

1,154,682.

F. W. WOOD.
WEB CHANGING DEVICE.
APPLICATION FILED MAR. 8, 1915.

Patented Sept. 28, 1915.
2 SHEETS—SHEET 1.

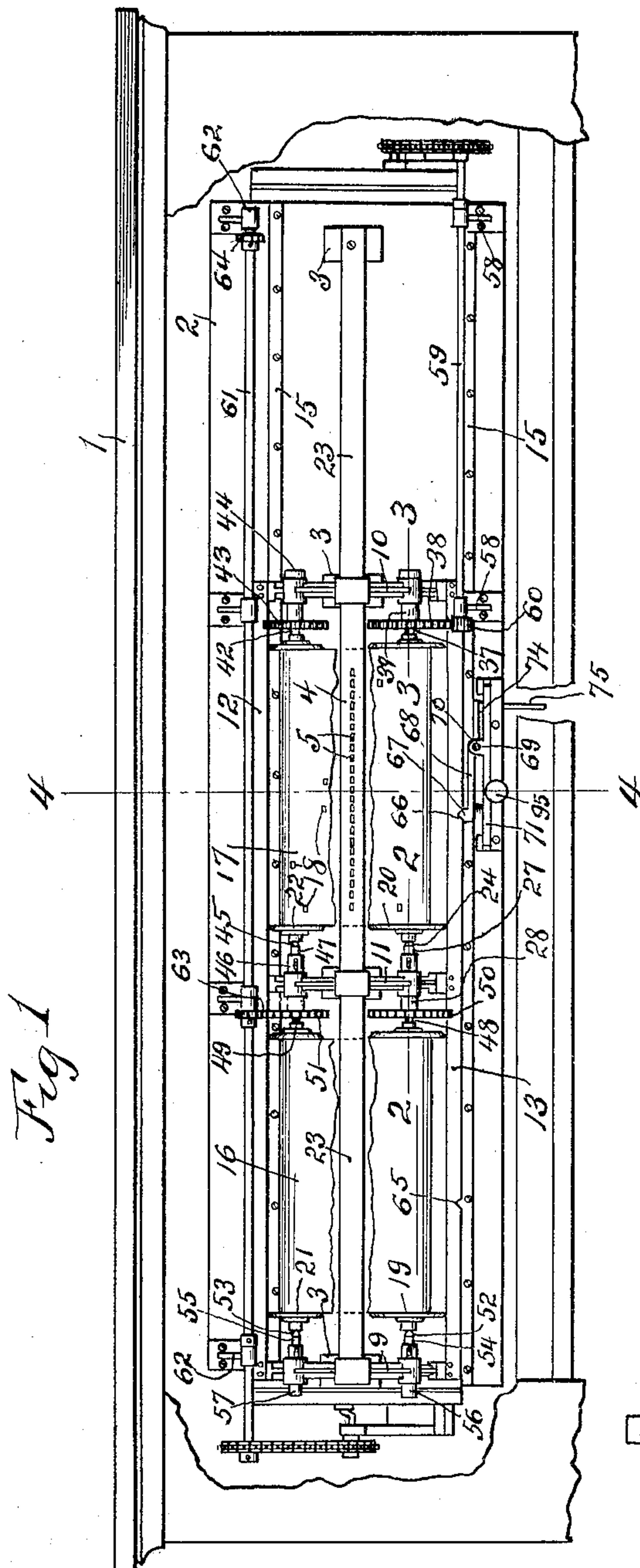


Fig 1

WITNESSES:

