

March 20, 1928.

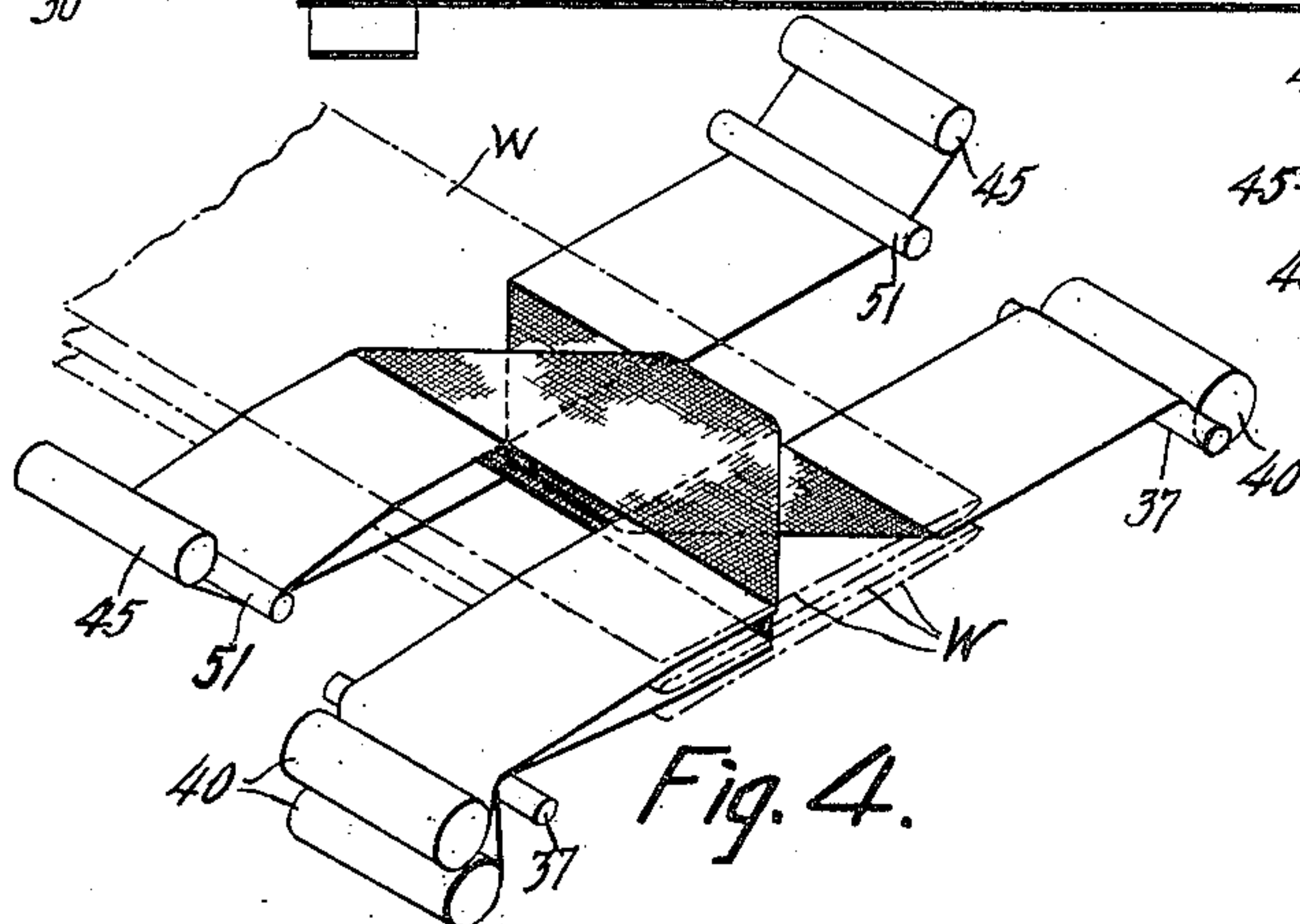
