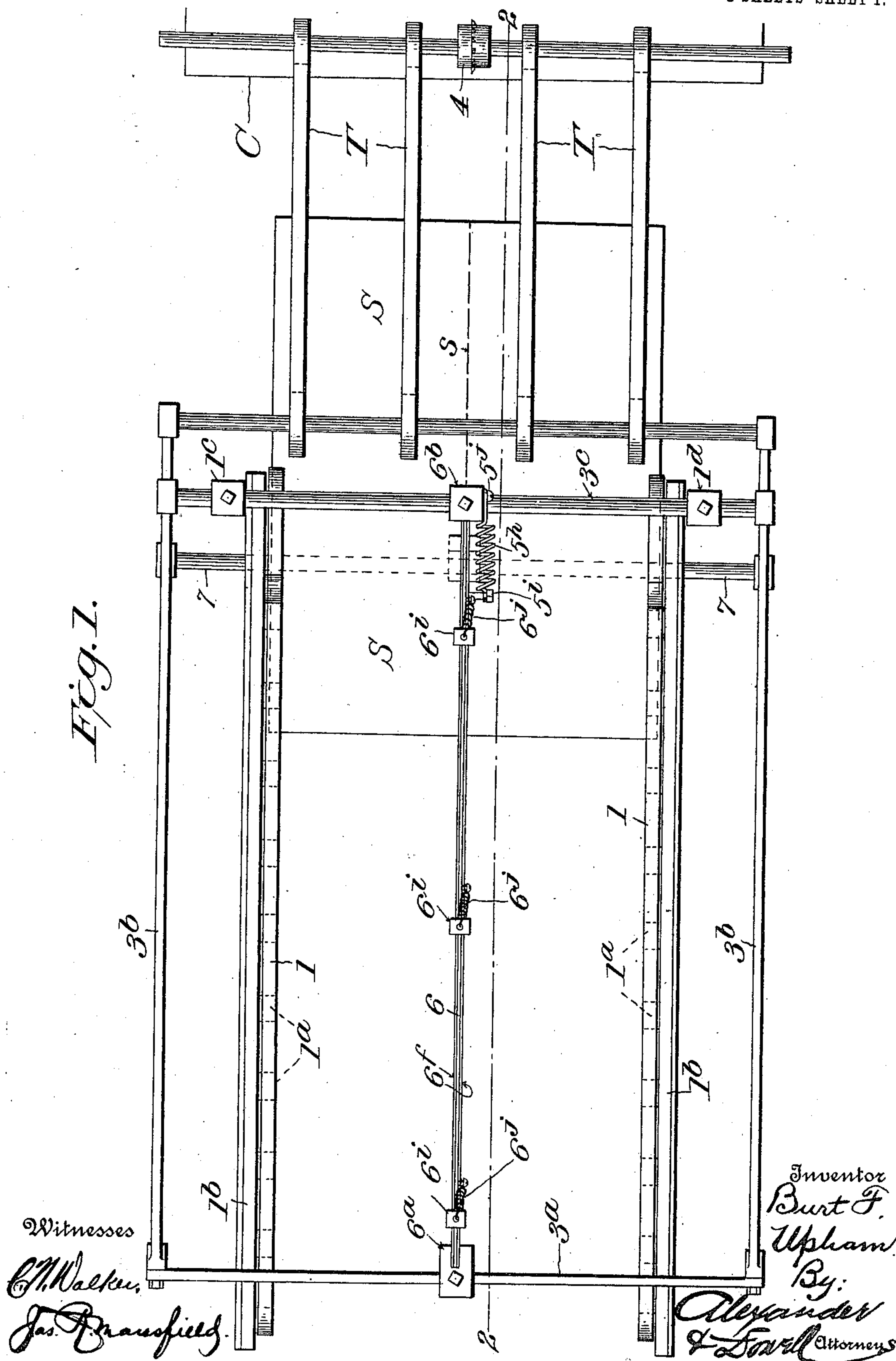


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APPLICATION FILED OCT. 12, 1910.