R. Hamilton

E. B. House.

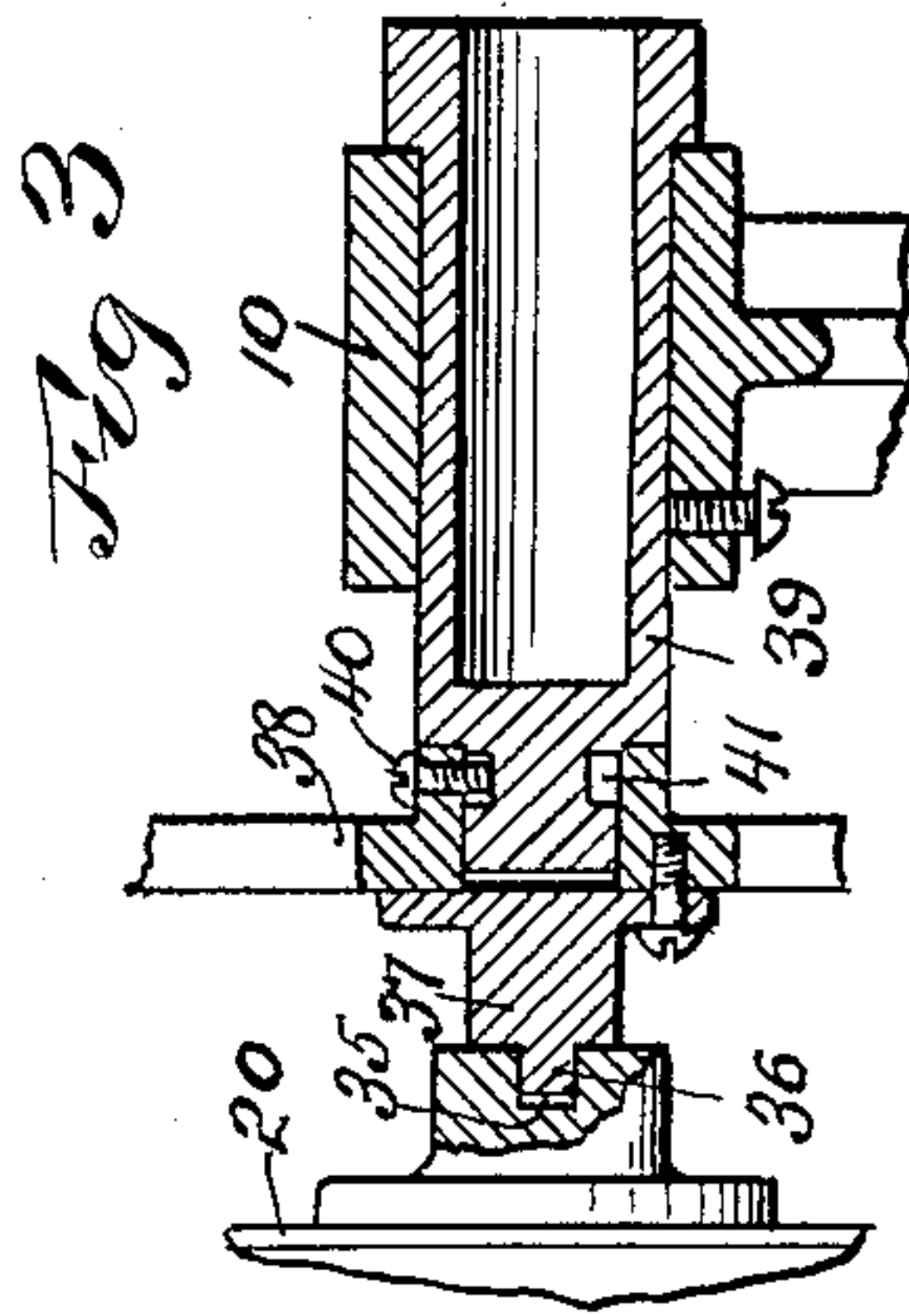


Fig 3

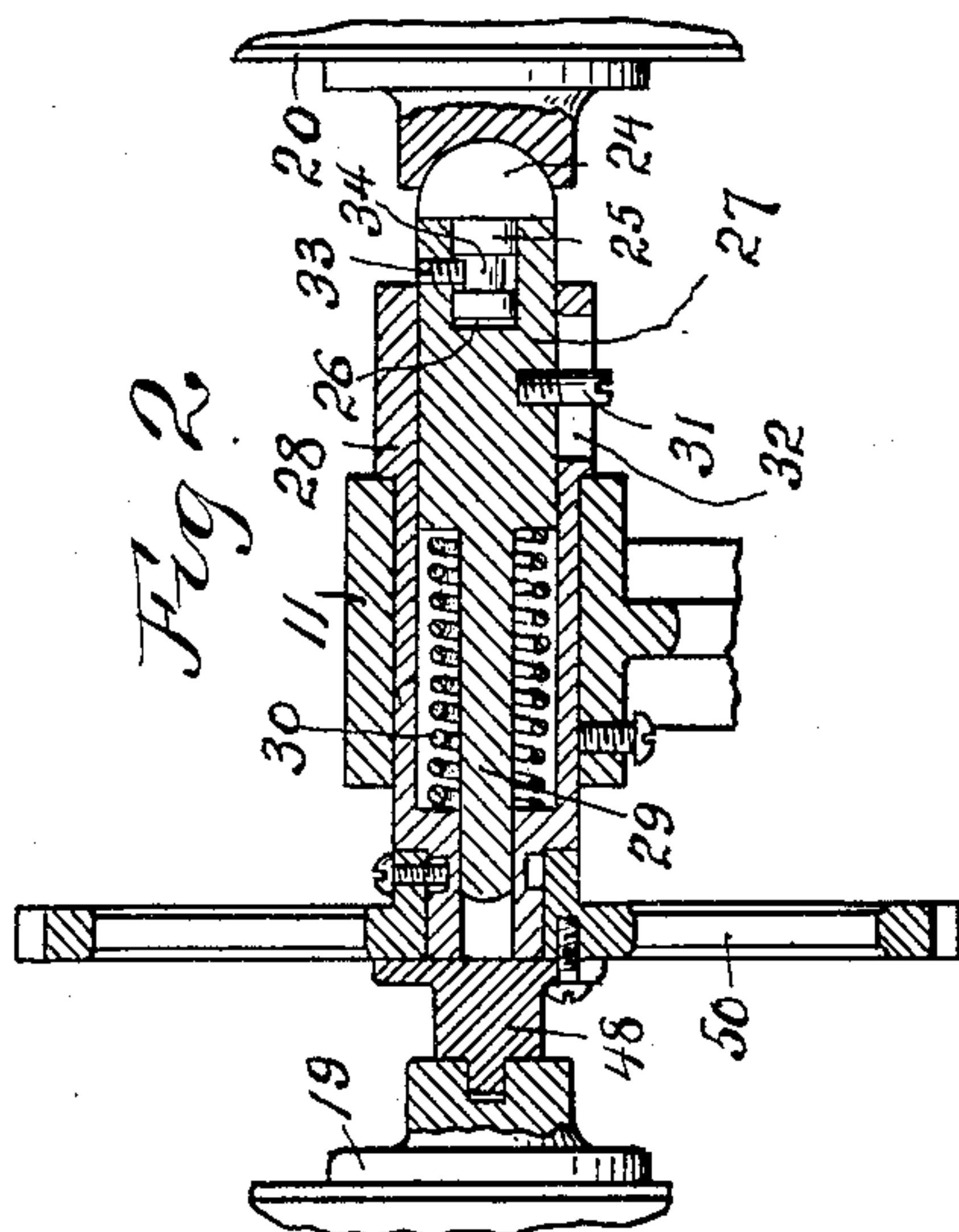


Fig 2

INVENTOR.

