G. E. PANCOAST.

SHEET DELIVERY MECHANISM.

APPLICATION FILED MAY 17, 1905.

APPLICATION FILED MAY 17, 1905. 918,084. Patented Apr. 13, 1909. SHEETS-SHEET 1. WITNESSES: INVENTOR

G. E. PANCOAST.

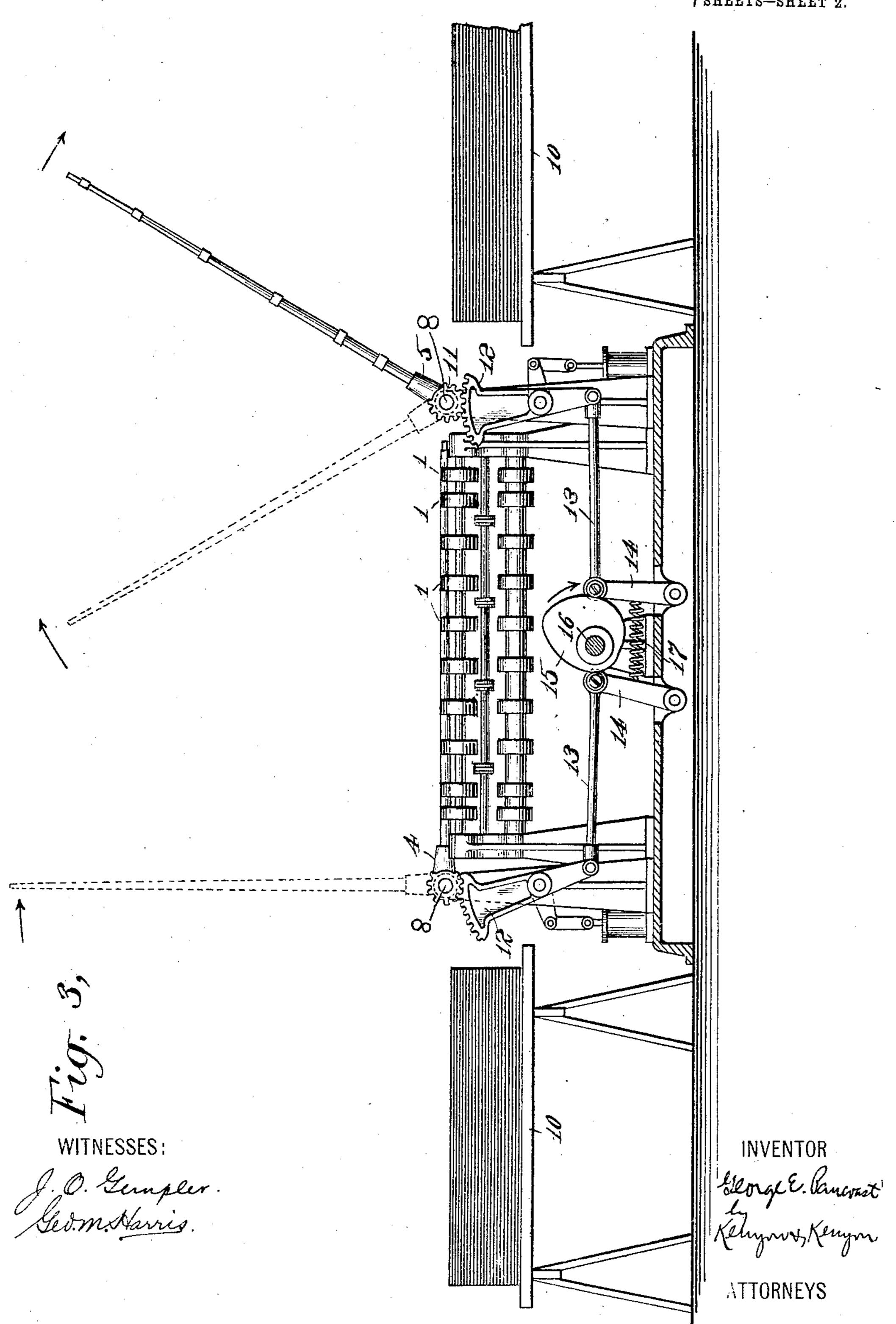
SHEET DELIVERY MECHANISM.

