Sept. 22, 1931. H. A. W. WOOD 1,824,583

HALF-SPEED SHEET INSERTING MECHANISM

Original Filed Dec. 3, 1926 3 Sheets-Sheet 1

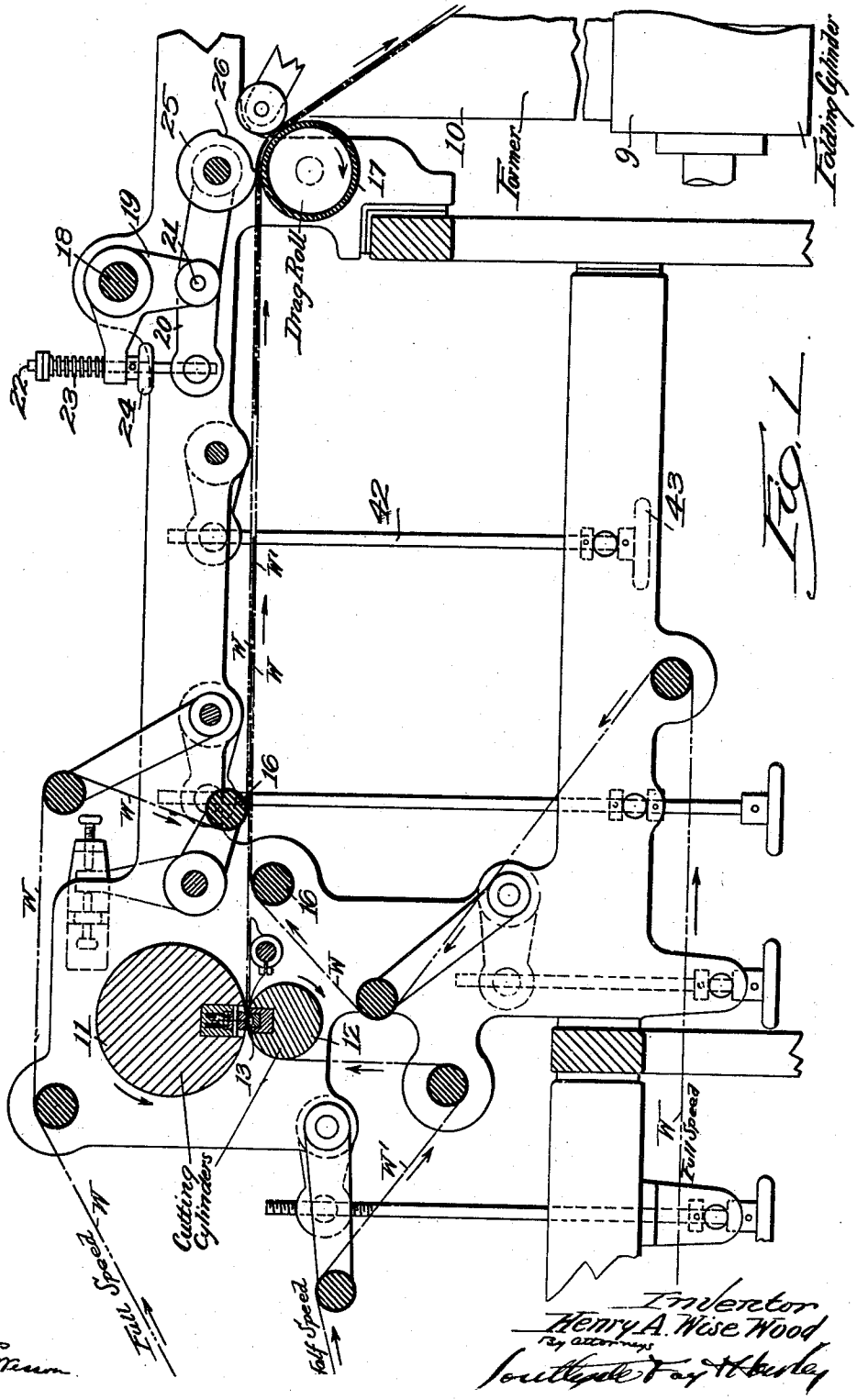


