Aug. 7, 1923.

1,464,463

H. A. W. WOOD

PAPER ROLL CHANGING APPARATUS

Original Filed Sept. 9, 1918 5 Sheets-Sheet 1

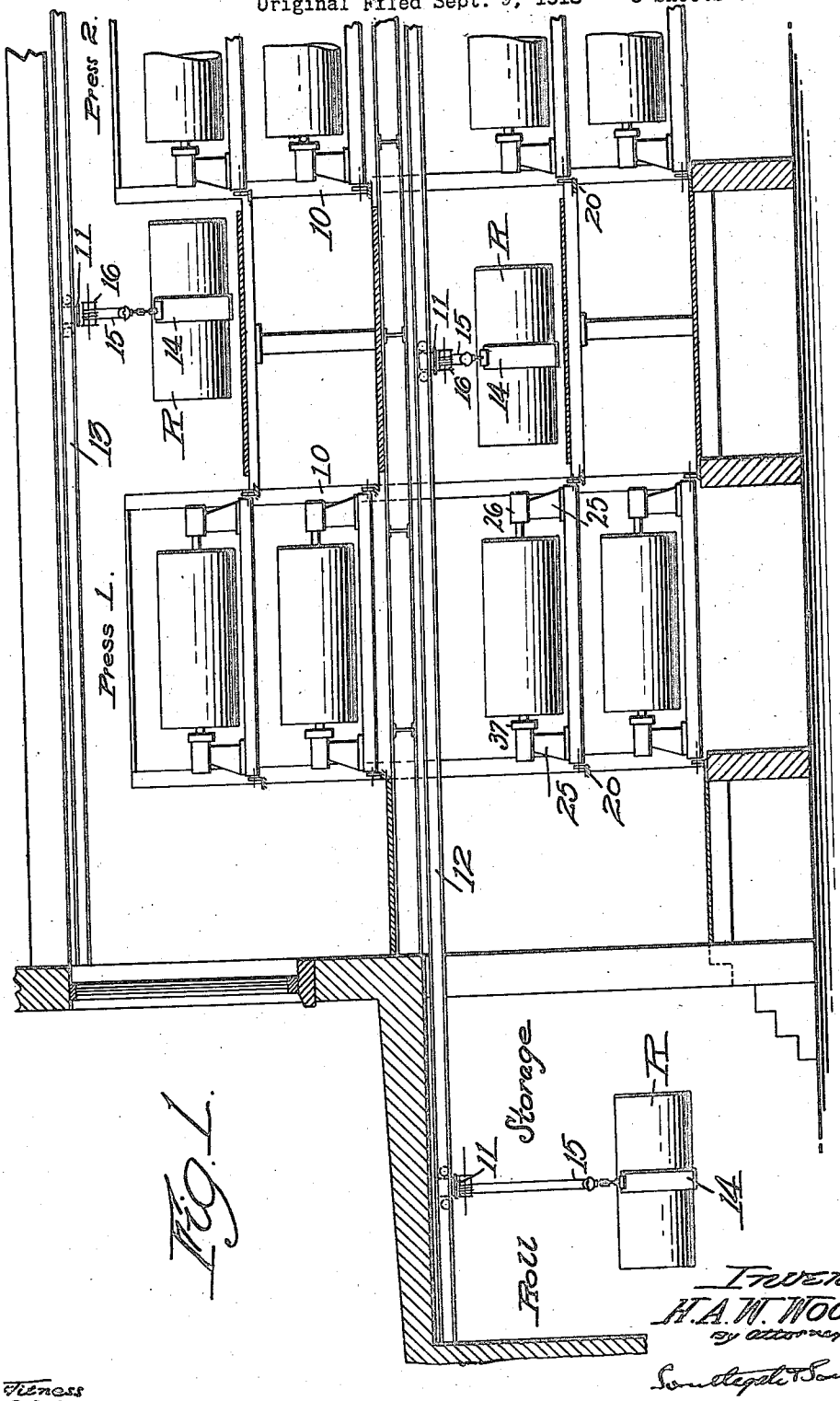


Fig. 1.

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PAPER ROLL CHANGING APPARATUS

