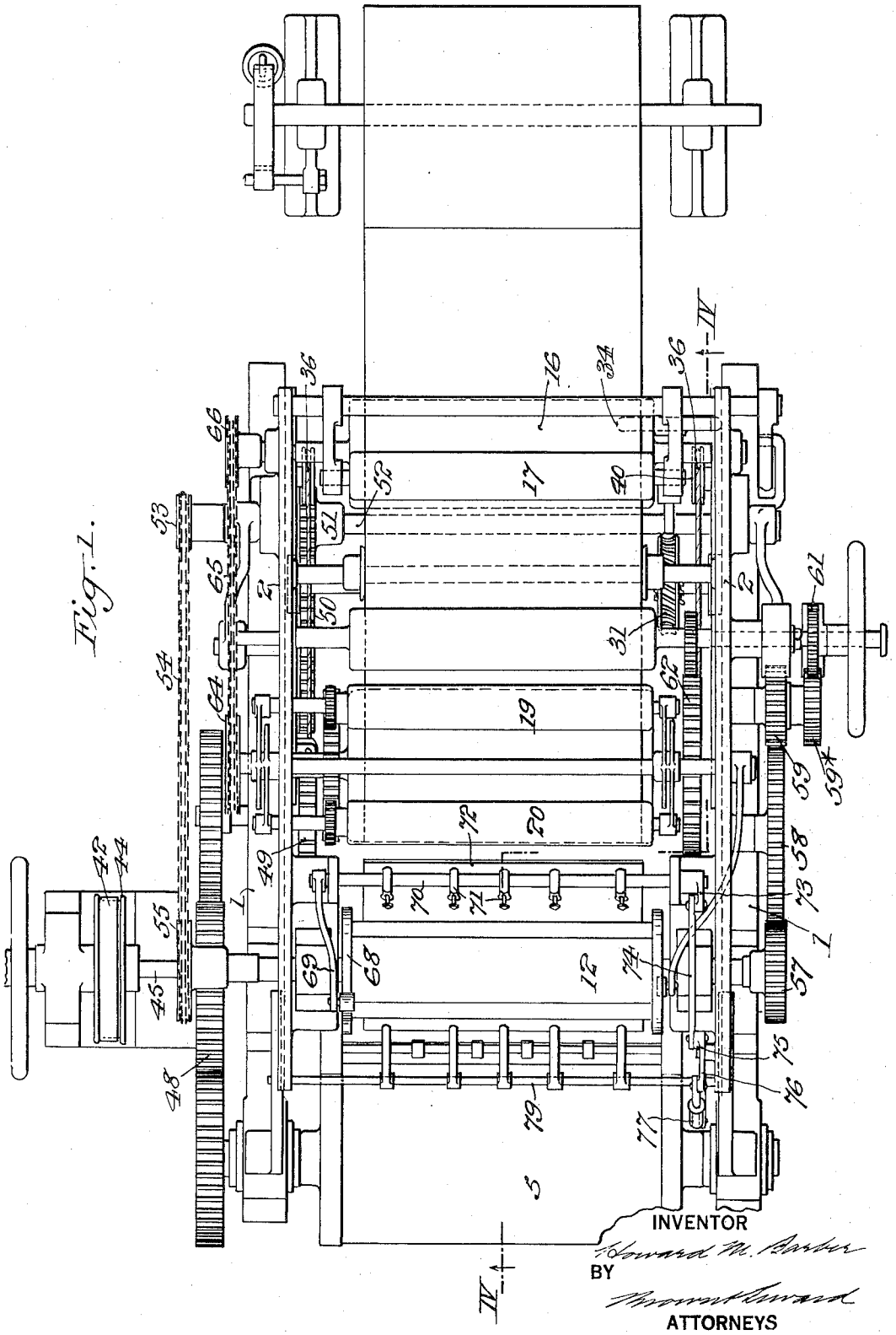
Dec. 19, 1933. H. M. BARBER 1,940,484

WEB FEEDING AND SHEET CUTTING MECHANISM

Filed Dec. 31, 1931 4 Sheets-Sheet 1

Fig. 1.