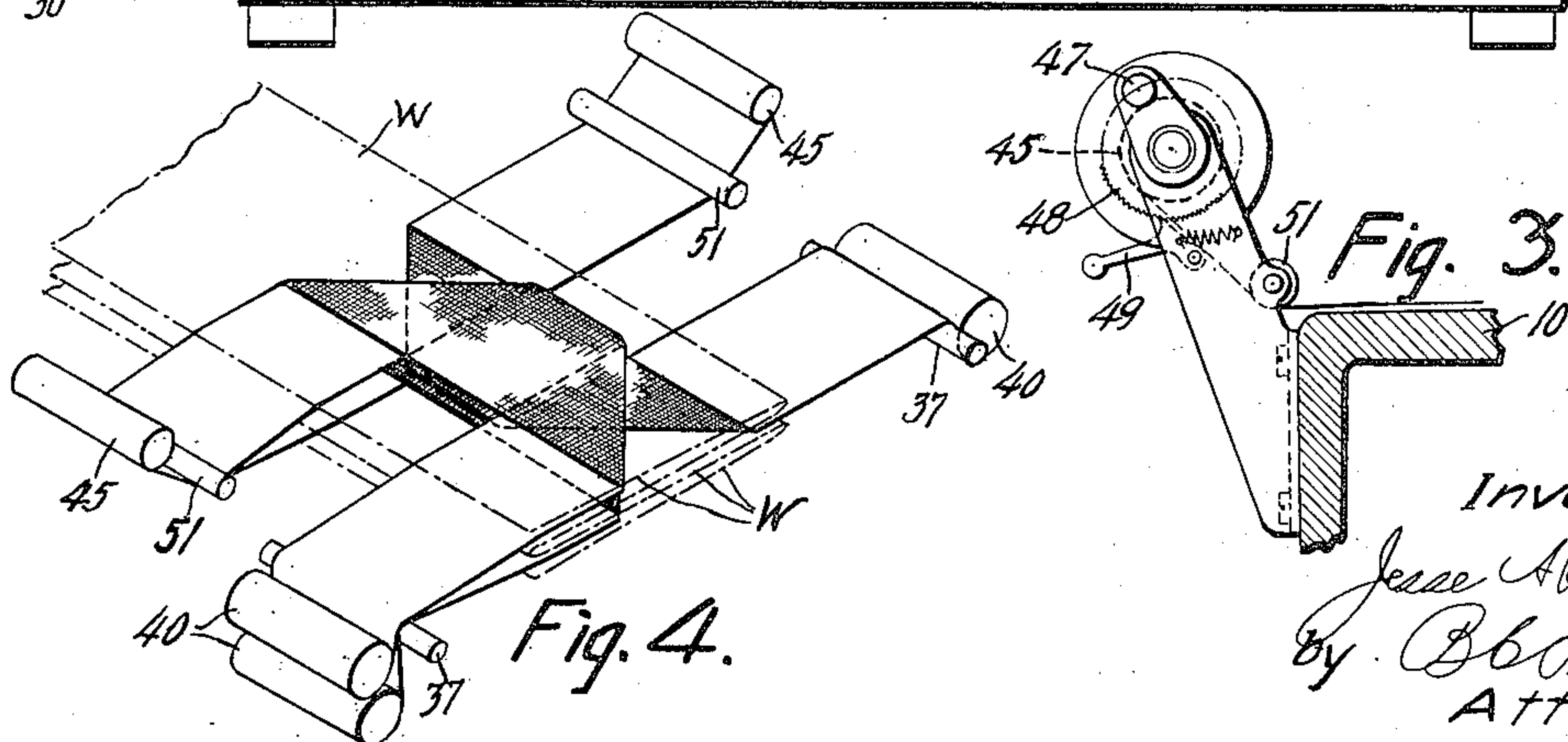
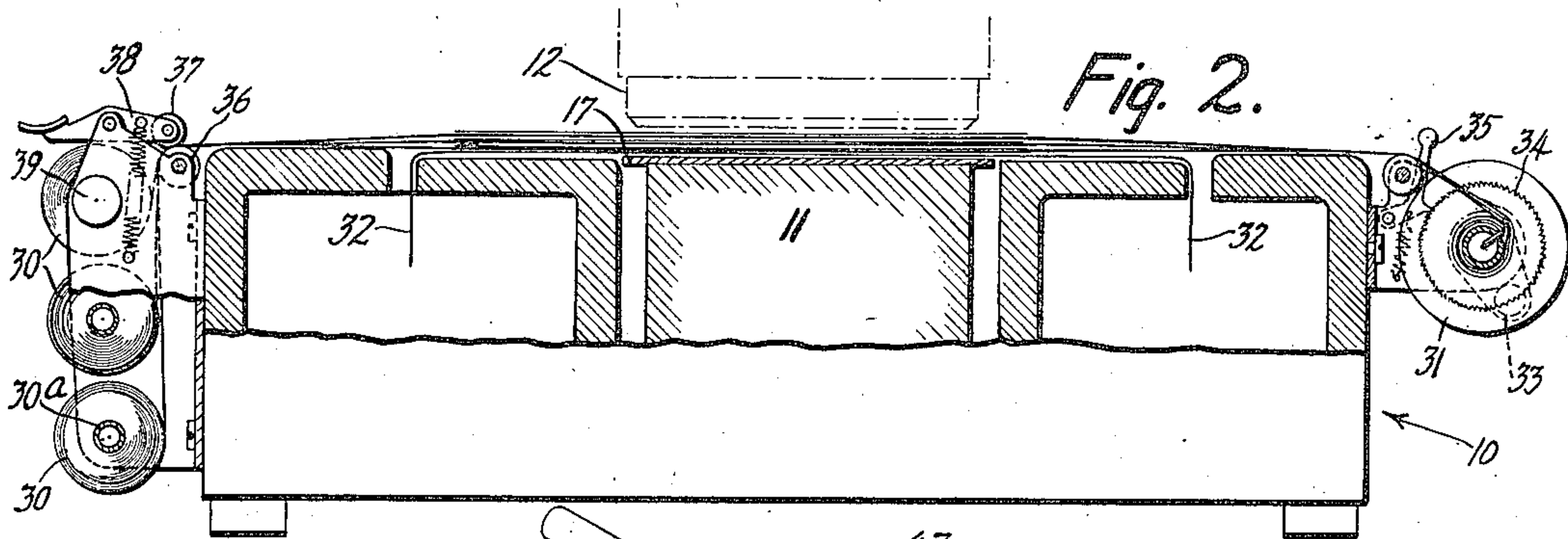