Original Filed Sept. 9, 1918 5 Sheets-Sheet 2

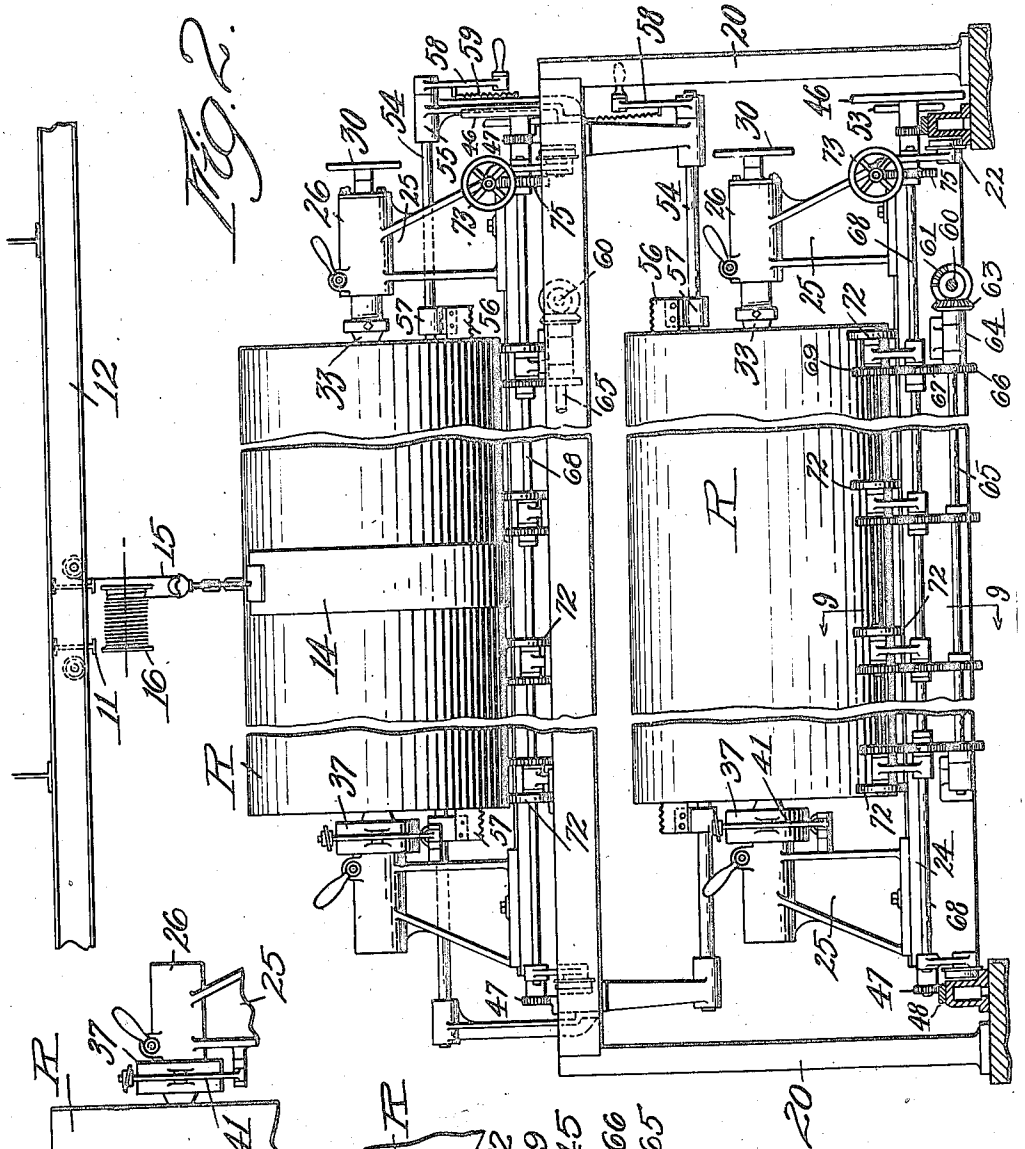


Fig. 2.

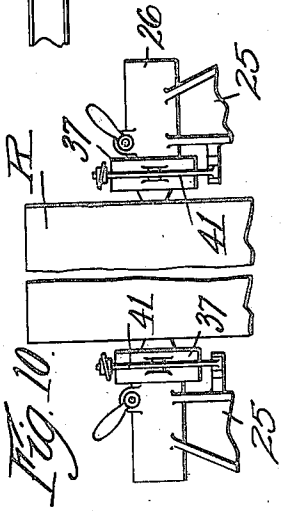


Fig. 10.

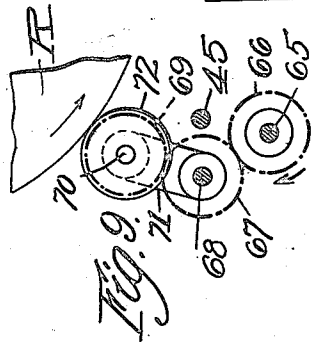


Fig. 9.