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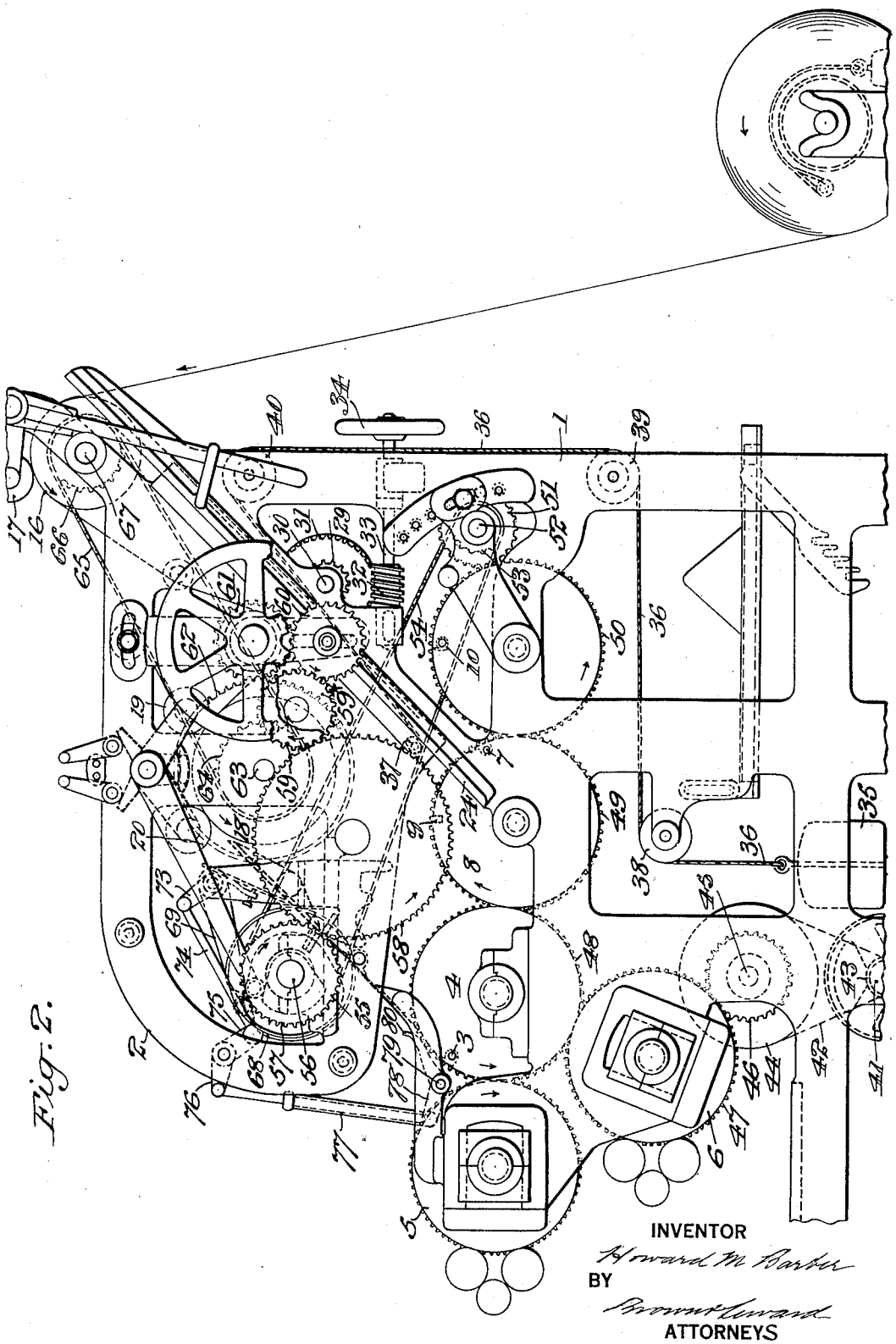

Fig. 2.