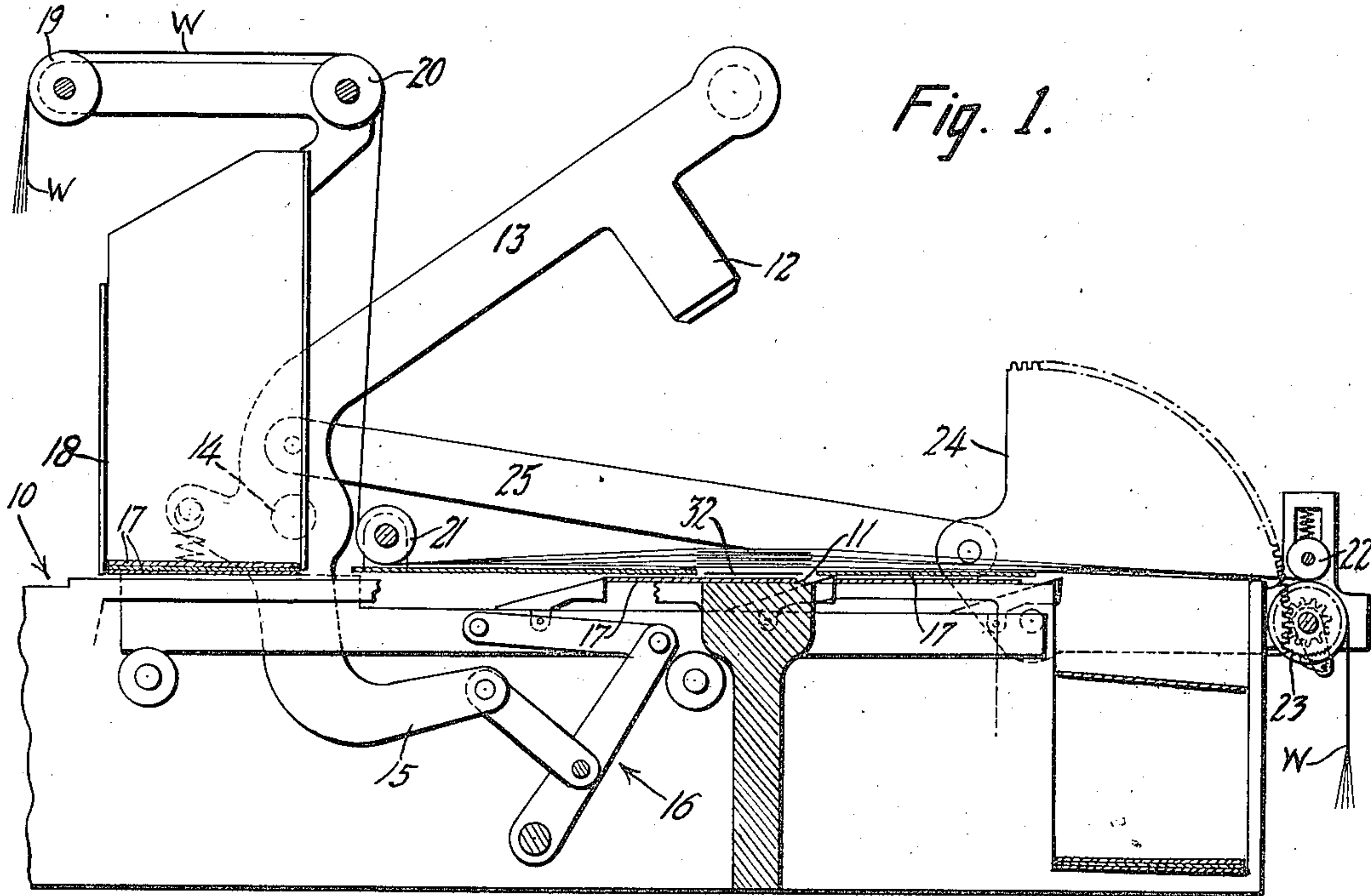
1,663,145