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PAPER ROLL CHANGING APPARATUS

Original Filed Sept. 9, 1918 5 Sheets-Sheet 3

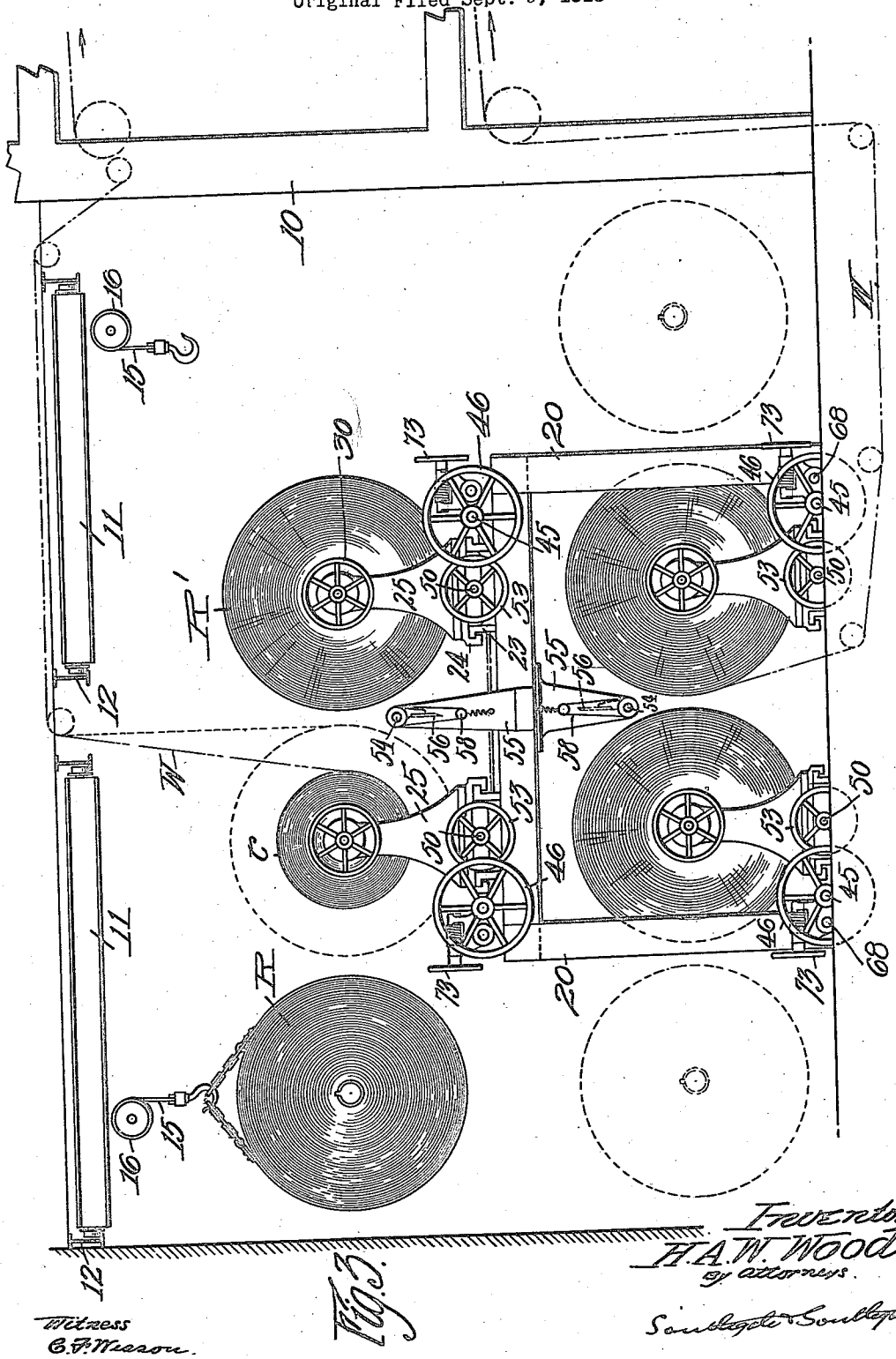


Fig. 3.

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PAPER ROLL CHANGING APPARATUS