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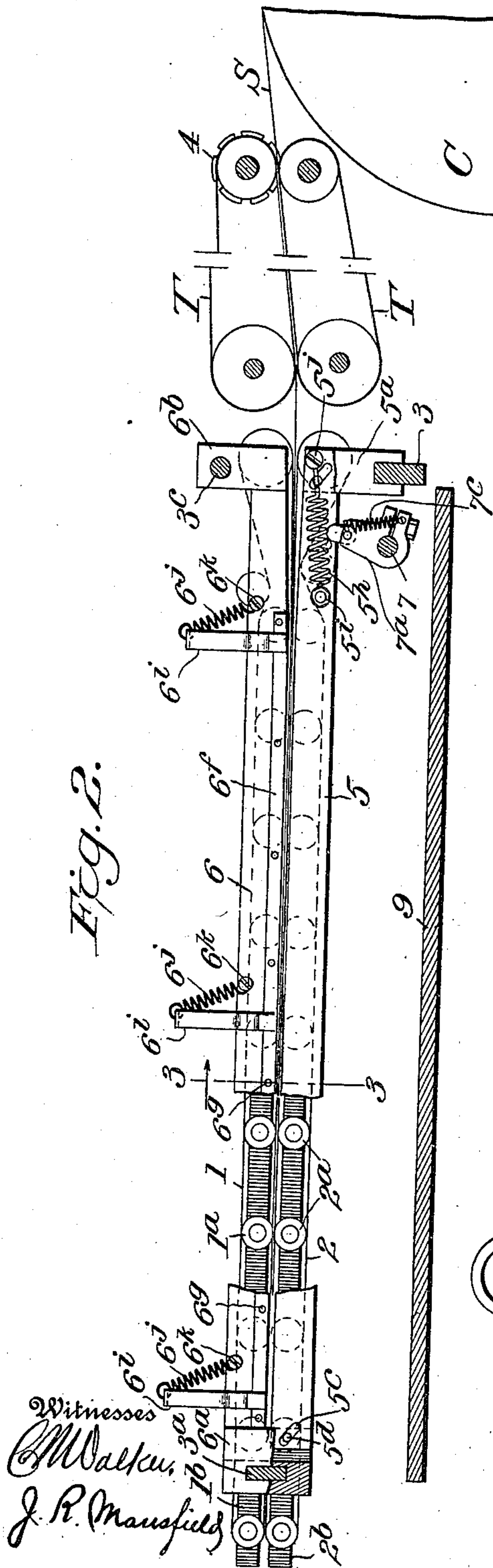


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# UNITED STATES PATENT OFFICE.

BURT F. UPHAM, OF EVANSTON, ILLINOIS.

SHEET-DIVIDING APPARATUS.

995,582.

Specification of Letters Patent. Patented June 20, 1911.

Application filed October 12, 1910. Serial No. 536,648.

*To all whom it may concern:*

Be it known that I, BURT F. UPHAM, of Evanston, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Sheet-Dividing Apparatus; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

This invention is an improvement in sheet dividing apparatus for use in connection with rotary sheet printing presses of the type shown in my Patent No. 931,099 of August 17, 1909, but readily adaptable for use in connection with other printing presses of large size.

The invention is particularly designed and adapted for use with sheet delivery mechanism of that class in which the printed sheets are transferred from the press to the receiving tables by means of carriers which engage the opposite side margins of a sheet, suspend it therebetween, carry it to the point of deposit, and there drop it. Such carriers preferably consist of sets of endless tapes which engage the margins of the sheet, but other carriers may be employed for transferring the sheet; for example reciprocating grippers as shown in my application filed May 7, 1910, Serial No. 559,915.

It is frequently desired in job printing offices to simultaneously print two small forms on a press, and this can be most conveniently and rapidly done by arranging the forms adjacent each other, and then simultaneously printing from both forms on one large sheet and afterward cutting such sheets in two;—this enables either two duplicate forms to be printed at one operation, or two different forms to be printed at one operation; and in either case saves the necessity of and time required for running separate small sheets through the press. It is of course quite desirable to enable a printing press to be operated in this manner but the special type of delivery mechanism above referred to cannot be conveniently constructed to deliver two sheets side by side simultaneously, as the sheet carriers engage only the side margins of the sheet, and con-

sequently are not adapted to handle two sheets or parts of sheets lying side by side.

It is a particular object of my present invention to enable each large sheet brought forward by such delivery mechanism to be severed into two smaller sheets, if desired, just prior to the dropping thereof, so that subsequent cutting of large sheets to divide them will not be necessary, and yet there shall be no complication of the delivery mechanism.

My present invention enables two forms to be arranged side by side to print simultaneously on a large sheet, and such large sheet can be transferred to the point of dropping by the aforesaid type of delivery apparatus, and said sheet be divided in two parts prior to dropping upon the delivery table; so that practically the same results and speed of operation is obtained as if two separate small sheets were fed simultaneously through the press.

I will now explain the invention with reference to the accompanying drawings and summarize in the claims the essential features and combinations of parts for which protection is desired.