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MANIFOLD WEB PRINTING MACHINE

Filed June 29, 1926

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 5.

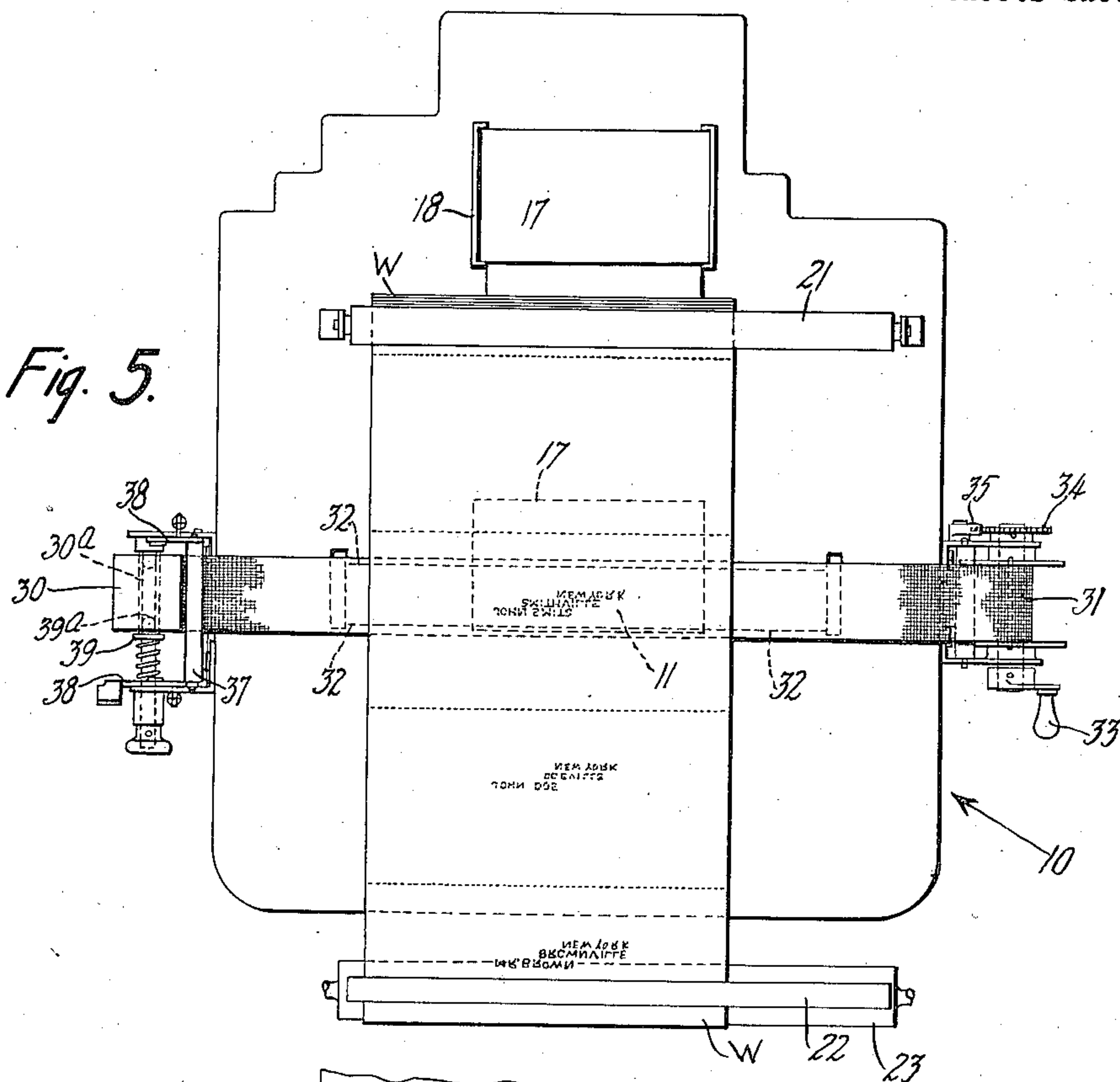
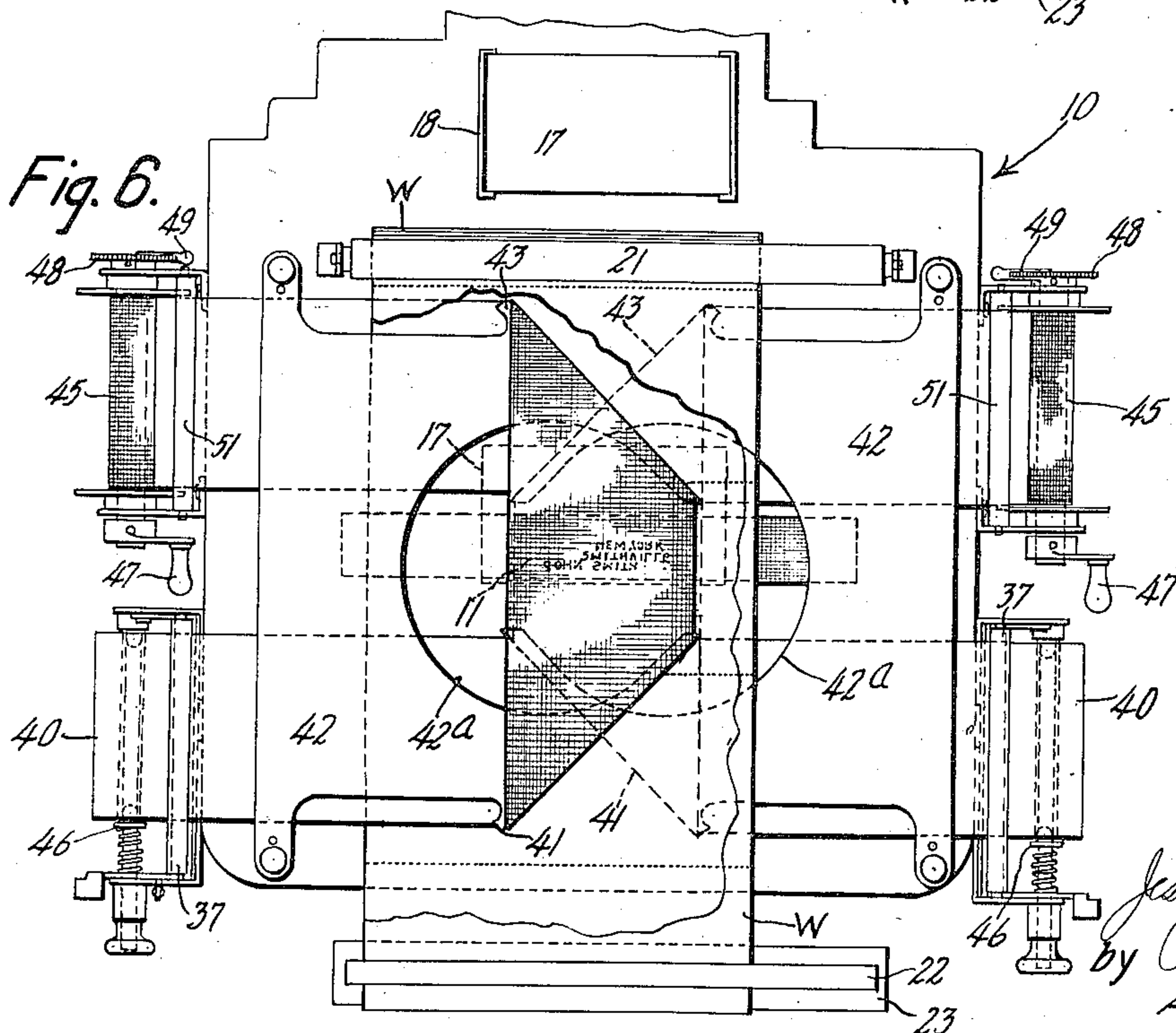