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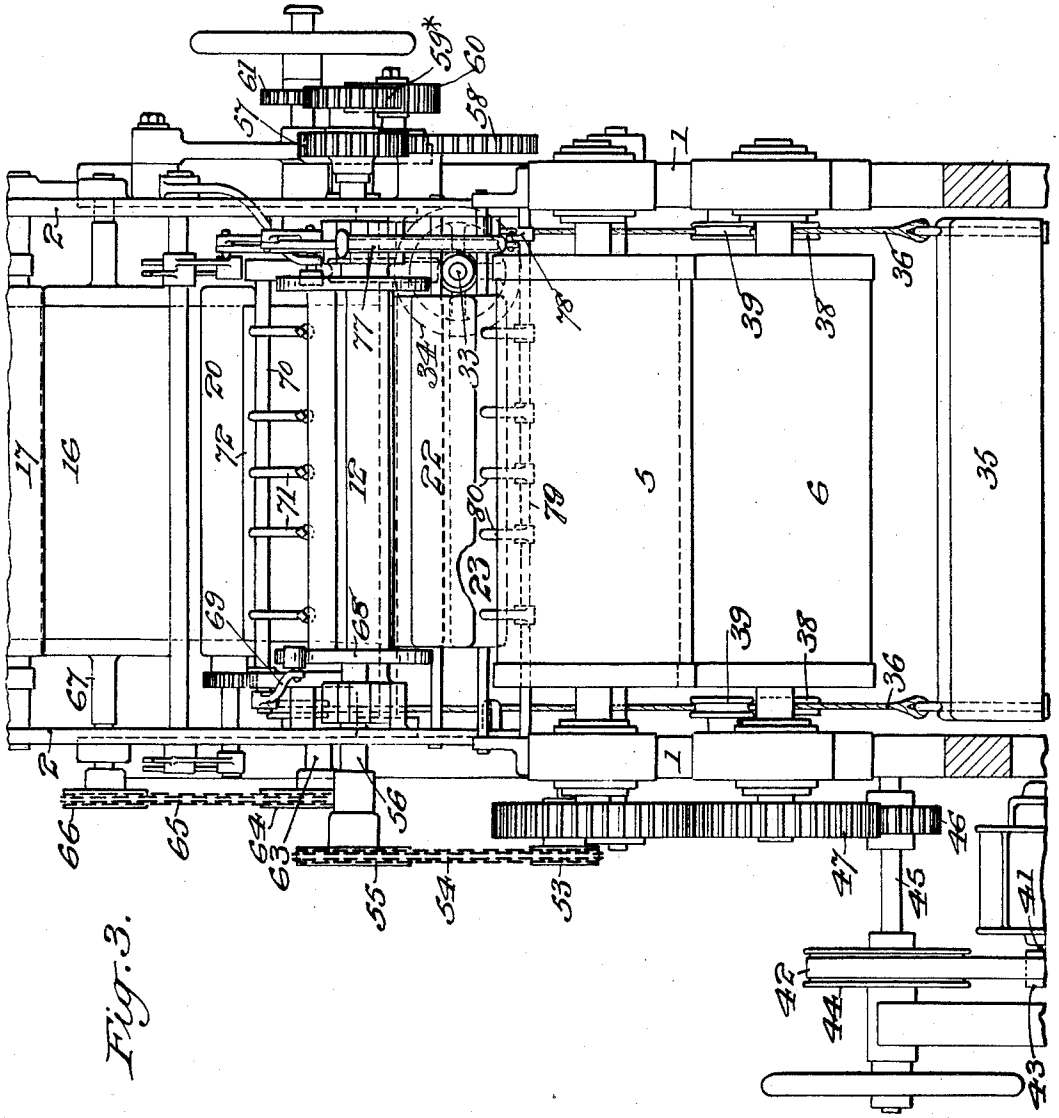

Fig. 3.

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WEB FEEDING AND SHEET CUTTING MECHANISM