Fig. 1

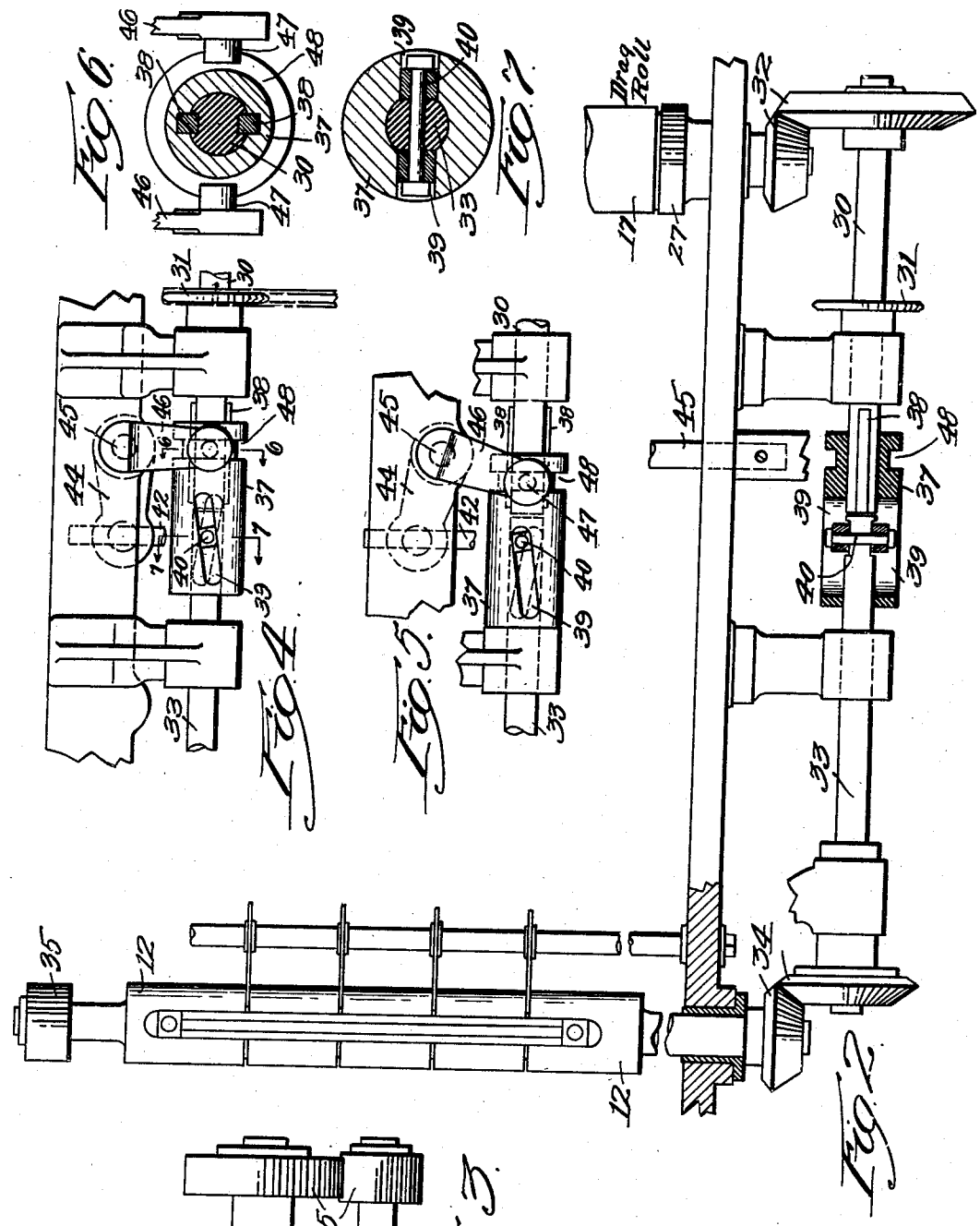
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HALF-SPEED SHEET INSERTING MECHANISM