APPLICATION FILED MAY 17, 1905.

918,084.

Patented Apr. 13, 1909.

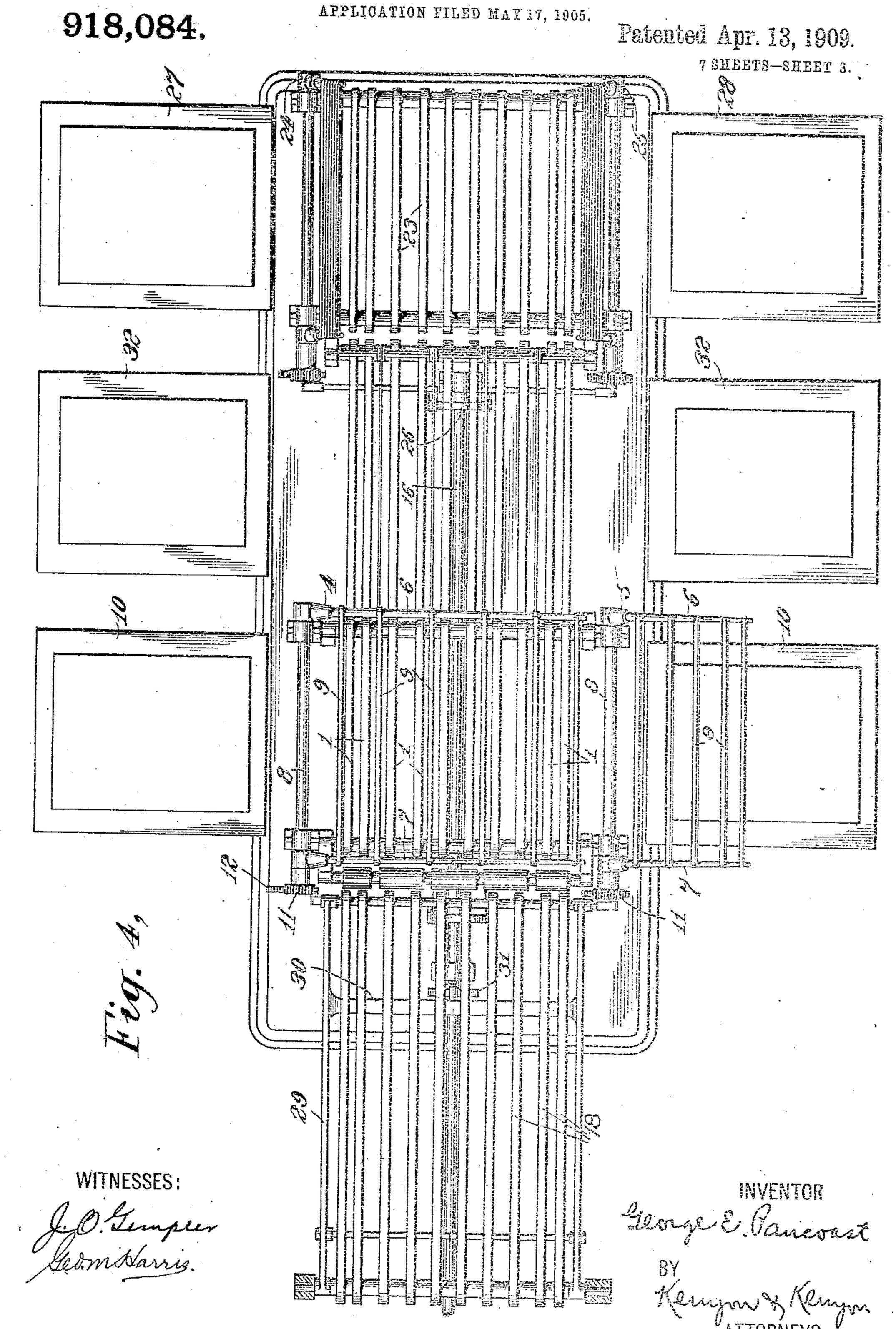
7 SHEETS-SHEET 2.