Fig. 6.



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UNITED STATES PATENT OFFICE.

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MANIFOLD-WEB-PRINTING MACHINE.

Application filed June 29, 1926. Serial No. 119,279.

This invention relates to the construction of manifold-web-printing machines both in connection with a typewriting machine and independently thereof.

5 In my co-pending application, Serial No. 631,956, filed April 14, 1923, (now Patent No. 1,592,470, dated July 13, 1926), there is disclosed a manifold-web-stamping machine in which carbon-sheets are held interleaved
10 between superposed plies of a longitudinally-fan-folded work-web, by means of blades which project transversely to the web between the plies thereof alternately from opposite sides, the blades being positioned to
15 the rear of the stamping bed.

In the present invention, long rolls of carbon are employed instead of relatively short sheets, and means are provided for feeding carbons from rolls at either side of
20 the web and for conducting the carbons between the superposed plies over the stamping or printing bed, and then winding them upon a take-up roll. By employing long rolls of carbons, fresh sections of which can
25 be fed to printing position as the advance sections become worn, it is not necessary to replace the carbon-manifolding elements as often as when relatively short sheets are used.

30 A feature of the invention resides in the provision of pairs of diagonal guides, which are arranged for conducting a carbon in between superposed plies of a longitudinally-fan-folded work-web from a feed roll located at one side of the web, thence along
35 the work-web over the printing bed, and out again to be wound up on a take-up roll. As the plies are joined along one side, the guides are positioned on both sides of the web whenever the latter includes more than
40 two plies. Another feature resides in positioning a pair of such diagonal guides with the feed-roll guide in front of the guide opposite the take-up roll, and arranging the
45 latter with means to prevent it from unwinding. The drag of the interleaved work-ply as they are moved forward according to this arrangement tends to keep the carbon smooth and taut without danger
50 of unwinding it from the feed-roll or take-up roll.