Original Filed Sept. 9, 1918 5 Sheets-Sheet 4

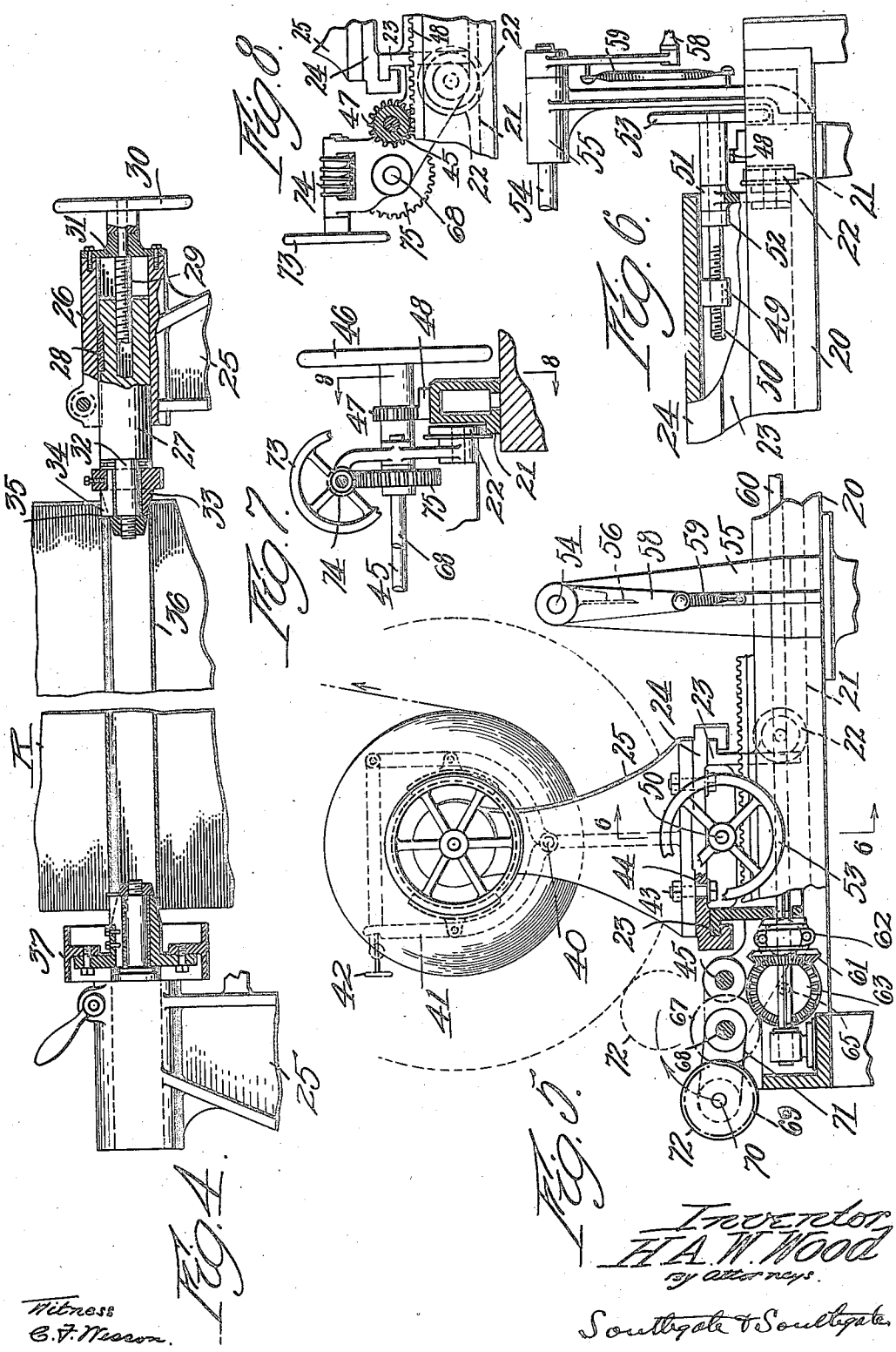


Fig. 4.

Fig. 5.

Witness
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PAPER ROLL CHANGING APPARATUS

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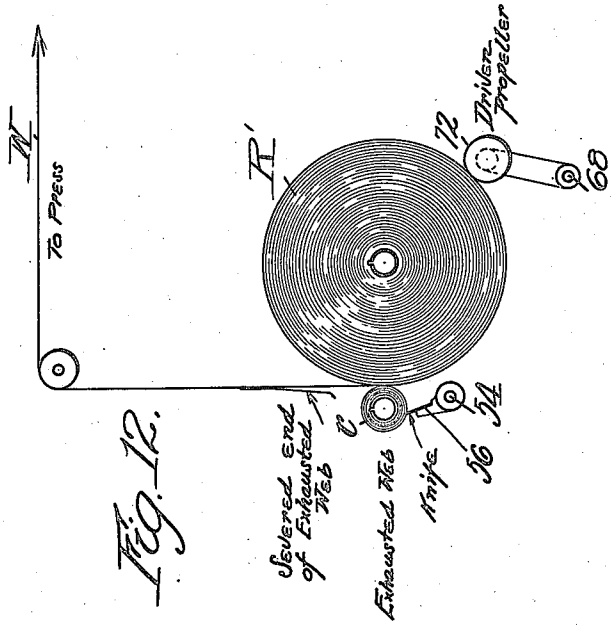
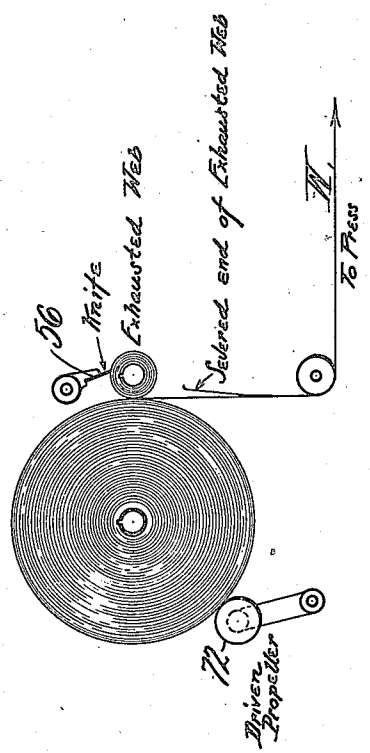


Fig. 12.