Original Filed Dec. 3, 1926 3 Sheets-Sheet 2



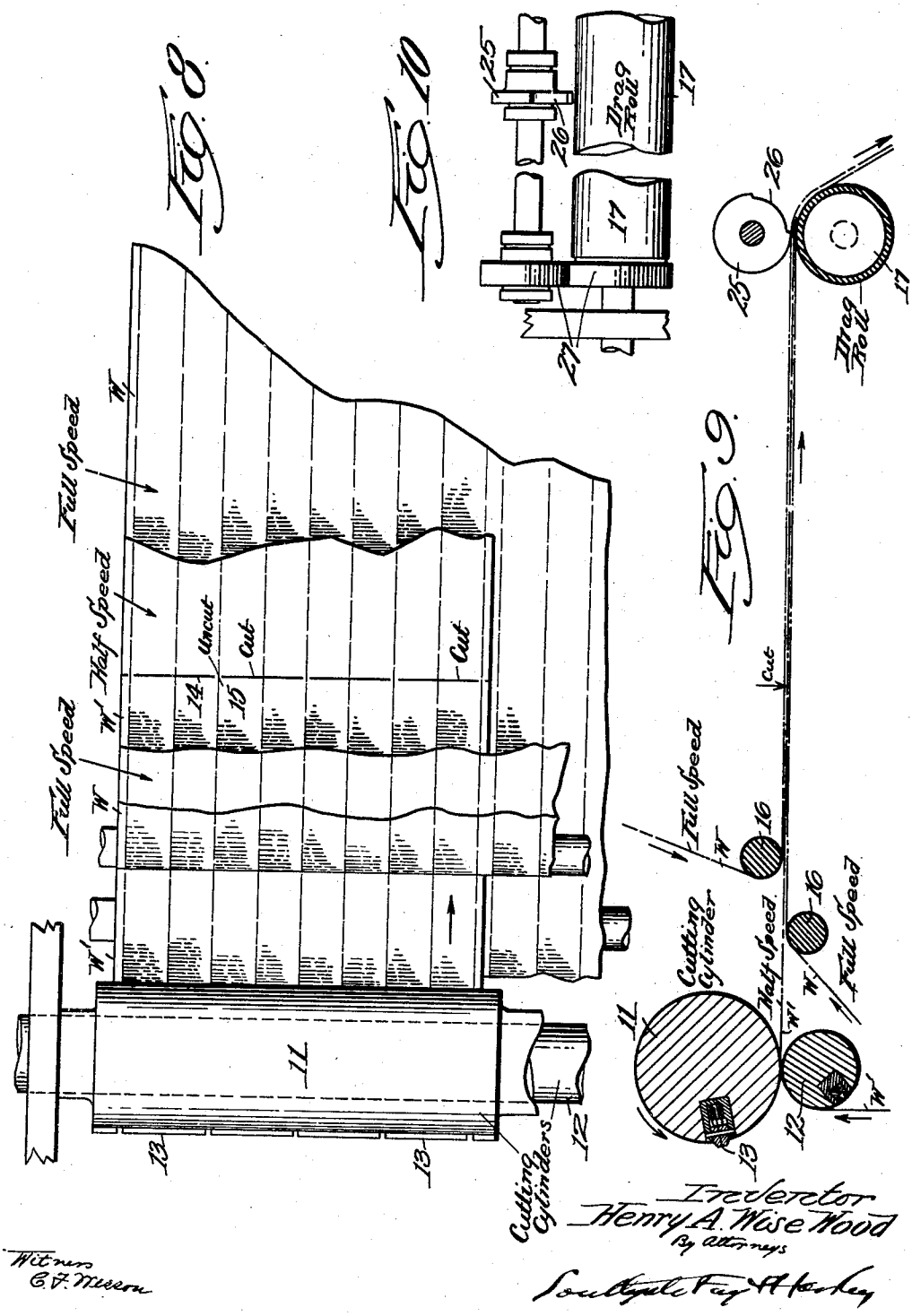
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HALF-SPEED SHEET INSERTING MECHANISM

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Patented Sept. 22, 1931

1,824,583

UNITED STATES PATENT OFFICE

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HALF SPEED SHEET INSERTING MECHANISM

Application filed December 3, 1926, Serial No. 152,402. Renewed February 25, 1930.