Frederick W. Wood

BY

Warren L. House
His ATTORNEY.

1,154,682.

F. W. WOOD.
WEB CHANGING DEVICE.
APPLICATION FILED MAR. 8, 1915.

Patented Sept. 28, 1915.

2 SHEETS—SHEET 2.

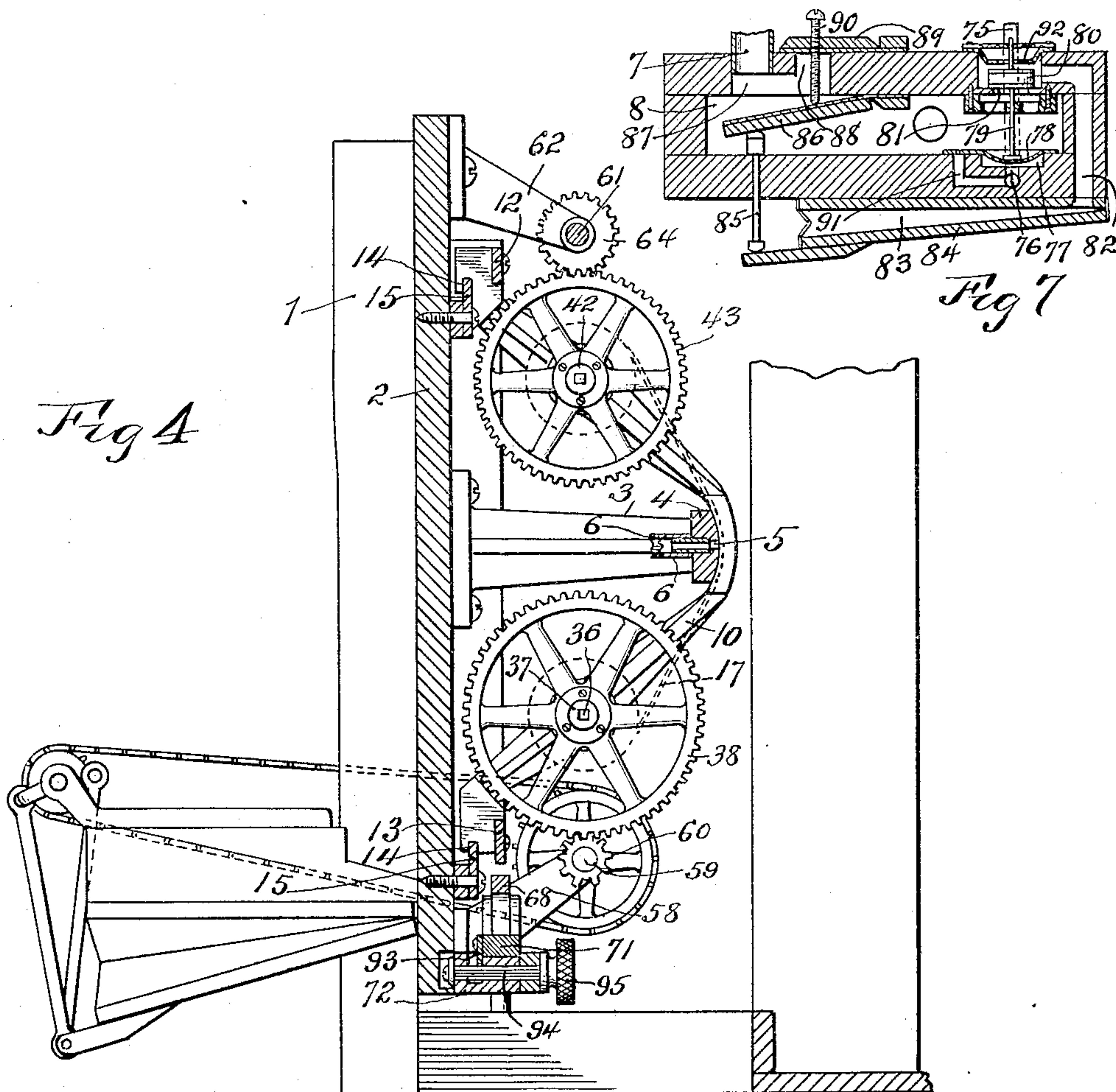


Fig 4

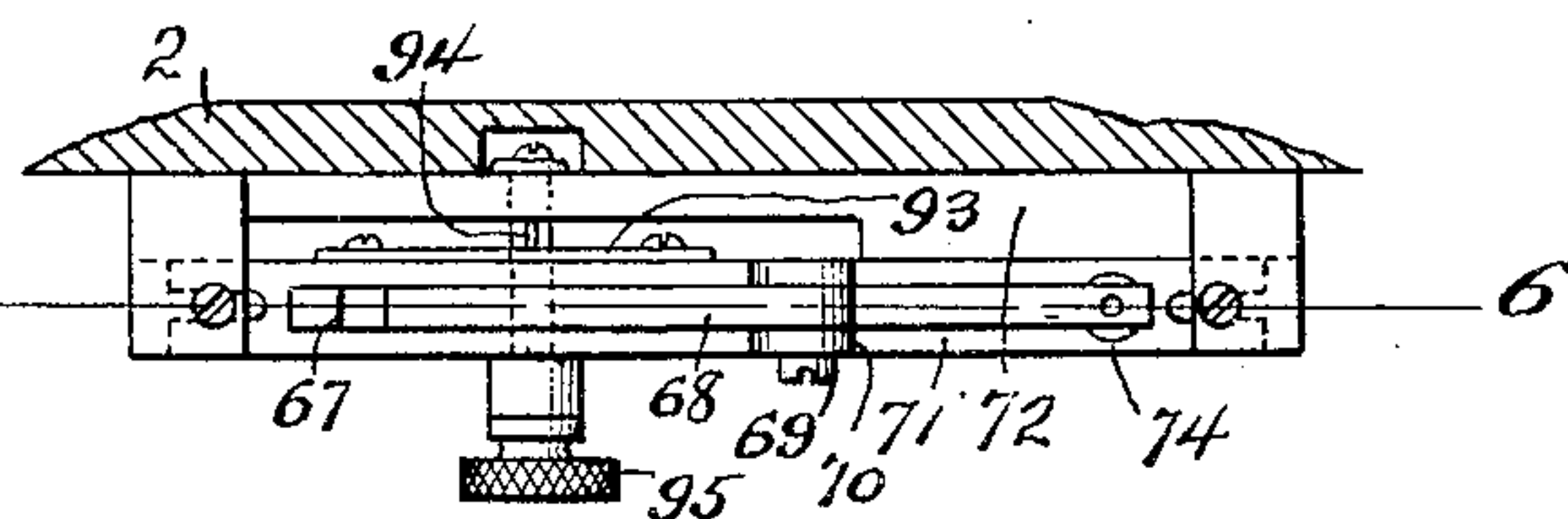


Fig 5

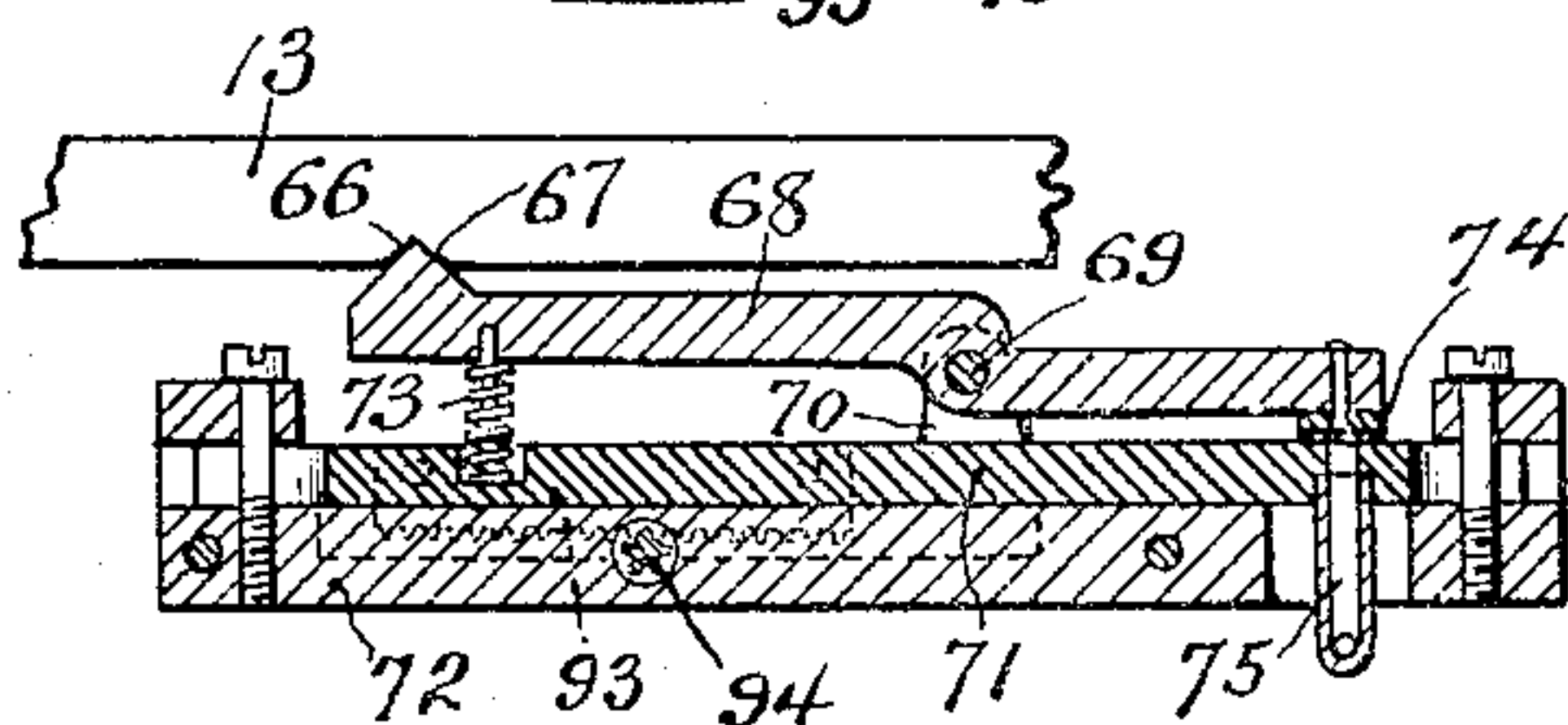


Fig 6

WITNESSES:

R. Hamilton
E. B. House

INVENTOR.