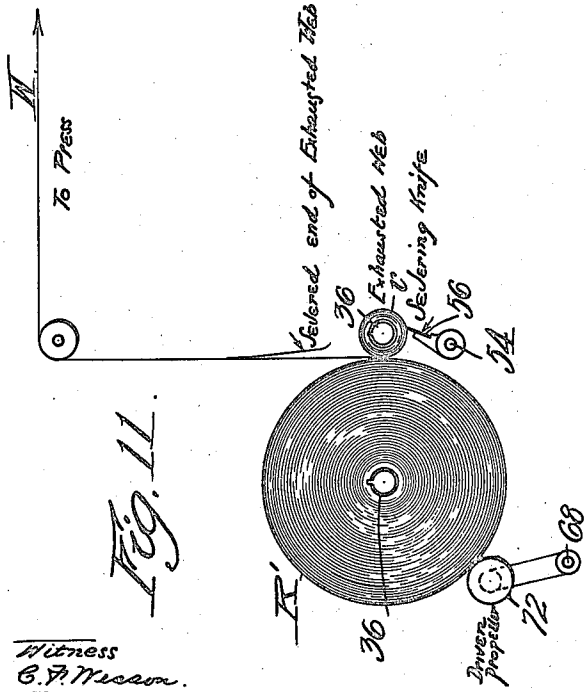
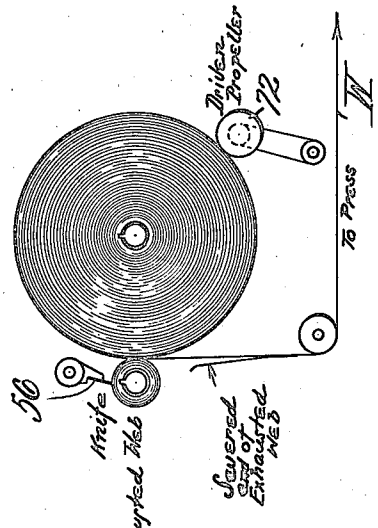


Fig. 11.



Witness
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Patented Aug. 7, 1923. 1,464,463

UNITED STATES PATENT OFFICE.

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PAPER-ROLL-CHANGING APPARATUS.

Application filed September 9, 1918, Serial No. 253,314. Renewed January 8, 1923.

To all whom it may concern:

Be it known that I, HENRY A. WISE WOOD, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a new and useful Paper-Roll-Changing Apparatus, of which the following is a specification.

This invention relates to a system of paper roll changing apparatus for printing presses and includes details of construction of the parts thereof.

The principal objects of this invention are to provide an arrangement of a comparatively simple character by which a continuous supply of web can be provided for a printing press or a plurality of printing presses; to provide an arrangement for this purpose by means of which one side of each roll, (both new and old) will be readily accessible; to provide means by which a comparatively small amount of power will be required to change the positions of the rolls for the purposes of paper change while the press is running; to provide a way by which new rolls may be carried through a series of presses while they are running to supply them to other presses on the line; to reduce the time and expense required in preparing the rolls for application to the presses by dispensing with the usual spindling thereof; to save room in height; and of course to provide for attaching the expiring web to a new roll while running the new web at web speed and severing the expiring web after the end of the new web is attached to it.

Further objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings, in which

Fig. 1 is a transverse sectional elevation of a press room containing a plurality of presses and showing the lay-out of the press room in order to apply this invention thereto, the paper roll supporting mechanism being shown diagrammatically;

Fig. 2 is an enlarged elevation of two sets of web rolls looking at them in the same direction as in Fig. 1, but showing the details of construction in accordance with this invention;

Fig. 3 is an elevation of the same taken from the side of the press constituting an end elevation of the web rolls themselves;

Fig. 4 is a sectional view of the supports for one web roll on enlarged scale with parts in elevation;

Fig. 5 is a view of one of the web roll supports in the same position as in Fig. 3, but on enlarged scale and showing parts in section;

Fig. 6 is an elevation of details of the roll adjusting and web severing mechanisms with parts in section on the line 6—6 of Fig. 5;

Fig. 7 is an elevation, partly in section, of the worm adjusting device for the propeller roller shaft;

Fig. 8 is a sectional view of the same on the line 8—8 of Fig. 7;

Fig. 9 is a sectional view on the line 9—9 of Fig. 2, showing one of the propeller rolls in elevation;

Fig. 10 is a view similar to Fig. 4, but entirely in elevation and showing a modification, and

Figs. 11 and 12 are diagrammatic views showing the method of attaching a fresh web to an expiring one in accordance with this invention, and illustrating different positions of the expiring and new rolls.