This invention relates to newspaper printing presses in which one or more webs are fed into a folder at full speed with another sheet fed in at half speed so as to vary the number of pages in successive products, and produces a paper of two parts having different number of pages.

The principal objects of this invention are to provide a simple and convenient means for perforating and separating the half speed web into paper lengths, and feeding them into the folder with a complete length product of the full speed webs to be cut off afterwards to make a complete product; to feed them so as to lengthen the spaces between the half speed sheets during the feeding so that the front edge of the incoming sheet reaches a certain point a whole page length behind the one in advance of it, and also to provide means for exactly registering the front edges of the severed half speed sheets at the points at which the full speed sheets or products will be severed in the folder.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings in which

Fig. 1 is a longitudinal sectional view through the forwarding mechanism from the printing press to the folder showing a preferred embodiment of this invention;

Fig. 2 is a plan of the means for operating the cutting couple for the half speed web;

Fig. 3 is an elevation showing the gearing thereof;

Fig. 4 is a side view of the registering means by which said cutting couple can be advanced or retarded;

Fig. 5 is a similar view showing the parts adjusted to a different position;

Fig. 6 is an enlarged sectional view on the line 6—6 of Fig. 4;

Fig. 7 is a similar sectional view on the line 7—7 of Fig. 4;

Fig. 8 is a plan of a portion of the forwarding mechanism shown in Fig. 1;

Fig. 9 is a diagrammatic edge view of the same showing the parts in a different position from that shown in Fig. 1; and

Fig. 10 is a front view of the drag roll and the means associated therewith for engaging and holding the webs.

As stated, this invention relates to that type of newspaper press in which two or more webs of paper w are fed into a folder 10 at full speed and an intermediate web w' is fed into the folder at half the speed of the other webs. This is done for the purpose of varying the number of pages in successive products so that, for example, every other product may have two extra pages taken from the web w. The folder has a former as usual and cutting and folding cylinders 9.

In accordance with this invention the web w' is fed between a pair of cutting cylinders 11 and 12. One of these cylinders is provided with a knife or blade 13 which extends along it and is provided with cutting edges at intervals so as to produce perforations 14 or slits leaving the webs connected at spaces 15 between them. These slits of course extend transversely of the web. They are formed so that, when the sheet ahead is pulled, the web will be separated along the line of perforations. That sheet can pass along into the folder without interference from the web w' behind it, which is held back by the fact that the surface speed of the cylinders 11 and 12 is only half the speed of the other webs. This web w' passes in between the two webs w which are brought in over guide rollers and conducted through a horizontal space from these guide rollers 16 to drag roll 17. This directs them into the former of the folder 10. The drag roll runs at a surface speed equal to that of the webs w. Above the drag roll is provided a shaft 18 on which are mounted a series of levers 19 each one having a stud 21 for supporting a lever 20. These levers are yieldingly and adjustably held by screw rods 22 connected with the other arm of each lever 19 and having a spring 23 for an obvious purpose and an adjusting nut 24. These rods are connected to one end of each lever 20. On the other end of each lever 20 is a roller 25. This roller has a portion of its circumference 26 reduced so that it does not come into contact with the drag roll during a part

of the rotation. The rollers 25 are driven from the drag roll by gears 27.

The half speed web is fed in between the full speed webs in the horizontal path described. When the larger part of the roll 25 is in contact with the drag roll, these webs are nipped between these rolls. The half speed length is located between the two full speed webs and it will have to move at the same speed as the two outer webs. The result of this is to tear the forward sheet from the web w' and forward this sheet at full speed. The two webs and one sheet go into the folder ready for the webs to be cut off at the end of the sheet and form a complete folded product. The horizontal path between the rolls 16 and 17 is of sufficient length to contain a considerable portion of the succeeding sheet of the web w'. This insures the proper entrance of the front edge of this succeeding sheet into its path, From the moment of severance, the space between the severed edges of the half speed sheet becomes increasingly greater. When the front edge of the incoming sheet reaches the bite between the rolls 17 and 25, a space of a page length has been created.