In said drawings—Figure 1 is a conventional plan view of the delivery mechanism of a printing press, showing my novel means for dividing sheets applied thereto. Fig. 2 is a longitudinal section on line 2—2, Fig. 1. Fig. 3 is an enlarged transverse section on line 3—3, Fig. 2, showing the sheet divider in open or inactive position. Fig. 4 is a similar view showing the action of the sheet divider. Figs. 5 and 6 are enlarged side and front views of the dividing blade operating devices.

In the drawings C designates the cylinder of the press, T the usual tapes which receive the sheet of paper S, from the cylinder C and carry same over to the delivery mechanism; which as shown preferably comprises opposite sets of upper and lower endless carrier tapes 1 and 2, which run over suitable guide rollers 1<sup>a</sup>, 2<sup>a</sup> attached to bars 1<sup>b</sup>, 2<sup>b</sup>, which bars are connected with hangers 1<sup>c</sup>, 1<sup>d</sup> by which they are adjustably attached to supporting bars or ribs 3, 3<sup>a</sup> extending transversely of the machine above the delivery table and attached to the usual



side frames 3<sup>b</sup>;—the construction being such that the sets of carriers can be adjusted laterally, to or from each other, on the bars 3, 3<sup>a</sup>, so that a sheet, S, brought forward by the tapes T from the cylinder C will have its opposite side margins entered between the pairs of endless tapes 1 and 2, and will be carried by such tapes to and over the delivery table 9.

10 In the operative machine means are provided for traveling the carrier tapes 1 and 2 at the speed of the tapes T, so that the sheet will be carried thereby in proper time; and means are also provided for causing the tapes to release the sheet at the point of deposit. 15 As the particular construction of the delivery forms no part of the present invention I have only conventionally illustrated the same in the drawings; because the present invention is useful with various constructions of such tape carriers and with reciprocating carriers, or other delivery devices which will engage a sheet and carry it from the tapes T to the point of delivery. As the 20 said sheet carriers 1 and 2 engage only the outermost side margins of the sheets, of course they can handle only one sheet at a time; but my invention enables two forms to be printed on one sheet and such sheet to be subsequently divided before it is dropped 30 upon the receiving table, and I will now describe the same.

At a suitable point between the cylinder C and the delivery I preferably place a perforating cutter 4, which may be conveniently attached to one of the tape pulley shafts, adjacent the cylinder C, as shown,—and which is adapted to perforate, and almost but not quite, sever the sheets in two 40 as they pass from the cylinder to the delivery. In other words this perforating cutter is constructed and arranged to partially divide the sheets coming from the press, in the center of the margin between the adjacent impressions thereon; but still the partly divided sheet can be handled by the sets of delivery tapes as one sheet. 45

Intermediate the opposite sheet carriers, or sets of delivery tapes 1 and 2, I arrange a sheet dividing or separating device; which preferably consists of a lower bar 5 and an upper bar 6. The bar 6 may be rigidly attached at its outer end to a bracket 6<sup>a</sup> on bar 3<sup>a</sup>, and at its inner end to a hanger 6<sup>b</sup> on a cross-shaft 3<sup>c</sup> attached to the side frames 3<sup>b</sup>. The bar 5 may be supported at its outer end on the bracket 6<sup>a</sup>, and at its inner end on a bracket 5<sup>a</sup> adjustably attached to the bar 3. The bar 5 is preferably connected to the brackets 6<sup>a</sup>, 5<sup>a</sup> by means of inclined slots 5<sup>c</sup> in its ends engaging pins 5<sup>d</sup> in the brackets; the slots 5<sup>c</sup> being so inclined that if the bar 5 is moved longitudinally outward it will also rise, and when moved in the opposite direction it will descend. Thus by mov- 65

ing the bar 5 longitudinally it can be caused to rise and fall, or move to and from the bar 6.

Preferably, bar 5 has a longitudinal groove 5<sup>e</sup> in its upper edge and upstanding flanges 5<sup>f</sup> at each side of the groove. And the bar 6 preferably has a depending cutter or divider 6<sup>e</sup> on its lower edge adapted to enter the groove 5<sup>e</sup>. And to each side of the bar 6, adjacent the divider 6<sup>e</sup> are side plates 6<sup>f</sup> which are adapted to engage with the ribs 5<sup>f</sup> on bar 5, see Fig. 4. The plates 6<sup>f</sup> are preferably made yieldable and capable of slight vertical movement on bar 6; being connected by pins 6<sup>g</sup> which pass through slots 6<sup>h</sup> in the lower part of bar 6, above the divider 6<sup>e</sup>. To the plates 6<sup>f</sup> are attached yokes 6<sup>i</sup> which extend above and over the bar 6; and springs 6<sup>j</sup> are connected to the upper ends of yokes 6<sup>i</sup> and to pins 6<sup>k</sup> on bar 6 so as to normally depress the plate 6<sup>f</sup>, as shown in Figs. 1 and 3. 70 75 80 85