The usual practice is to provide each paper roll with a spindle which is to be applied to the roll before it is ready to be connected with the expiring web. According to this invention this process is entirely eliminated, thus saving time and expense, and the paper rolls are supported on paper cones running freely on the ends of studs, one of which can be forced into the open end of the core so as to hold firmly the paper roll in central position, means being provided for positively transmitting the rotation of the roll to the taper cones. These cone studs are supported on suitable bracket bearings which are mounted on carriages. The carriages are provided with driven propellers mounted thereon, which may be thrown into contact with a paper roll supported by the studs thereon. Thus, when one of the rolls is about to be exhausted its carriage is moved along the tracks toward a fresh paper roll which has been pasted already, and is being caused to revolve at the proper speed by its own propellers. The fresh paper roll of course is mounted on a carriage like the exhausted one.

When the two rolls contact the pasted end of the fresh roll is, of course, carried along by the expiring web and at this moment a

severing knife is thrown against the exhausted stud to sever the old web and of course stop the exhausted stub from revolving. The latter is removed and the carriage is moved along its tracks into a position away from the press where it can receive a fresh paper roll on its cone studs. This fresh roll of course is properly pasted, its propellers brought into contact with it, and started up when the other roll is about to be exhausted.

The arrangement of the press room, according to this invention, is such that these paper roll carriages can be so located as to provide two free passages at either end through which fresh paper rolls may be transmitted preferably on overhead carriages or cranes without interrupting the running of the press or presses. For this purpose two rolls are provided for each press mounted horizontally one above the other. Suitable platforms or galleries are arranged in such a way as to leave full passage-way on either side by which a fresh supply of rolls may be brought from storage. These passage-ways are located one between the system of carriages and the end of the press, and the other at the other side of the carriage.

Referring more especially to Figs. 1 and 3, I will first describe the relative locations of the elements of this paper roll changing system. It is to be noted that a plurality of press frames 10 are indicated in their usual relationship to each other in the press room. This invention can be applied to one or any desired number.

At the rear of these presses is a space in which the new and old web rolls are located, and beyond it is a roll storage place as indicated in Fig. 1. The rolls R in their usual condition are taken from this storage place by means of overhead carriage or cranes 11 operating on horizontal overhead tracks 12 and brought out into the space behind the presses horizontally. The lower tracks 12 provide for the application of the rolls to the lower decks of the presses, but if it is desired to apply them to the upper decks one or more tracks 13 above them are provided for that purpose. Their cranes 11 take the rolls from the lower track and lift them to the higher altitude. It is to be noted that I have shown two pairs of these tracks 12 and tracks 13 arranged in the same way. This is to provide two horizontal passage-ways through which the rolls are introduced into the space behind the presses and moved along that space to the proper press. These may be called the front and rear passage-ways, and are indicated fully in Fig. 3.

The rolls R, of course, are supported by straps 14 and cables 15, the operating mechanism for which need not be described in detail as any convenient well-known form may be used. The drums 16 carrying the cables can be moved cross ways on their carriages. The two passage-ways which have been mentioned are located respectively one just at the rear of the press frames and the other at the rear end of the space provided behind the press frames. Between these two passage-ways is located a supporting frame 20 for the old and new rolls for each press. One of these frames is provided for each four rolls in active service in the form illustrated, and it will be seen that the rolls R can be moved along the tracks 12 or 13 laterally with respect to the presses through free spaces or passage-ways in a horizontal direction even while the presses are running, and without interrupting their operation in any way and the rolls brought up adjacent to the support 20 to which they will be applied, and also brought to the proper height. They can then be mounted on these supports in a manner to be described.

From what has been said and shown with relation to the lay-out of the plant, it will be seen that the paper rolls are changed horizontally, thus requiring less power, saving room and height, providing easy accessibility to one side of each roll, and also easy access to the new rolls in addition to the provision of a clear passage-way for each of the rolls independently of the operation of the press. It is to be noted also that the web W passes beyond the crane carriage, the upper one passing above it and the lower one below the space in which the rolls are brought in so that there can be no interference.

Fixedly mounted on the floor or any solid stationary supports are tracks 21. On these tracks run rollers 22. The rollers by means of legs 23 which have flanges acting as ways slidingly support carriages 24. There is one of these carriages for each pair of legs. These carriages carry brackets 25 for supporting the web rolls. Each bracket is provided with a cylinder 26 in which slides a stud 27, sliding key 28 and slot being provided for keeping the stud in proper position. A screw 29 operated by a hand wheel 30 mounted on an end 31 of the cylinder 26 moves the stud back and forth. On this stud 27 is a reduced cylindrical portion 32 on which is revolubly mounted a cone 33. This cone is provided with a key 34 adapted to engage in a key slot 35 in a metal tube constituting a paper roll core 36. In the form shown in Fig. 4 this supporting member on one side is provided with a brake pulley 37 fastened to it by means of bolts. In the form shown in Fig. 10 there is no difference except that a brake pulley is used on both studs. These brake pulleys are used for the usual purpose, and only one of them is required ordinarily, but two of them are of value in case

one key slot gives way through a sudden stoppage of the press or any damage in transportation. In that case the other pulley could be used without any loss of time. Pivoted on lugs 40 are the usual brake shoes 41 with their adjusting hand wheels 42.