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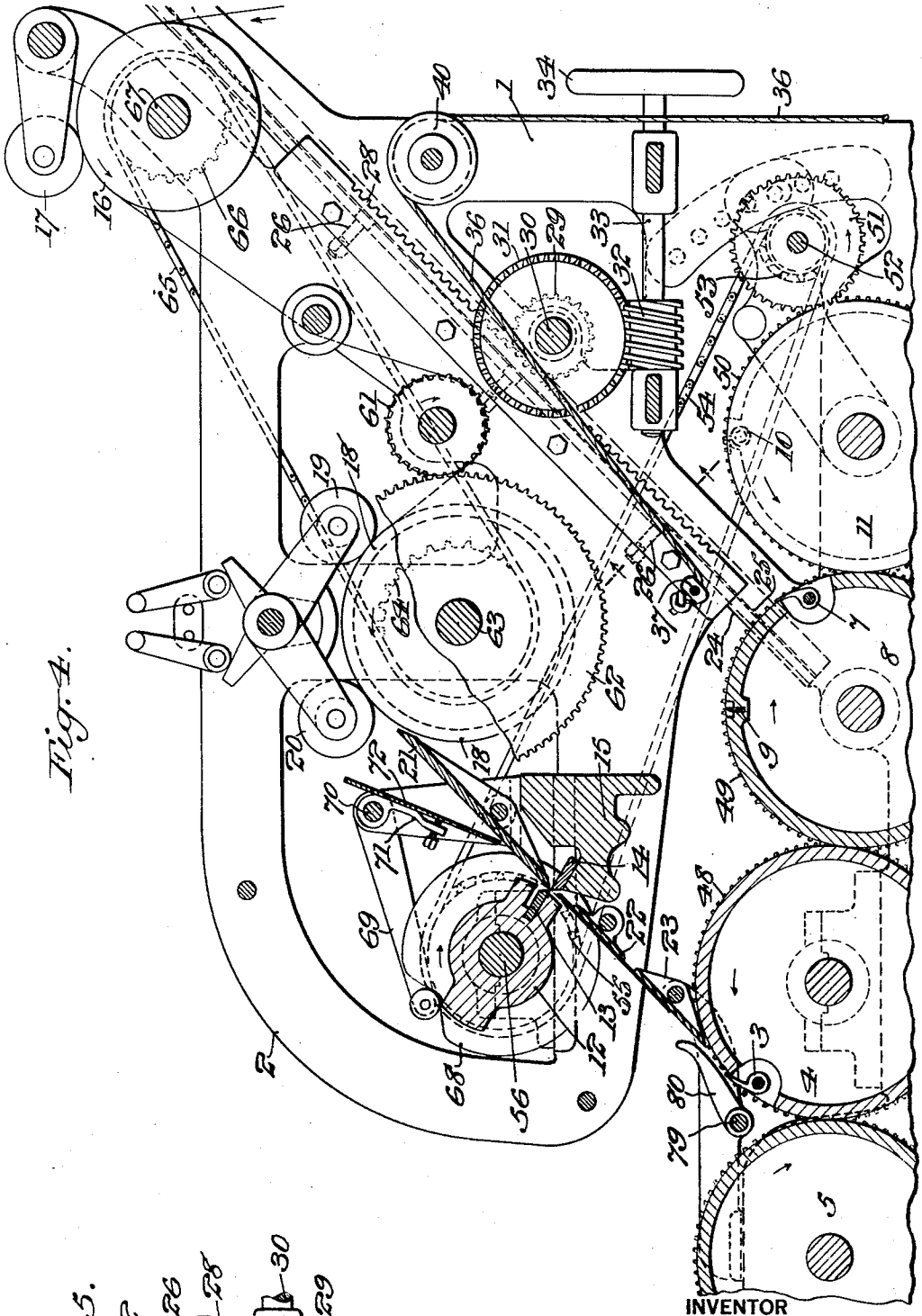

Fig. 4.

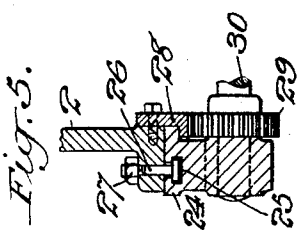

Fig. 5.

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UNITED STATES PATENT OFFICE

1,940,484

WEB FEEDING AND SHEET CUTTING MECHANISM

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Application December 31, 1931
Serial No. 584,074

9 Claims. (Cl. 164—67)

In the past it has been common to feed measured lengths of web to a sheet cutter where sheets of predetermined lengths have been cut from the web and to deposit the so cut sheets onto an endless tape carrier to be fed to a sheet taking device for subsequent operations, such as printing and/or folding. This arrangement has worked satisfactorily with longer sheets but not so satisfactorily with shorter sheets and especially very short sheets.

The object of this invention, therefore, is to provide means whereby very short sheets as well as long sheets may be fed in exact register to their sheet taking device.

My invention comprises, generally, means whereby both the web feeder and the sheet cutter which are carried by an auxiliary frame slidably mounted on the main frame may be adjusted as a unit toward and away from the sheet taking device which is carried by the main frame, an extension guide being interposed between the web feeder and the sheet taking device.

My invention further comprises means whereby the web is temporarily arrested by a pressure device acting on the web upon both sides of the sheet cutter just as the leading edge of the web reaches the sheet taking device and just before the sheet is severed from the web, thereby assuring a square cut and a perfect register for the sheet.