Other features and advantages will hereinafter appear.

In the accompanying drawings,

55 Figure 1 is a partial longitudinal sec-

tional view through the printing machine of the present invention.

Figure 2 is a partial cross-sectional view of the same through the printing bed.

Figure 3 is an end view of one form of a
60 carbon-take-up roll which may be employed in the present invention.

Figure 4 is a diagrammatic view illustrating how a plurality of carbons may be interleaved between the work-ply of a longi-
65 tudinally-fan-folded work-web from the sides of the latter.

Figure 5 is a fragmentary plan view of the printing machine shown in Figure 1.

Figure 6 is a fragmentary plan view of
70 the printing machine of the invention arranged with feed-rolls, take-up rolls, and diagonal guides for interleaving carbons between the superposed plies of a longitudi-
75 nally-fan-folded work-web.

The web-printing machine includes a main frame 10, a printing bed 11, and a platen 12 fastened to an arm 13 which is pivoted about a shaft 14 and which has a lower forwardly-extending lug 15 connected
80 to a plate-feeding mechanism generally designated as 16, which mechanism is arranged to move plates 17 from a magazine 18 over the main frame 10 to the printing bed 11. A work-web W may be guided from the
85 rear of the machine over the magazine 18 and along the top of the main frame 10 by rollers 19, 20 and 21. The work-web W may be advanced forwardly over the printing bed by means of rolls 22 and 23, mount-
90 ed at the front of the frame 10 and arranged to be rotated upon upward movement of the platen 12 by engagement with a gear-segment 24, which may be operatively connected to the arm 13 by a bar 25. The
95 construction and operation of the above-mentioned parts of the machine may be substantially the same as for like parts described in my above-mentioned application.

For manifolding a work-web whose super-
100 posed work-ply are not joined at the sides, carbon-feed rolls 30 and a take-up roll 31 may be mounted on opposite sides of the work-web, as shown in Figures 2 and 5. To print with ink on the original or lowermost
105 member of a set of superposed forms, an inked ribbon 32 may be passed across the printing bed under the lowest ply of the superposed work-ply. Carbon from the
110 lowermost feed-roll 30 may be passed be-

tween the lowest and second lowest work-plies, and across the frame to be fastened in any suitable way to the take-up roll 31. Carbon from the second lowest feed-roll may
 5 be passed between the second and third lowest work-plies, and operatively fastened to the take-up roll 31. In like manner, the carbon from the remaining feed-rolls may be passed between the proper web-plies and
 10 fastened to the take-up roll 31, which may have a handle 33 for winding the carbon across the printing bed 11 to bring fresh sections of carbon to position for manifold-
 15 ing the superposed forms. The take-up roll may have a toothed wheel 34, and a spring-pressed dog 35 engaging the toothed wheel to prevent backward rotation of the take-up
 20 roll. Each carbon after passing from its feed-roll 30 may be led over a roll 36 adjacent the top feed-roll. A second roll 37 mounted in the end of a spring-pressed
 25 bracket 38 may be arranged to press the carbons down against the roll 36 which will tend to cause the carbons to be unrolled
 30 evenly under a suitable tension. To provide additional means for holding the carbons satisfactorily taut between the work-plies, spring-actuated friction brakes 39 may be
 35 arranged in a well-known way around stub-shafts 39^a so as to engage the feed-rolls 30 and retard the rotation of the latter. The carbon of the feed-rolls may be wound on hollow spindles 30^a, into which the stub-shafts 39^a may be fitted. The stub-shafts
 40 may be retracted and the feed-rolls easily removed when desired.

To manifold superposed forms of a longitudinally-fan-folded work-web whose plies are connected at the sides, it is impossible
 45 to have the carbon-manifolding elements pass through the work-web from a feed-roll to a take-up roll in the manner just described above. In order to pass the carbon between superposed work-plies of a longi-
 50 tudinally-fan-folded work-web at the printing bed, and then conduct the carbon to the take-up roll, provision is made in the present invention of feed-rolls 40 mounted on each side of the work-web W in front of the
 55 printing bed 11. Carbon from the feed-rolls 40 may pass preferably at right angles to the work-web and between two desired work-plies, and be turned around a diagonal guide 41 of a guide-plate 42 in the opposite direc-
 60 tion to the forward movement of the work-web. After extending past the printing bed 11, a carbon may be turned around a second diagonal guide 43 of the plate 42 and be conducted to a take-up roll 45, mounted on the same side of the work-web W as the
 65 feed-roll 40 from which the carbon started, and in the rear of the feed-roll. The feed-rolls 40 may be arranged with friction brakes 46, like those employed on feed-rolls 30. The take-up rolls 45 may have handles

47, toothed wheels 48 and dogs 49 arranged to function like the similar parts of the take-up roll 31.