Frederick W. Wood

BY

Warren D. House
ATTORNEY.

UNITED STATES PATENT OFFICE.

FREDERICK W. WOOD, OF KANSAS CITY, MISSOURI.

WEB-CHANGING DEVICE.

1,154,682.

Specification of Letters Patent.

Patented Sept. 28, 1915.

Application filed March 8, 1915. Serial No. 13,021.

To all whom it may concern:

Be it known that I, FREDERICK W. WOOD, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Web-Changing Devices; of which the following is a specification.

My invention relates to improvements in web changing devices.

It is adapted to be used in connection with any mechanism employing two webs which it is desirable to be alternately moved to and from a common operative position.

It is particularly adapted for use in connection with musical instruments, such as player pianos, which employ perforated webs which coöperate with tracker bars.

The object of my invention is to provide a simple and efficient device for alternately shifting two webs into a common operative position.

A further object of my invention is to provide a device with which two webs comprising each a perforated music sheet may be alternately shifted to and from coöperative relationship to a tracker bar, combined with means by which the tracker bar is disconnected from the vacuum chamber, or otherwise rendered inoperative when the web shifting mechanism is not in a position in which one of the webs will be in the playing position.

Other novel features of my invention are hereinafter fully described and claimed.

In the accompanying drawings which illustrate the preferred embodiment of my invention, as applied to a player piano, Figure 1 is a front elevation of my improved web changing device, shown applied to a player piano, a portion of which is shown, the pneumatic mechanism which controls the tracker bar being omitted. Fig. 2 is an enlarged horizontal section on the line 2—2 of Fig. 1. Fig. 3 is an enlarged horizontal section on the line 3—3 of Fig. 1. Fig. 4 is an enlarged vertical section on the line 4—4 of Fig. 1. Fig. 5 is an enlarged top view of the mechanism which is controlled by the web support and which controls the disconnecting of the tracker bar from the vacuum chamber. Fig. 6 is a vertical section on the line 6—6 of Fig. 5. Fig. 7 is a vertical sectional view of the pneumatic

mechanism with which the tracker bar is connected.

Similar reference characters designate similar parts in the different views.

1 designates the frame of a piano player, to which is secured a base plate 2, from which forwardly extend and to which are secured brackets 3, to which is fastened a horizontal tracker bar 4, of the usual construction and provided with the usual air inlet openings 5 which respectively communicate by means of tubes 6 with the usual playing chests, not shown, but the construction of which is well known, and which are connected by a tube 7, Fig. 7, with a chamber 8 in which is maintained a constant partial vacuum.

A web support comprising a shifting frame is provided, which consists of two end brackets 9 and 10 and a central bracket 11 having their upper ends secured to a horizontal bar 12, and their lower ends secured to a horizontal bar 13.

The brackets 9, 10 and 11 are each provided in their upper and lower portions with vertical slots 14 in which are slidably mounted respectively two horizontal plates 15, which are secured to the base plate 2, and which serve as supports and guiding means for the shifting frame.

The shifting frame just described is adapted to alternately bring two webs 16 and 17 into and out of operative engagement with the tracker bar 4. These webs are of the usual type having openings 18 adapted to register with the tracker bar openings 5. One set of ends of the webs 16 and 17 are respectively secured to and adapted to be wound upon two playing rollers 19 and 20. The other sets of ends of the webs are secured to and are adapted to be respectively wound upon two re-winding rollers 21 and 22. The webs 16 and 17 are adapted to longitudinally and transversely slidably engage the front surface of the tracker bar 4 and extensions thereof 23 at the left and right respectively, as viewed in Fig. 1, of the central portion having the air inlet openings 5.

As shown in Fig. 2, the left end of the roller 20 is provided with a rounded central recess adapted to have fitted therein the rounded head 24 of a horizontal rotary pin 25, which is mounted in an axial recess 26

provided in the adjacent end of a horizontal cylindrical member 27, which is longitudinally slidable in a tubular bearing member 28, which is secured in the bracket 11. The member 27 has a central reduced portion 29 which is encircled by the coil spring 30 mounted in the tubular bearing 28 and having one of its ends resting against said bearing and the other end against the member 27 for forcing the latter member outwardly. A radial stop screw 31 secured to the member 27 and extending through and slidable in a longitudinal slot 32 in the member 28 limits the outward movement of the member 27. A radial screw 33 mounted in the member 27 and having its inner end disposed in an annular peripheral groove 34 retains the pivot pin 25 in the member 27, while permitting of its rotation therein.

As shown in Fig. 3, the right end of the roller 20 is provided with a central square recess 35 into which is adapted to be fitted a square projection 36 on the end of a member 37 which is secured to a gear wheel 38 rotatably mounted on a bearing member 39 and retained thereon by means of a radial screw 40, the inner end of which is disposed in an annular peripheral slot 41, with which the bearing member 39 is provided. The bearing member 39 extends through and is secured in the bracket 10.