A practical embodiment of my invention is represented in the accompanying drawings in which:

Fig. 1 represents a top plan view of the machine;

Fig. 2 represents a detail side view of the same;

Fig. 3 represents a detail end view of the machine;

Fig. 4 represents a detail longitudinal vertical section on an enlarged scale taken in the planes of the line IV—IV of Fig. 1; and

Fig. 5 represents a detail section showing the means for mounting and adjusting the auxiliary frame on the main frame.

The main frame is denoted by 1 and the auxiliary frame which is movable along an inclined plane with respect to the main frame is denoted by 2.

A sheet taking device is carried by the main frame, which device is herein shown as a set of grippers 3 on the impression cylinder 4 of a printing unit, the coacting form cylinders of which are denoted by 5 and 6. The grippers 3 are arranged to transfer the two color printed sheets to grippers 7 of a folding cylinder 8, which folding cylinder is provided with a folding blade 9 arranged to coact with folding jaws 10 on the folding cylinder 11.

The sheet cutter is carried by the auxiliary frame 2 and is herein illustrated as comprising a rotary cutter 12, the knife 13 of which is arranged to coact with the knife 14 of a stationary block 15.

The web feeder is also carried by the auxiliary frame and is herein shown as comprising the following elements: The primary web feeding roll is denoted by 16 and its coacting pressure roll by 17. The secondary web feeding roll is denoted by 18 and its coacting pressure feed rolls by 19 and 20.

An inclined extension guide has a fixed member 21 interposed between the web feeder and the sheet cutter. This inclined guide also has overlapping members 22 and 23 carried by the auxiliary and main frames respectively, said members being interposed between the sheet cutter and the sheet taking device.

The means for manually moving the auxiliary frame along a plane parallel to the inclined extension guide to adjust the positions of the sheet feeder and the sheet cutter with respect to the sheet taking device is as follows: The main frame is provided with inclined tracks 24, which tracks have undercut grooves 25 within which the heads of bolts 26 carried by the auxiliary frame 2 may be moved when their clamping nuts 27 are released. Racks 28 are secured along the sides of the auxiliary frame, which racks mesh with pinions 29 carried by a shaft 30 mounted in the main frame 1. This shaft 30 carries a worm gear 31 which meshes with a worm 32 on a hand shaft 33, the hand wheel 34 of which is located outside the main frame 1 in convenient position for manipulation.

The auxiliary frame with the parts carried thereby may be substantially counterbalanced for facilitating its adjustment along the inclined track of the main frame. In the present instance I have shown a counterbalanced weight 35 connected by cords 36 to the auxiliary frame at 37, said cords passing over guide pulleys 38, 39 and 40.

The means for driving the several mechanisms is shown herein as comprising the following arrangement: The motor drive shaft 41 has a belt and pulley connection 42, 43, 44 with the shaft 45 which carries the first gear 46 of a train of gears 47, 48, 49, 50, 51 to the shaft 52 which carries a sprocket 53 connected by a chain 54 to a sprocket 55 on the shaft 56 of the rotary cutter 12. This shaft 56 carries the first gear of a train of gears 57, 58, 59, 59*, 60, 61, 62, connecting the shaft 56 with the shaft 63 of the web feed roll 18. This shaft 63 is provided with a sprocket wheel 64 which is connected by a chain 65 with a sprocket wheel 66 carried by the shaft 67 of the primary web feed roll 16.

The device which I have shown for clamping the web to the guide upon opposite sides of the sheet cutter just as the leading edge of the web

reaches the sheet taking device and just before the sheet is severed from the web, is constructed, arranged and operated as follows:

A cam 68 carried by the cutter shaft 56 controls the operation of a lever arm 69 carried by a rock shaft 70, which rock shaft in turn carries a lever arm 71 provided with a clamp plate 72 for engaging the web between the sheet cutting device and the web feeding device. This rock shaft 70 is also provided with a lever arm 73 which is connected by a rod 74 to one arm 75 of a rock lever, the other arm 76 of which is connected by a rod 77 to one arm 78 carried by a rock shaft 79. This rock shaft carries a series of pressure fingers 80 arranged to press the web against the member 23 of the inclined guide between the sheet cutter and the sheet taking device.

From the above description it will be seen that I have provided means whereby the leading edge of the web is fed along the guide to its sheet taking point before the sheet is cut from the web and also that the movement of the web is arrested momentarily while the sheet is being severed from the web, thereby ensuring a square cut and a perfect register for the sheet.