The bar 5 is normally retracted in lowermost position, so as to hold its flanges 5<sup>f</sup> out of contact with the plates 6<sup>f</sup>, by means of a spring 5<sup>h</sup> attached at 5<sup>i</sup> to the bar 5 and at 5<sup>j</sup> to the bracket 6<sup>b</sup>. Bar 5 may be moved outwardly against the action of spring 5<sup>h</sup> by means of an arm 7<sup>a</sup> attached to a rock shaft 7 which extends across the machine adjacent the bar 3, and is rocked at the proper time by any suitable mechanism, not shown, so as to cause bar 5 to rise and cause the division of a sheet, as hereinafter explained. The shaft 7 forms part of the tape delivery mechanism above referred to and therefore does not need to be particularly described herein. 90 95 100

Preferably the arm 7<sup>a</sup> has a pivoted finger 7<sup>b</sup> which is adapted to engage a pin 5<sup>m</sup> on the bar 5; said finger is unyielding in one direction, but can yield if pressed in the opposite direction, being held yieldingly against a stop 7<sup>m</sup> by means of a spring 7<sup>c</sup>, see Fig. 5, so that when the shaft 7 is rocked in one direction the finger 7<sup>b</sup> engages pin 5<sup>m</sup> and moves bar 5 outward, and upward, until the finger passes under the pin 5<sup>m</sup>, whereupon the spring 5<sup>h</sup> quickly retracts bar 5. On the return movement of the arm 7<sup>a</sup> finger 7<sup>b</sup> yields and passes under pin 5<sup>m</sup>. 105 110 115

Operation: When it is desired to have the press print two forms on one sheet, as above explained, and such sheet is to be subsequently divided;—the sets of delivery tapes or carriers are adjusted so as to engage the opposite outermost side margins of the sheets as described in my aforesaid application. The perforating cutter 4 is then adjusted so that it will partially divide the sheets as indicated by the line s in Fig. 1 in the central marginal line between two impressions on the sheet. The bars 5 and 6 are then adjusted to a central position between the opposite carriers, or in exact aline- 120 125 130



ment with the perforating cutter 4, so that the line of perforations or slits *s* made by such cutter 4 in the sheets will, as the sheet is brought forward by the delivery mechanism, come directly between the bars 5 and 6 and over the groove 5<sup>e</sup> in bar 5. The parts are so timed to operate that when a sheet has been brought to the proper position above the delivery table 9 the shaft 7 is rocked so as to cause finger 7<sup>b</sup> to engage pin 5<sup>m</sup> and move bar 5 outward and upward, thereby causing the flanges 5<sup>f</sup> to contact with the yielding plates 6<sup>f</sup>, which serve first to arrest the sheet at the delivery point, and then the further upward movement of the bar 5 lifts plates 6<sup>f</sup>, and as the central margin of the sheet is held between the flanges 5<sup>f</sup> and plates 6<sup>f</sup>, the divider 6<sup>e</sup> which is unyielding enters groove 5<sup>e</sup> and divides the sheet longitudinally as indicated in Fig. 4. In some cases, particularly when operating upon light paper sheets the divider 6<sup>e</sup> might be used to sever the sheet in two without any prior slitting or perforating thereof; in which case it would be possible to dispense with the perforating cutter 4.

It will be observed that the flanges 5<sup>f</sup> and plates 6<sup>f</sup> hold the central portion of the sheet at opposite sides of the dividing line and keep such portion taut so that the divider 6<sup>e</sup> will sever the sheet when it enters groove 5<sup>e</sup> as indicated in Fig. 4. While the construction shown is at present preferred, the invention is not restricted thereto, and it can be embodied in various other forms when the principle is disclosed.

I preferably make the lower bar 5 movable, but this is not essential. I also preferably make the pin 5<sup>a</sup> which connects bar 5 to bracket 6<sup>a</sup> removable, and detachably attach the bracket 5<sup>a</sup> to the bar 3 as shown, so that when it is not desired to sever the sheets the lower bar 5 can be removed, so that it will not interfere with the delivery of large sheets by the carriers; and of course when the sheets are not to be divided the perforating cutter 4 should be removed, or thrown out of operation. It will be seen that by utilizing this invention sheet delivery apparatus, of the kinds specified, can be used on a press, where two forms are to be printed at the same time, in the manner above mentioned; and a duplicate, or an interchangeable delivery apparatus, not required; and this invention therefore enhances the utility of presses equipped with such deliveries. When the bar 5 is in position it will support the central portion of the sheet, and preventing sagging thereof between the carriers, prior to the severance of the sheet.