By moving the roller 20 endwise to the left, as viewed in Fig. 2 and in Fig. 3, the member 27 is moved to the left against the pressure of the spring 30, thus permitting the other end of the roller 20 to be withdrawn from engagement with the projection 36, after which the other end of the roller may be freed from the head 24. By reversing this operation, the roller 20 may be mounted in operative position on its support. In like manner, the right end of the roller 22 is mounted upon a member 42 which is secured to a gear wheel 43 which is rotatably mounted on a bearing 44 mounted in the bracket 10.

The left end of the roller 22, as viewed in Fig. 1, is supported in a manner similar to the left end of the roller 20, it being provided with a central end recess in which is fitted a member 45, corresponding to the member 25 and rotatably fitted in a longitudinally slidable member 47 mounted in a bearing member 46 similar in construction to the bearing member 28 and mounted in the bracket 11.

The right ends of the rollers 19 and 21 are each supported in a manner similar to that employed for supporting the right end of the roller 20, as shown in Fig. 3, being provided respectively with central square recesses fitted to members 48 and 49 respectively, the latter members corresponding in construction to the member 37 and being respectively secured to gear wheels 50 and

51, which are respectively rotatably mounted on bearing members 28 and 46, the latter bearing member corresponding in construction to the member 28 and being mounted in the bracket 11, as above described.

The left ends of the rollers 19 and 21, as viewed in Fig. 1, are supported similarly to the means employed for supporting the left ends of the rollers 20 and 22, and as shown in Fig. 2.

The left ends of the rollers 19 and 21 are respectively provided with central recesses in which are respectively fitted heads 52 and 53 of pivot pins, corresponding to the pivot pin 25, and rotatably mounted respectively in longitudinally slidable members 54 and 55, which correspond in construction substantially to the members 27 and 47 and which are respectively mounted in bearing members 56 and 57, which are mounted in the bracket 9.

Rotatably mounted in bearings 58 secured to the base plate 2 is a horizontal longitudinal driving shaft 59 to which is secured a pinion 60, which, when the shifting frame which supports the webs 16 and 17 is in the position shown in Fig. 1, meshes with the gear wheel 38, thereby driving the playing roller 20 when the web 17 is in playing or operative relationship to the tracker bar 4.

When the frame or support which carries the webs 16 and 17 is shifted to the right, as viewed in Fig. 1, so that the web 16 is in playing relationship to the tracker bar 4, the pinion 60 will mesh with the gear wheel 50, thereby driving the playing roller 19 so as to wind the web 16 thereon.

A driving shaft 61 is rotatably mounted in bearings 62 secured to the base plate 2, and has secured to it two pinions 63 and 64. When the parts are in the position shown in Fig. 1, the pinion 63 meshes with the gear wheel 51, thereby driving the rewinding roller 21 so as to wind thereon the web 16. At this time the roller 19 is free to rotate, the gear wheel 50 being disengaged from the pinion 60.

When the frame or support carrying the webs 16 and 17 is shifted to the right, as viewed in Fig. 1, to a position in which the web 16 will be in operative relationship to the tracker bar 4, the pinion 60 will engage the gear wheel 50 and the pinion 64 will engage the gear wheel 43, thereby driving the roller 22 so as to rewind thereon the web 17 while the roller 19 is winding thereon the web 16.

From the foregoing it will be understood that the web supporting frame may be alternately shifted to two positions in which the webs 16 and 17 will alternately be in playing or operative relationship to the tracker bar 4, and that while one web is being played, the other is being rewound.

In order that the tracker bar may be disconnected operatively from the vacuum chamber 8 excepting at such times as the web supporting frame is in one of said two positions, the following described mechanism is employed.

The lower edge of the plate or bar 13 is provided with two V shaped notches 65 and 66 adapted to receive therein a V-shaped projection 67 on the upper side of a horizontal lever 68 which is pivoted by a transverse horizontal pin 69 to two upstanding ears 70 of a horizontal plate 71, which is longitudinally slidable on a horizontal plate 72 which is secured to the base plate 2.

A vertical coil spring 73, Fig. 6, has its lower end supported by the plate 71 and its upper end bearing against the under side of the lever 68 for the purpose of forcing the left end of the lever upwardly, so that the projection 67 may enter either of the notches 65 or 66. Secured to the other end and lower side of the lever 68 is a valve 74 which, when the projection 67 is in either of the notches 65 or 66, closes the upper end of a tube 75, the other end of which communicates with a passage 76, Fig. 7, which in turn communicates with a chamber 77, which is covered by a flexible diaphragm 78 which supports a vertical valve stem 79 carrying a valve 80 which, in the lower closed position, shown in Fig. 7, closes a passage 81 which communicates with the vacuum chamber 8 and a passage 82, which communicates with a pneumatic 83, which may be of the usual bellows type having an upwardly and downwardly movable lower member 84. A vertical rod 85 has its lower end supported by the member 84, and is slidably mounted in the bottom of the chamber 8 and has its upper end supporting an upwardly and downwardly movable flap valve 86 which, when the pneumatic 83 is collapsed, is raised by the rod 85, thereby cutting off from the chamber 8 a passage 87 which communicates with the tube 7, and is also adapted to communicate with the atmosphere by means of an opening 88, which is adapted to be closed by a flap valve 89 hinged to the outer and upper side of the top of the chamber 8 and which carries a vertical screw 90, the lower end of which rests upon the valve 86.