It will be understood that the feed of the half speed web as described is of such a nature that a certain relationship has to be maintained between the drag roll, the surface of which runs at full speed, and the cutting couple, the surfaces of which run at half speed. They are both driven from the same source. A shaft 30 is driven from the press by a chain and sprocket wheel 31 or in any other desired manner. This shaft is directly geared to the spindle of the drag roll 17 by bevel gears 32 so that the drag roll is positively driven from the press at a speed governed by the speed of the press.

The shaft 30 is connected with a shaft 33 in alignment with it, which by bevel gears 34 drives the cutting couple. The cylinders of this couple are positively driven one from the other by gearing 35. If the shafts 30 and 33 were in one piece there would be no, or at least no convenient, way of registering the two sets of cylinders, that is, the drag roll and the cutting couple, to produce exactly the right ratio. It is for this purpose that the shafts 30 and 33 are made separate. They are connected by a coupling 37 slidably keyed to the shaft 30 by keys 38. This coupling is connected with the shaft 33 by opposite angularly located slots 39 in the coupling which receive the opposite heads of a cross pin 40. This cross pin is positively supported by the shaft 33 so that they must turn together about the axis of the shaft 33 relatively to the shaft 30. By shifting the coupling longitudinally the shaft 33 is turned angularly about its own axis.

A rod 42 with an operating hand wheel 43 on the end of it is adjustably connected with an arm 44 on a shaft 45. This shaft has at the other end a yoke 46 fixed to it and provided with two opposite pins 47. These pins enter a circumferential groove 48 in the coupling 37 and move the coupling back and forth. The result of this motion is to cause the coupling to turn and take with it the shaft 33 so as to advance or retract the cutting couple as may be desired. This is a screw adjustment operated very simply for the purpose of registering the front edge of the severed half speed sheet with the point at which the full sheet will be severed in the folder. It is the cut in the half speed sheet that is regulated in this manner.

It will be seen therefore that by this invention one or more of the webs w can be fed into the folder at full speed. The web w' is perforated across and fed in between the first-mentioned sheets at half speed. This half speed web is under the control of the cutting cylinders until separated from the next succeeding sheet. When it passes far enough along to reach the bite between the rolls 17 and 25, it is suddenly speeded up to full speed thereby. This immediately pulls it apart at the line of perforations. It then passes into the folder at full speed and the space between it and the forward end of the half speed sheet increases. The angular position of the cutting cylinders is varied in the manner above described so that by the next time the forward end of the half speed sheet reaches the top of the drag roll, a product containing an extra page or pages from the half speed sheet has been folded in the folder. Another product not containing any such extra pages is being delivered to the folder, its rear end being at the bite between the rolls 17 and 25. Thus every other product may be provided with two extra pages in the form shown in the drawings. Of course in this case one half speed web is fed between two full speed webs and the half speed web is only half the width of the full speed webs. However, other combinations are possible according to the principles of this invention.

Although I have illustrated and described only a single form of the invention, I am aware of the fact that other modifications can be made therein by any person skilled in the art without departing from the scope of the invention as expressed in the claims.

Therefore I do not wish to be limited to the details of construction except as set forth in the claims, but what I do claim is:—

1. In web forwarding mechanism, the combination with means for forwarding a web and means for forwarding a second web in contact therewith at half the speed of the first web, of means for perforating the half speed web across at paper length intervals, and means for nipping both webs and positively advancing them at full speed to

separate the forward sheet from the half speed web.

2. In web forwarding mechanism, the combination with means for forwarding a web and means for forwarding a second web in contact therewith at half the speed of the first web, of means for perforating the half speed web at intervals, and means for nipping both webs and positively advancing them at full speed to separate the forward sheet from the half speed web and assemble the sheets from the half speed web with alternate products from the full speed web.