It will also be seen that by providing means for moving the web feeder and sheet cutter as a unit toward and away from the sheet taking device, very short sheets may be accurately handled.

It will also be seen that by substantially counterbalancing the auxiliary frame and the parts carried thereby I am enabled to very easily adjust the auxiliary frame along the main frame to the desired position for the length of sheet to be cut from the web.

It is evident that various changes may be resorted to in the construction, 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 particular embodiment herein shown and described, but

What I claim is:

1. A sheet taking device, a web feeder, an interposed sheet cutter, an extension sheet guide having fixed and movable members, said sheet guide extending downwardly and forwardly from the web feeder to the sheet taking device, and means for adjusting the web feeder, the sheet cutter and the movable member of the extension sheet guide as a unit in an inclined path toward and away from the sheet taking device.

2. A sheet taking device, a sheet cutter, an inclined guide, means for feeding a web along the guide and through the sheet cutter to the sheet taking device, said inclined guide extending from the web feeder to the sheet taking device, and a device for momentarily arresting the movement of the web as its leading edge reaches the sheet taking device and the sheet is about to be severed from the web.

3. A sheet taking device, a sheet cutter, an inclined guide, means for feeding a web along the guide and through the sheet cutter to the sheet taking device, said inclined guide extending from the web feeder to the sheet taking device, and a device for momentarily arresting the movement of the web as its leading edge reaches the sheet taking device and the sheet is about to be severed from the web, said arresting device comprising members arranged to clamp the web to the guide upon opposite sides of the sheet cutter.

4. A sheet taking device, a sheet cutter, an inclined guide, means for feeding a web along the guide and through the sheet cutter to the sheet taking device, a device for momentarily arresting the movement of the web as its leading edge reaches the sheet taking device and the sheet is about to be severed from the web, said arresting device comprising members arranged to clamp the web to the guide upon opposite sides of the sheet cutter, and means for adjusting the web feeder and sheet cutter as a unit in an inclined path toward and away from the sheet taking device.

5. A main frame, an auxiliary frame, a sheet taking device carried by the main frame, a web feeder and a sheet cutter both carried by the auxiliary frame, means for moving the auxiliary frame to adjust the position of the feeder and cutter as a unit with respect to the sheet taking device, and an inclined guide interposed between the web feeder and sheet taking device, said guide having coacting overlapping members carried by the main and auxiliary frames respectively.

6. A main frame, an auxiliary frame, a sheet taking device carried by the main frame, an inclined guide, a sheet cutter and a web feeder both carried by the auxiliary frame, the feeder being located upon the opposite side of the sheet cutter from the sheet taking device and operable to feed the web along said inclined guide through the sheet cutter to the sheet taking device, and means for causing the severance of the sheet from the web substantially coincident with the taking of the sheet by the sheet taking device.

7. A main frame, an auxiliary frame, a sheet taking device carried by the main frame, an inclined guide, a sheet cutter and a web feeder both carried by the auxiliary frame, the feeder being operable to feed the web along said guide through the sheet cutter to the sheet taking device, means for causing the severance of the sheet from the web substantially coincident with the taking of the sheet by the sheet taking device, and a device for momentarily arresting the travel of the web during the severance of the sheet therefrom.

8. A main frame, an auxiliary frame, a sheet taking device carried by the main frame, an inclined guide, a sheet cutter and a web feeder both carried by the auxiliary frame, the feeder being operable to feed the web along said guide through the sheet cutter to the sheet taking device, means for causing the severance of the sheet from the web substantially coincident with the taking of the sheet by the sheet taking device, and means for moving the auxiliary frame along an inclined path to adjust the position of the sheet cutter and web feeder with respect to the sheet taking device.

9. A main frame, an auxiliary frame, a sheet taking device carried by the main frame, an inclined guide, a sheet cutter and a web feeder both carried by the auxiliary frame, the feeder being operable to feed the web along said guide through the sheet cutter to the sheet taking device, means for causing the severance of the sheet from the web substantially coincident with the taking of the sheet by the sheet taking device, a device for momentarily arresting the travel of the web during the severance of the sheet therefrom, and means for moving the auxiliary frame along an inclined path to adjust the position of the sheet cutter and web feeder with respect to the sheet taking device.

HOWARD M. BARBER.