When the web supporting frame is moved from either of its operative positions, the bar 13 depresses the lever 68 at its left end, as viewed in Figs. 1 and 6, thereby raising the other end of said lever and lifting the valve 74 so as to permit communication with the tube 75 with the atmosphere. The air enters the tube 75 and passes therethrough into the chamber 77, thereby creating a pressure which lifts the diaphragm 78 and with it the valve 80, thus establishing communication between the vacuum chamber 8 and the pneumatic 83, by way of the passages 81 and

82. The pneumatic is thereby collapsed, thus lifting the rod 85 and closing the valve 86 and, by means of the screw 90, opening the valve 89 so as to establish communication of the tracker bar 4 with the atmosphere by way of the playing chests, connected therewith by the tubes 6, and the tube 7 and passage 87. The tracker bar will thus be rendered inactive and will not again become active until connection has been reestablished with the vacuum chamber 8, which occurs when the web supporting frame is in a position for the projection 67 of the lever 68 to enter either of the notches 65 or 66 of the bar 13. When this occurs, said lever will swing so as to close the upper end of the tube 75, thus closing the said tube to the atmosphere, upon which the suction in the vacuum chamber 8 will withdraw air from the chamber 77 by way of a bleed passage 91, Fig. 7, which communicates in the usual manner common to structures of this character with the chamber 8 and with the passage 76. The diaphragm 78 will then lower and the valve 80 will lower with the diaphragm and close the passage 81, at the same time uncovering the usual air inlet 92 which communicates with the atmosphere and with the pneumatic 83 by way of the passage 82. The pneumatic will now expand, thus permitting the valve 86 to open and the valve 89 to close. Communication will now be reestablished between the tracker bar 4 and the vacuum chamber 8 by way of the tube 7 and the passage 87.

In order that proper registration may be secured between the perforations 18 of the webs 16 or 17, as the case may be, and the openings 5 of the tracker bar 4, longitudinal adjustment of the slidable plate 71 is obtained by means of a horizontal rack 93, which is secured to the plate 71 and engages with a transverse horizontal pinion 94, Figs. 4, 5 and 6, which is rotatably mounted in a hole provided therefor in the plate 72, and which has secured to its forward end a thumb piece 95. By turning the thumb piece 95 in the proper direction, the rack 93 and with it the plate 71 and lever 68 is moved longitudinally to a position in which the projection 67 will enter the notch 65 or 66 when the perforations 18 properly register with the openings 5 of the tracker bar 4.

When the webs 16 and 17 are not in the operative position on the tracker bar, they will be supported by the tracker bar extensions 23.

Any suitable means may be employed for rotating the shafts 59 and 61.

In operating my invention, the rollers 19 and 21 and 20 and 22 together with the webs which they respectively carry, are mounted in the shifting frame, in the manner already described, after which the frame

will be shifted to a position in which the web which it is desired to have played will be in the operative position on the tracker bar. Such web will then be wound on its playing roller, while at the same time, the other web will be winding upon its rewinding roller. After the web has been played, the web support or shifting frame will be shifted on the guide plates 15 to the other playing position, at which time the other web which has been rewound will be in operative relationship to the tracker bar and the playing of the last named web will now proceed, while the one that has been played will be subjected to rewinding. During the shifting of the web support between the two playing positions, the tracker bar will be disconnected from the vacuum chamber in the manner already described.

I do not limit my invention to the structure shown and described, as modifications, within the scope of the appended claims, may be made without departing from the spirit of my invention.

What I claim is:—

1. In a web changing device, a movable support having means for supporting and rotating two web supporting rollers comprising a playing roller and a rewinding roller, guiding means on which said support may be shifted to alternately bring said rollers into rewinding and playing positions, means for operating the said rotating means to rotate the playing roller when the rollers are in the playing positions, and means for operating the rotating means to rotate the rewinding roller when the rollers are in the rewinding position.

2. In a web changing device, a movable support having means for supporting and rotating two pairs of web supporting rollers, each pair comprising a rewinding roller and a playing roller, guiding means on which the support may be shifted to alternately bring said pairs of rollers from a rewinding to a playing position, means for rotating the playing roller of each pair when it is in the playing position, and means for rotating the rewinding roller of each pair when it is in the rewinding position.

3. In a web changing device, a movable support, a pair of rotary devices rotatably mounted on said support and adapted to respectively engage and rotate two playing rollers, a second pair of rotary devices rotatably mounted on said support and adapted to engage and rotate respectively two rewinding rollers, guiding means upon which said support may be shifted to alternately bring the first named rotary devices into the playing position and to alternately bring the other two rotary devices into the rewinding position, means for rotating the first named rotary devices when they are in the playing position, and means for rotating

the other two rotary devices when they are in the rewinding position.

4. In a web changing device, a support, two gear wheels rotatably mounted thereon and having means for respectively engaging and rotating two playing rollers, two rewinding gear wheels rotatably mounted on said support and adapted to engage and rotate respectively two rewinding rollers, guiding means upon which said support is movable so as to alternately bring the first named gear wheels into the playing position and to alternately bring the rewinding gear wheels into a rewinding position, a driving shaft, a pinion secured to said driving shaft and adapted to engage with the first named gear wheels when they are in the playing position, a second driving shaft, and two pinions secured to the second driving shaft and adapted to respectively engage said rewinding gear wheels when they are in the rewinding positions.

5. In a web changing device, two rollers adapted to support and alternately wind thereon a web, supporting means upon which said rollers may be alternately shifted to two positions, means for rotating one of said rollers when the support is in one of said positions, and means for rotating the other roller when said support is shifted to the other position.