What I claim is:

1. In combination with sheet delivery mechanism comprising opposite carriers adapted to engage the printed sheet by its outermost side edges and transfer same to

the dropping point; with means for partly slitting the sheet, and means for dividing the slitted sheet after it is brought forward by the carriers.

2. In combination with sheet delivery mechanism comprising opposite carriers adapted to engage the printed sheet by its outermost side edges and transfer same to and over the dropping point; means for severing the sheet comprising means for perforating the sheet, before it reaches the carriers, and means for dividing the perforated sheet after it is brought forward to the dropping point by the carriers.

3. In combination, a delivery table opposite sheet carriers adapted to engage the outermost margins of a sheet and transport same to the delivery table and drop it thereupon; with means for partly slitting the sheets, and a sheet dividing mechanism located centrally between the said carriers and over the delivery table, dividing mechanism comprising devices co-acting to sever the slitted sheets; and means for clamping the sheet at opposite sides of the line of severance prior to and during the action of said devices.

4. In sheet delivery and severing mechanism, the combination of a delivery table opposite sheet carriers adapted to engage the outermost margins of a sheet and transport same to the delivery table and drop it thereupon; with means for partly slitting a sheet, and a sheet dividing mechanism located centrally between the said carriers and over the delivery table, said dividing mechanism comprising opposite bars respectively provided with a groove and with a blade co-acting with the groove to sever the slitted sheet, and means for clamping the sheet on opposite sides of the blade prior to and during the action of said blade.

5. In sheet delivery and severing mechanism, the combination of a delivery table, and opposite sheet carriers adapted to engage the outermost margins of a sheet and transport same to the delivery table; with a sheet dividing device located centrally between the said mechanism and over the delivery table, said devices comprising opposite bars, one of said bars provided with a groove and the other with a blade co-acting with the groove to sever the sheet, and means on said bars for clamping the sheet at opposite sides of the blade prior to and during the action of said blade.

6. In combination a delivery table, and opposite sheet carriers adapted to engage the outermost margins of a sheet and transport same to the delivery table; with a sheet divider located centrally between the said carriers and over the delivery table, said divider comprising a pair of parallel bars arranged in the path of the sheet, one of said bars having a rib or cutter and the other a



groove, means for moving one of the bars and causing the blade to enter the groove, and devices on said bars for yieldingly clamping the sheet at opposite sides of the rib and groove prior to and during the severance of the sheet.

7. In sheet delivery and severing mechanism, the combination of opposite sheet carriers adapted to engage the outermost margins of a sheet and transport same to the delivery point; with a slitter adapted to partly divide the sheet; and a divider located centrally between the said carriers and over the delivery point, said divider comprising a pair of parallel bars arranged in the path of the sheet, one of said bars having a rib or cutter and the other a groove, means for moving one of the bars and causing the blade to enter the groove, and devices for yieldingly clamping the sheet at opposite sides of the rib and groove prior to and during the division of the sheet.

8. In combination, sheet delivery mechanism adapted to carry sheets by their side margins to the point of deposit; with means located in the path of the sheet and above the point of deposit whereby each sheet may be divided longitudinally after it has been brought to the point of deposit by said delivery mechanism and before the sheet is deposited.

9. In combination, a delivery table and sheet delivery mechanism adapted to engage a printed sheet by its outermost side edges and transfer same to the delivery table; with means for dividing the sheet

arranged in the path of the sheet and over the delivery table and adapted to sever the sheet brought forward by said mechanism approximately simultaneously with its release by the delivery mechanism whereby both halves of the sheet are dropped side by side upon the table

10. In combination, a delivery table and sheet delivery mechanism comprising opposite carriers adapted to engage the printed sheet by its outermost side edges and transfer same to the delivery table; with means located in the central line of the path of the sheet and directly over the delivery table, whereby the sheet is divided in two parts after it is brought forward over the table by the carriers, and approximately simultaneously with its release by the carriers.

11. In combination, a delivery table and sheet delivery mechanism comprising opposite sets of carriers adapted to engage the printed sheet by its outermost side edges and transfer same edgewise to the delivery table; with means for dividing the sheet arranged intermediate the carriers and over the delivery table and adapted to sever the sheet brought forward by said carriers so that both halves of the sheet can drop side by side upon the table.

In testimony that I claim the foregoing as my own, I affix my signature in presence of two witnesses.

BURT F. UPHAM.

Witnesses:

ROY M. KINDER,  
PERCY G. SHAW.