The brackets 25 are held in place by bolts 43 sliding in grooves 44 preferably running the entire length of the carriage 24 so that they can move along these grooves to accommodate the several widths of paper rolls.

Each carriage 24 is provided with a shaft 45 having a hand wheel 46 and carrying two pinions 47 meshing with two stationary racks 48 by which the carriages can be moved along the tracks 21.

For the purpose of adjusting the paper roll laterally on its carriage, the latter is provided with a threaded bracket or nut 49 for receiving a screw 50. This screw is journalled in a bearing 51 on the carriage held in place by a collar 52 and the shank of a hand wheel 53. This hand wheel is fixed to the screw and can be turned to move the carriage along and thus adjust the roll lengthwise with respect to itself along the carriage 24.

A shaft 54 journalled in bearings 55 carries a web severing knife 56 fastened to arms 57 which are keyed to the shaft 54. A hand lever 58 actuated by means of a spring 59 normally holds the knife in the position indicated in Fig. 3 out of the way of the two revolving paper rolls.

Under the carriages are provided horizontal shafts 60 mounted to turn in fixed bearings. These carry sliding bevel gears 61 in brackets 62 fastened to the carriages so as to move with them along the shaft. These bevel gears are slidingly keyed to the shafts 60 and drive other bevels 63 mounted on shafts 65 journalled in bearings 64 fastened to the carriages. On each shaft 65 is fastened a gear 66 which meshes with and drives a gear 67 running loose on a propeller arm shaft 68. Each of these gears 67 meshes with a gear 69 fastened to a propeller shaft 70. This propeller shaft has bearings in arms 71 which are fastened on the propeller arm shaft 68 and swing with it. On each of these shafts 70 is of course one gear 69 and also one propeller wheel 72. In this way it will be seen that the constantly driven shaft 65 operated from any desired source of power constantly drives the propeller shafts and consequently all the propellers.

When it is desired to throw the propellers into contact with a new web roll, this is done by operating a hand wheel 73 on a worm 74. This operates a worm wheel 75 which meshes with this worm and also is fastened to the shaft 68. This shaft therefore is turned and the propellers moved into contact with the new web roll or out of contact with it as may be desired. These devices, of course, are located in each web roll position so that each web roll is operated independently by its propellers and all driven preferably from the same source of power.

When a roller is nearly exhausted a new one R is lifted in the storage room as indicated in Fig. 1 and moved on its carriage past the other rolls as indicated in Fig. 3 along one of the spaces above described. Let it be assumed that in Fig. 3 the new roll R′ has just been moved in on the right hand carriage 11 and set in the position R′. When the other roll R is more fully exhausted its carriage 24 and supports 23 are moved sideways by operation of the proper hand wheel 46 so that it comes over to the position shown at the top of Fig. 12. The new roll R′ is rotating at web speed. The old web is brought into contact with it so as to take its free end with it as indicated. Then the severing knife 56 is operated to cut the old web and disconnect the old roll from the main web W. Now the old roll spindle is removed and the carriage brought back to its original position. The new roll R′ stays where it is first placed until it becomes almost exhausted.

From this it will be seen that the paper rolls are changed horizontally, thus saving room in height, that the rolls are all readily accessible from one side, that power is saved because it is the light expiring roll that is moved instead of the heavy new roll for purposes of paper change while the press is running, that passages are provided through which the new rolls may be carried through several presses while they are running for supplying some other press along a line and at the same time a continuous supply of web is secured to each press without the usual spindling of the paper rolls. Dispensing with this operation materially reduces the time and expense of attending to the change of the web.

Although I have illustrated and described only one form of the invention, I am aware of the fact that 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 all the details of construction herein shown and described, but what I do claim is:—

1. The combination with a printing press, of a support for a plurality of web rolls spaced therefrom to permit new web rolls to be moved along transversely between the support and printing press, means for supporting the rolls movable side ways to mount the rolls on said support, and means on the support for thereafter moving a nearly exhausted roll side ways to bring it into contact with a new roll on the support.

2. The combination with a printing press, of a support for a web roll located at the end of the printing press but spaced therefrom far enough to permit a new roll to be moved along transversely between the support and printing press, said support being independent of the press, and means for moving a web roll longitudinally and laterally on said support.