3. In a printing press, the combination with means for feeding two webs to a folder and means for feeding an insert web between them at a slow speed and perforating the slow speed web between printed products, of means for positively nipping the webs between rollers operating at full surface speed to sever the slow speed web at the line of perforations and thereafter feed it forward at full speed.

4. In a printing press, the combination with means for forwarding a plurality of webs at different speed, of a cutting couple arranged to control the speed, and cut into lengths, the slower speed web, the cutting means of said couple being adapted to perforate the web and leave the forward sheet connected with the web until separated thereafter, said slower web being fed forward in contact with the higher speed web or webs, means for nipping the webs while in contact with each other and advancing them all at the higher speed so as to separate the forward sheet of the slow speed web and feed it forward at full speed, and means for thereafter cutting all the webs along a line substantially registering with the forward edge of the sheet separated from the slow speed web.

5. In a printing press, the combination with means for forwarding in contact with each other a plurality of webs at different speeds, of a cutting couple arranged to cut into lengths the slower speed web, means for nipping the webs while in contact with each other and advancing them all at the higher speed so as to separate the forward sheet of the slow speed web and feed it forward at full speed, and means for thereafter cutting all the webs along a line substantially registering with the forward edge of the sheet separated from the slow speed web.

6. In a printing press, the combination with means for feeding a plurality of webs in contact with each other at different speeds, means for perforating the slower web across to divide it into sheets, a drag roll for receiving the webs, a roller having part of its surface full size and part of its surface below the same to engage the webs passing over the drag roll, whereby, when the forward edge of the higher part of the roller engages the web on the drag roll, it will force the slow speed web forward at full speed to separate the front sheet thereof from the main web.

7. In a printing press, the combination with means for feeding a plurality of webs in contact with each other at two different speeds, means for perforating the slower web across to divide it into sheets before it is brought into contact with the other web or webs, a drag roll for receiving the webs, a roller having parts of its surface full size and part of its surface below the same and geared to the drag roll to be rotated therewith to engage the webs passing over the drag roll, yielding means for forcing the roller into contact with said web and drag roll, whereby, when the forward edge of the higher part of the roller engages the web on the drag roll, it will force the slow speed web forward at full speed to separate the front sheet thereof from the main web.

8. In a printing press, the combination with means for forwarding a plurality of webs at different speeds, of a cutting couple having means for perforating the slow speed web and leaving the forward sheet connected with the web until separated thereafter, means for nipping the webs in contact with each other and advancing them all at the higher speed, so as to separate the forward sheet from the slow speed web, and means for advancing or retarding said cuting couple for the purpose of securing registration of the forward edge of the slower sheet with the means for cutting up the main webs.

9. In a printing machine, the combination with means for feeding a pair of webs and separating them into sheets, of means for feeding a web between them at half speed, means for separating the half speed web into half as many sheets, the means for feeding the slow speed web comprising a pair of cutting cylinders and the means for feeding the high speed web comprising a drag roll, a shaft for positively driving the drag roll, a shaft for positively driving the cutting couple, and a coupling between the two shafts having means for turning one of them forward or back to get the proper registration.

10. In a printing press, the combination with a cutting couple for one web, and a drag roll for receiving and advancing another web, of two shafts in alignment with each other, one connected with the cutting couple and the other with the drag roll, means to drive one of said shafts, a coupling between said shafts shiftable longitudinally and slidingly keyed to one shaft, said coupling comprising a sleeve having oppositely inclined slots and a rod carried by the other shaft and having its ends engaging said slots, whereby when the sleeve is moved longitudinally the rod and the shaft which supports it will be turned either forward or back.

11. In a printing press, the combination

with a cutting couple for one web, and a folder for receiving and advancing another web, of a drag roll, two shafts, one connected with the cutting couple and the other with the drag roll for driving them, means for driving one of said shafts, a coupling between said shafts, said coupling comprising a sleeve having oppositely inclined slots and a rod and having its ends engaging said slots, whereby when the sleeve is moved the rod and the shaft which supports it will be turned to advance or retard the cutting couple relatively to the folder.

In testimony whereof I have hereunto affixed my signature.

HENRY A. WISE WOOD.