G. E. PANCOAST.

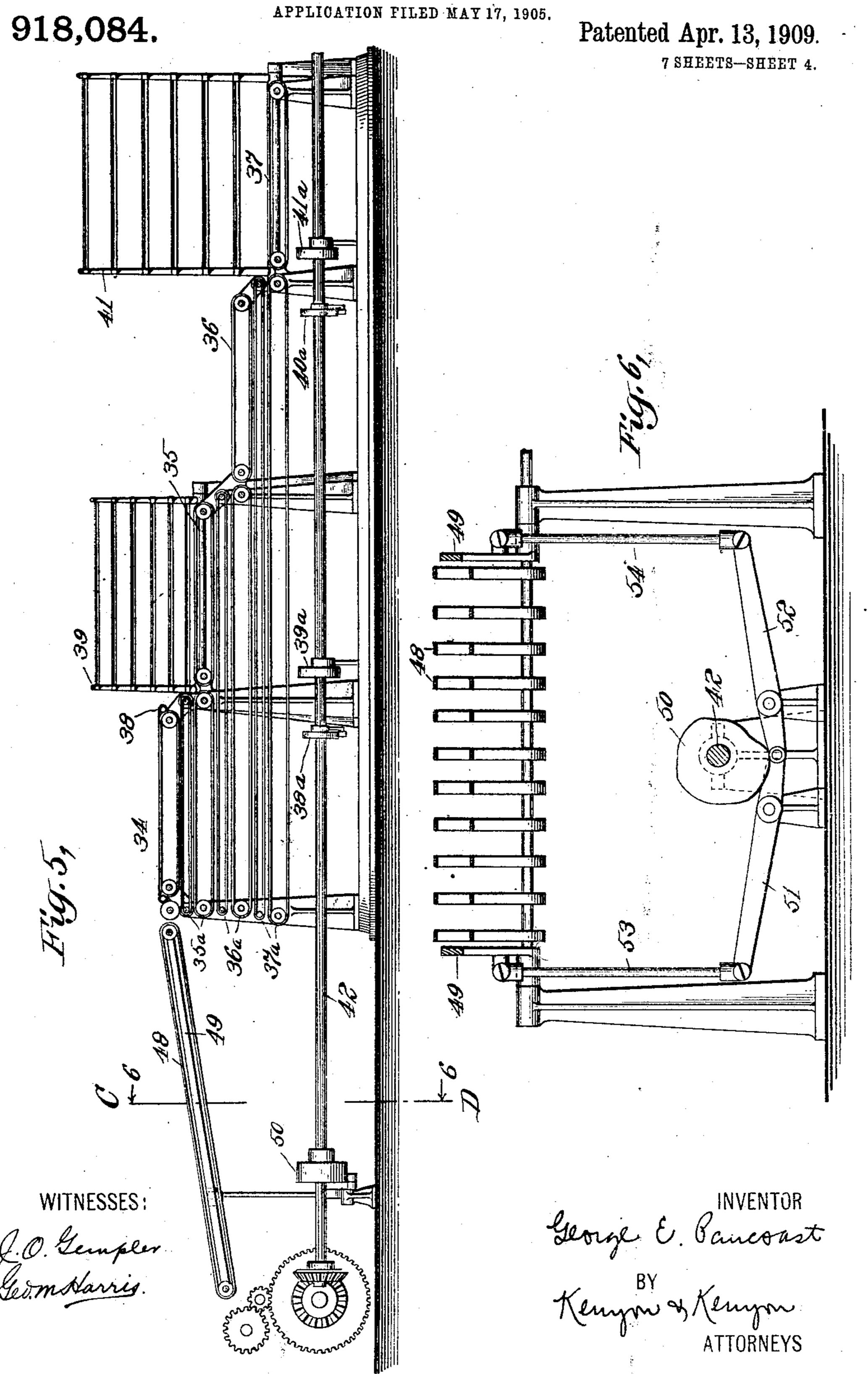
SHEET DELIVERY MECHANISM.