3. A support for a web roll having brackets for carrying the ends of the roll, longitudinal legs having ways for slidingly supporting said brackets, and means for moving said legs laterally.

4. In a support for a web roll, the combination of a stationary frame, a track adjacent to said frame, a carriage movable along said track, means on the carriage for operating it to move it along the track, said carriage having a pair of legs, and means movable on said legs transversely to the track for supporting a web roll.

5. In a support for a web roll, the combination of a carriage, means supported by said carriage for holding a web roll with its axis transverse to the direction of motion of the carriage, and means for adjusting said web roll supporting means in the direction of the axis of the web roll.

6. In a support for a web roll, the combination of a track, a carriage movable on said track, means supported by said carriage for holding a web roll, means for adjusting said web roll supporting means in a direction transverse to the direction of the track, and a hand wheel and screw connection mounted on said carriage for moving the web roll axially.

7. In a support for a web roll, the combination of a track, a carriage movable along said track, a worm wheel connection on the carriage, a pair of racks parallel with the track, and pinions operated by said worm wheel connection and meshing with the racks for moving the carriage on the track, said carriage having means transverse to the track for supporting a web roll.

8. In a support for a web roll, the combination of a carriage, means on the carriage for supporting a web roll, a shaft mounted in fixed bearings, a plurality of gears on the carriage adapted to be operated by said shaft in all positions of the carriage, and a plurality of propeller rolls connected with said gears for rotating a web roll supported on the carriage.

9. In a support for a web roll, the combination of a carriage, means on the carriage for operating it to move it, said carriage comprising a pair of legs, means movable on said legs for supporting a web roll, a shaft mounted in fixed bearings, a plurality of gears on the carriage adapted to be operated by said shaft in all positions of the carriage, and a plurality of propeller rolls connected with said gears for rotating a web roll supported on the carriage.

10. In a support for a web roll, the combination of a stationary frame, a track adjacent to said frame, carriage movable along said track, means on the carriage for operating it to move it on the track, said carriage comprising a pair of legs, means movable on said legs transversely to the track for supporting a web roll, a shaft mounted in fixed bearings, a plurality of gears adapted to be operated by said shaft in all positions of the carriage, a plurality of propeller rolls connected with said gears for rotating a web roll on the carriage, and means for moving said propeller rolls back and forth toward and from the web roll.

11. In a support for a web roll, the combination of a movable carriage, a pair of brackets adjustably mounted on said carriage, means for moving the carriage in a direction transverse to the direction of adjustment of the brackets, cones carried by said brackets, and a web roll for receiving said cones at its opposite ends.

12. The combination with a series of printing presses, of a support for a plurality of web rolls spaced therefrom to permit new web rolls to be moved along transversely between the support and printing presses while the presses are running, said support also having a space beyond it for a similar purpose, transverse tracks located above said spaces, carriages movable along the tracks and having means for supporting the rolls movable sideways to mount the rolls on said support, and means on the support for thereafter moving a nearly exhausted roll side ways to bring it into contact with a new roll on the support.

13. In a support for a web roll, the combination of a movable carriage, a pair of brackets mounted on said carriage, two opposite freely rotatable cones carried by said brackets having a key, a web roll for receiving said cones at its ends, and means for adjusting said cones longitudinally on said brackets.

14. In a support for a web roll, the combination of a movable carriage, a pair of brackets adjustably mounted on said carriage, means for moving the carriage in a direction transverse to the direction of adjustment of the brackets, two opposite freely rotatable cones carried by said brackets having a key, a web roll for receiving said cones, and means for adjusting one of said cones longitudinally.

15. In a support for a web roll, the combination of a movable carriage, a pair of brackets mounted on said carriage, means for moving the carriage, freely rotatable cones carried by said brackets, a web roll

for receiving said cones at its ends, and a manually operated means connected with one of said cones for reducing the rotation thereof.

16. In a support for a web roll, the combination of a pair of brackets, a cylinder on one of said brackets, a cone stud longitudinally adjustable in the cylinder, a freely rotatable cone carried by said stud, a web roll for receiving said cones at its ends, and a manually operated means connected with one of said cones for reducing the rotation thereof.

17. In a support for a web roll, the combination of a movable carriage, a pair of brackets mounted on said carriage, a cone carried by said brackets, a web roll for receiving said key, means for moving the carriage laterally, and means for adjusting the carriage longitudinally.

18. In a support for web rolls, the combination of a track, a carriage movable along said track, a worm wheel connection on the carriage, a pair of racks parallel with the track, pinions operated by said worm wheel connection and meshing with the racks for moving the carriage on the track, said carriage having means transverse to the track for suporting a web roll, and a hand wheel and screw connection on the carriage for moving the web roll axially.

In testimony whereof I have hereunto affixed my signature.

HENRY A. WISE WOOD.