In Figure 3 is illustrated an advantageous form of a carbon-take-up roll for use with
 70 longitudinally-fan-folded work-webs. The spool 45, on which the carbon may be wound, is positioned above a guide-roll 51 whose lower edge is approximately level with the top of the printing bed 11. By this con-
 75 struction the carbons may be directed along a substantially level plane to the proper guide-plate 42, by which to rotate the spool and a handle 47 may be positioned high
 80 enough so as to be clear of the main frame 10 or adjacent feed-rolls 40.

By making the diagonal carbon-guides 41 and 43 from a single plate 42 and leaving an opening 42^a therein over the printing
 85 bed 11, an advantageous construction is secured, which gives a very desirable rigidity as well as economy.

By positioning the feed-roll guide 41 in front of the printing bed 11 and the take-up guide 43 in the rear of the printing bed and
 90 arranging to wind new sections of the carbons into position from front to rear, that is, in the opposite direction to the movement of the work-web W, and by arranging the toothed wheels 48 and dogs 49 to prevent the
 95 backward rotation of the take-up-rolls 45, the friction of the forwardly-moving work-plies on the carbons may be utilized to keep the interleaved carbons smooth and taut without danger of unrolling them from the
 100 feed-rolls or the take-up rolls.

Variations may be resorted to within the scope of the invention, and portions of the improvements may be used without others.

Having thus described my invention, I
 105 claim:

1. In a manifold-web-printing machine, in combination, a printing bed over which may be passed a multiple-ply longitudinally-fan-folded work-web having a plurality
 110 of carbons interleaved therewith, a plate mounted at each side of said web, and a pair of diagonal guides arranged on each of said plates, one guide of each pair being positioned in front of said printing bed and
 115 the other in the rear of said printing bed, each pair of said guides being disposed to extend inwardly between two adjoining superposed plies of said work-web for turning one of said carbons which may enter
 120 between said workplies at right angles to the same in the opposite direction of the movement of said work-web and thence away from said work-web at right angles and on the same side from which the carbon entered
 125 said work-plies.

2. In a manifold-web-printing machine, in combination, a printing bed over which may be passed a multiple-ply work-web, a plurality of carbons being interleaved there-
 130

with, a take-up roll mounted at one side of said work-web and arranged for winding thereon all of said carbons, means for preventing backward rotation of said take-up roll, and means for holding said carbons taut as they are wound on said take-up roll including a spring-operated device.

3. In a device of the class described, in combination, a printing bed over which may be passed a multiple-ply work-web, a plurality of carbon-feed rolls mounted at one side of said printing bed, and a single carbon-take-up roll mounted on the opposite side of said printing bed, said feed-rolls and said take-up roll being so mounted that a carbon from each of said feed-rolls may pass over said printing bed and between plies of said workweb in interleaved relation therewith and be wound together on said take-up roll.

4. In a device of the class described, in combination, a printing bed over which may be passed a longitudinally-fan-folded work-web, and means for guiding carbons from a source at the side of said web into interleaved relation with the plies of said work-web at one side of said printing bed, thence over said printing bed and thence out of interleaved relation with said plies.

5. In a manifold-web-printing machine, in combination, a printing bed over which may be passed a multiple-ply work-web, a plurality of carbons being disposed in interleaved relation with the plies of said work-web, a take-up roll mounted at one side of said web and arranged for winding thereon all of said carbons, a toothed wheel fastened at an end of said take-up roll for rotation therewith, a dog arranged for engaging said toothed wheel to prevent backward rotation thereof, a plurality of feed-rolls for said carbons mounted on the opposite side of said work-web in a vertical row, and a tensioning device for holding all of said carbons taut as they are reeled off their respective feed-rolls, said device including a roll, for said carbons to pass over, positioned between the uppermost one of said feed-rolls and work-web, and a spring-held roller arranged for pressing said carbons against said roll positioned between said web and said feed-roll.

6. A device for guiding a carbon from a source at one side of a multiple-ply work-web into and out of parallel interleaved relation with two adjoining plies of said work-web, said device including a thin plate mounted at one side of said work-web and having a diagonal guide-member disposed for turning said carbon to lie parallel with the edges of said work-web between said plies, and a second guide-member at a distance from said first-named guide-member and disposed to turn said carbon transverse-ly of said work-web to the same side as

the source of said carbon, said plate having a portion between said guide-members cut away.

7. In a device of the class described, in combination, a printing bed over which may be passed a longitudinally-fan-folded work-web previously printed with successive forms, a pair of rollers in front of said printing bed arranged for advancing said work-web form by form, a vertical row of carbon-feed rolls disposed on each side of said work-web in front of said printing bed, a carbon-take-up roll arranged for rotation only in a forward direction, disposed on each side of said work-web in the rear of said printing bed, and means for guiding carbons from said feed-rolls into interleaved relation with the plies of said work-web over said printing bed and out of interleaved relation with said plies to be wound up on said carbon-take-up rolls, said guiding means including a stack of plates disposed in the rear of said pair of rollers on each side of said work-web and projecting into the plies thereof, each of said plates having a diagonal edge opposite the adjacent row of feed-rolls, the second diagonal edge being disposed opposite the adjacent take-up roll, and each of said plates further having a portion over said printing bed cut away, the dimensions of said cut-away portions measured along said work-web being greater than the similar demensions of said forms.