6. In a web changing device, two rollers adapted to support and alternately wind thereon a web, supporting means by which said rollers may be alternately shifted to two positions, two gear wheels, means actuated by said gear wheels for respectively rotating said rollers, two driving shafts, and two pinions secured respectively to said driving shafts, one pinion engaging with one of said gear wheels when said rollers are in one of said two positions, the other pinion engaging with the other gear wheel when said rollers are in the other of said two positions.

7. In a web changing device, a tracker bar, two web supporting devices, each comprising a rewinding roller and a playing roller, means for alternately shifting said devices from a rewinding position to a playing position in which webs carried by said devices will be in operative relationship to said tracker bar, means for rotating the playing rollers when they are in the playing position, and means for rotating the rewinding rollers when they are in the rewinding position.

8. In a web changing device, a tracker bar, a movable support, two rotary playing devices mounted on said support and adapted to respectively engage and rotate two playing rollers, two rotary rewinding devices mounted on said support and adapted to respectively engage and rotate two rewinding rollers, said support being movable from a position, in which one playing device and

one rewinding device will be in the playing position, to a position in which the other playing device and the other rewinding device will be in the playing position, means for rotating the rotary playing devices when they are in the playing position with respect to the tracker bar, and means for rotating the rotary rewinding devices when they are in the rewinding position.

9. In a web changing device, a tracker bar, a movable support, two rotary playing devices mounted on said support and adapted to respectively engage and rotate two playing rollers, two rotary rewinding devices mounted on said support and adapted to respectively engage and rotate two rewinding rollers, said support being movable from a position, in which one playing device and one rewinding device will be in the playing position, to a position in which the other playing device and the other rewinding device will be in the playing position with respect to said tracker bar, two driving shafts, means actuated by one of said driving shafts for rotating the rotary playing devices when they are in the playing position, and means actuated by the other driving shaft for rotating the rotary rewinding devices when they are in the rewinding position.

10. In a web changing device, a tracker bar, a support provided with means for carrying two webs and movable to two positions in which the two webs will respectively be in operative relationship to the tracker bar, and means actuated by said support for rendering the tracker bar inoperative when said support is not in one of said two positions.

11. In a web changing device, a tracker bar, a support having means for carrying a web and movable to and from a position in which the web will be in operative relationship to the tracker bar, and means actuated by said support for rendering the tracker bar inoperative when said support is not in said position.

12. In a web changing device, a tracker bar, a support having means for carrying a web and movable to and from a position in which the web will be in operative relationship to the tracker bar, and means adjustable lengthwise of and controlled by the said support for rendering the tracker bar inoperative when said support is not in said position.

13. In a web changing device, a tracker bar, a support having means for carrying a web and movable to and from a position in which the web will be in operative relationship to the tracker bar, a vacuum chamber with which the tracker bar is adapted to be connected, and means controlled by said support for disconnecting the tracker bar from the vacuum chamber when said support is not in said position.

14. In a web changing device, two devices provided respectively with means for supporting and driving two webs, supporting means for said devices upon which they may be alternately moved to and from a predetermined position, and means by which said devices may be operated to drive the webs simultaneously in opposite directions when either of said webs is in said predetermined position.

15. In a web changing device, two devices, each having means for supporting two web supporting rollers, supporting means by which said devices may be alternately moved to and from a predetermined position, and means by which said devices may be operated to simultaneously drive the webs carried by said rollers in opposite directions when either of said devices is in said predetermined position.

16. In a web changing device, means for supporting and alternately shifting two webs to and from a predetermined position, and means for actuating said web supporting means to simultaneously drive said webs in opposite directions when either of said webs is in said predetermined position.

17. In a web changing device, means for supporting and alternately shifting two pairs of webs supporting rollers to and from a playing position, each pair comprising a playing roller and a rewinding roller, and means for simultaneously rotating the playing roller of one pair and the rewinding roller of the other pair so as to wind thereon the webs respectively supported thereby, when the pair of rollers, having its playing roller thus rotated, is in the playing position.

18. In a web changing device, a tracker bar, supporting means for two webs provided with means by which said two webs may be alternately brought into and out of operative engagement with said tracker bar, and means for simultaneously driving said webs in opposite directions when one of the webs is operatively engaged with the tracker bar.

19. In a web changing device, a tracker bar, a movable support having means adapted to engage and operate two web supporting and driving devices, guiding means on which said support may be shifted to alternately bring said devices into and out of operative relationship to the tracker bar, and means for actuating said driving devices to simultaneously drive the webs in opposite directions when one of the webs is operatively engaged with the tracker bar.

20. In a web changing device, a tracker bar, a movable support having means for engaging and rotating two web supporting rollers, guiding means upon which said support may be shifted to alternately bring each of said rollers into and out of operative relationship to said tracker bar, and means

by which said rotating means is actuated to rotate said rollers so as to simultaneously drive the webs respectively carried thereby in opposite directions when one of the rollers is in operative relationship to the tracker bar.

21. In a web changing device, a tracker bar, two web supporting devices, each comprising a rewinding roller and a playing roller, means for alternately shifting said two devices to and from the playing position relative to the tracker bar, and means

for simultaneously actuating said devices for driving the rewinding roller of one of said devices to wind its web thereon, and 15 for driving the playing roller of the other device to wind its web thereon.

In testimony whereof I have signed my name to this specification in presence of two subscribing witnesses.

FREDERICK W. WOOD.

Witnesses:

CLARENCE JACKSON,
J. F. CAMPBELL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."