8. In a manifold-web printing machine, in combination, a printing bed over which a multiple-ply longitudinally-fan-folded work-web may be fed, means for feeding said web from rear to front, means for taking carbons from feed-rolls at the sides of said work-web in front of said printing bed and interleaving the carbons between the plies of said work-web, whereby the drag of said plies will keep said carbons smooth and taut without danger of unwinding them from said feed-rolls, said means including a take-up roll on each side of said work-web, a stack of plates mounted on each side of said work-web, each plate extending in between two adjoining plies of said work-web and having two integral diagonal guide-members arranged to turn the carbons leading from the adjacent feed-roll to a course parallel with said work-web, thence along with said work-web over said printing bed, and thence out to said take-up rolls, and devices arranged for preventing the carbons from being unwound from said take-up rolls by the forward drag of said work-plies.

9. In a device of the class described, in combination, a printing bed over which may be passed a longitudinally-fan-folded work-web, and means for guiding carbons from a source at a side of said web into interleaved relation with the plies of said work-web at

one end of said printing bed, thence over said printing bed, and thence out of interleaved relation with said plies, said means including a thin plate fastened at a side of
5 said printing bed and having diagonal edges arranged for turning said carbons into and out of parallel interleaved relation with said plies.

10 10. In a manifold-web-printing machine, in combination, a printing bed over which may be passed a multiple-ply, longitudinally-fan-folded work-web having a plurality of carbons interleaved therewith, a plate
15 mounted at each side of said web, and a pair of diagonal guides arranged on each of said plates, one guide of each pair being positioned in front of said printing bed and the other in the rear thereof, each pair of said
20 guides being disposed to extend inwardly between two adjoining superposed plies of said work-web for turning one of said carbons entering between said work-plies at an angle thereto into longitudinal alignment
25 therewith, and thence away from said work-web at an angle thereto upon the same side from which the carbon entered said work-plies.

11. In a device of the class described, in combination, a printing bed over which may
30 be passed a multiple-ply work-web, a plurality of carbon-feed-rolls mounted adjacent said printing bed, a carbon-take-up roll mounted in another position adjacent said printing bed, a carbon-guide-roller between
35 said feed-rolls and said bed, and a second carbon-guide-roller between said take-up roll and said bed to bring the carbons from said feed-rolls into substantially parallelism with said printing bed in condition to be inter-
40 leaved between portions of said work-web and finally wound on said take-up roll.

12. In a manifold-web-printing machine, in combination, a printing bed over which
45 may be passed a multiple-ply work-web, a plurality of carbons being disposed in interleaved relation with the plies of said work-web, a take-up roll mounted at one side of said web and arranged for winding thereon
50 all of said carbons, means to prevent reverse rotation of said take-up roll, a plurality of

carbon-feed-rolls for said carbons mounted on the opposite side of said work-web as a group, and a tensioning device for holding
all of said carbons taut as they are reeled off their respective feed-rolls, said device in-
55 cluding a roll beneath said carbons disposed between the uppermost one of said feed-rolls and said work-web, and a spring-held roller arranged for pressing said carbons upon
60 said roll positioned between said web and said feed-roll.

13. In a device of the class described, in combination, a printing bed over which may
be passed a longitudinally-fan-folded work-
65 web, and means for guiding carbons from a source at the side of said web into interleaved relation with the plies of said work-web at one side of said printing bed, thence
over said printing bed in longitudinal alignment with said work-web, and thence out
70 upon the same side again from interleaved relation with said plies.

14. In a manifold-web-printing machine, in combination, a printing bed over which
75 may be passed a multiple-ply-work-web, a carbon-feed-roll mounted at one side of said web adjacent said printing bed, a carbon-take-up roll also mounted adjacent said
printing bed and adjacent said feed-roll, guide-means located adjacent said printing
80 bed for turning a carbon-sheet fed from said feed-roll towards said take-up roll, and tensioning means to smooth said carbon-sheet.

15. In a manifold-web-printing machine, 85 in combination, a printing bed over which may be passed a multiple-ply work-web, a carbon being interleaved therewith, a carbon-feed-roll for the carbon mounted at one
side of said work-web, a smoothing roller in
90 contact with said carbon between said feed-roll and said printing bed, a spring-pressed idle roller located co-operatively adjacent
said smoothing roller for pressing the carbon against the latter, a take-up roll also
95 mounted at one side of said work-web, and means to prevent reverse rotation of said take-up roll.

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