APPLICATION FILED MAY 17, 1905

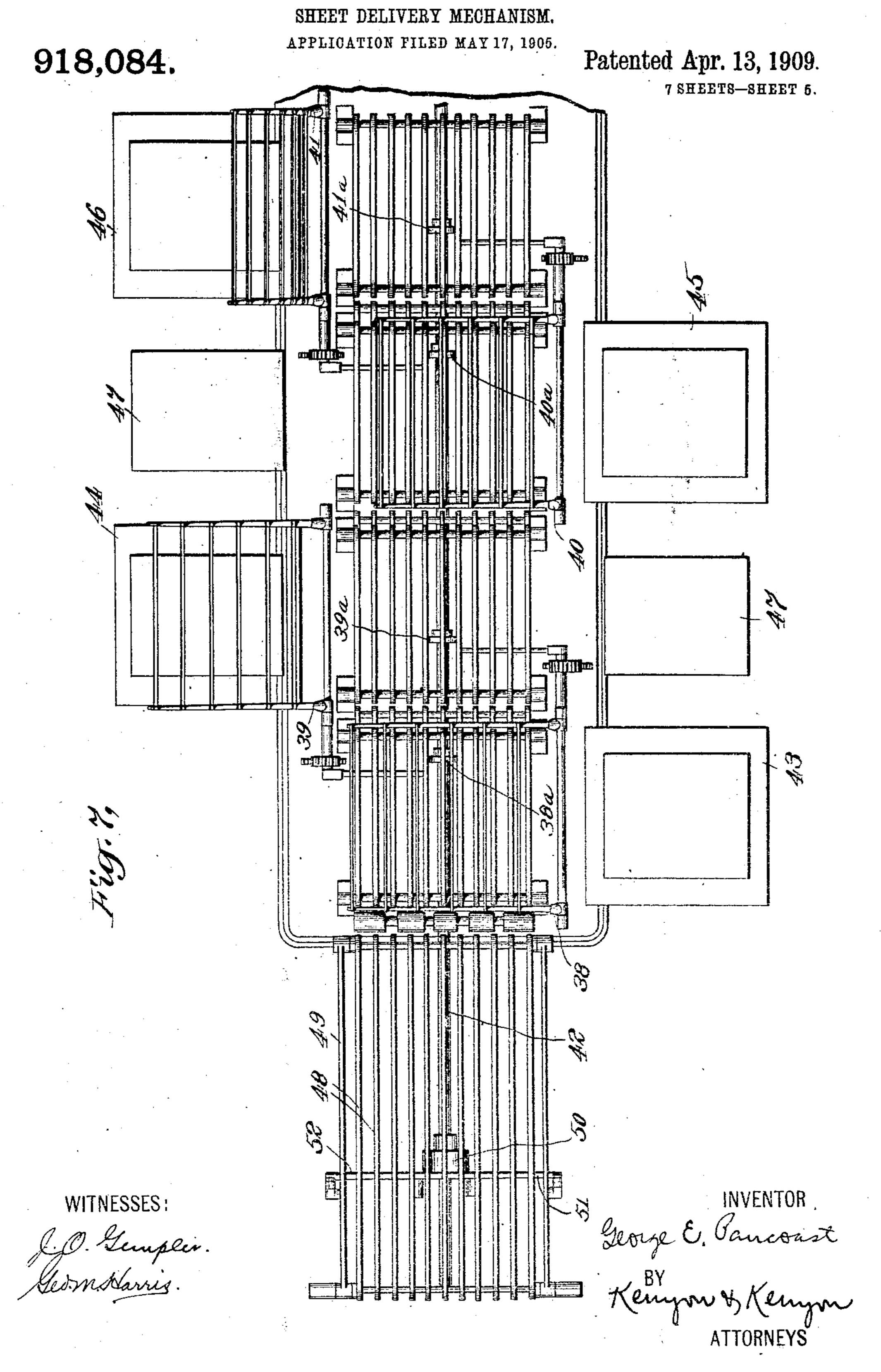


G. E. PANCOAST.

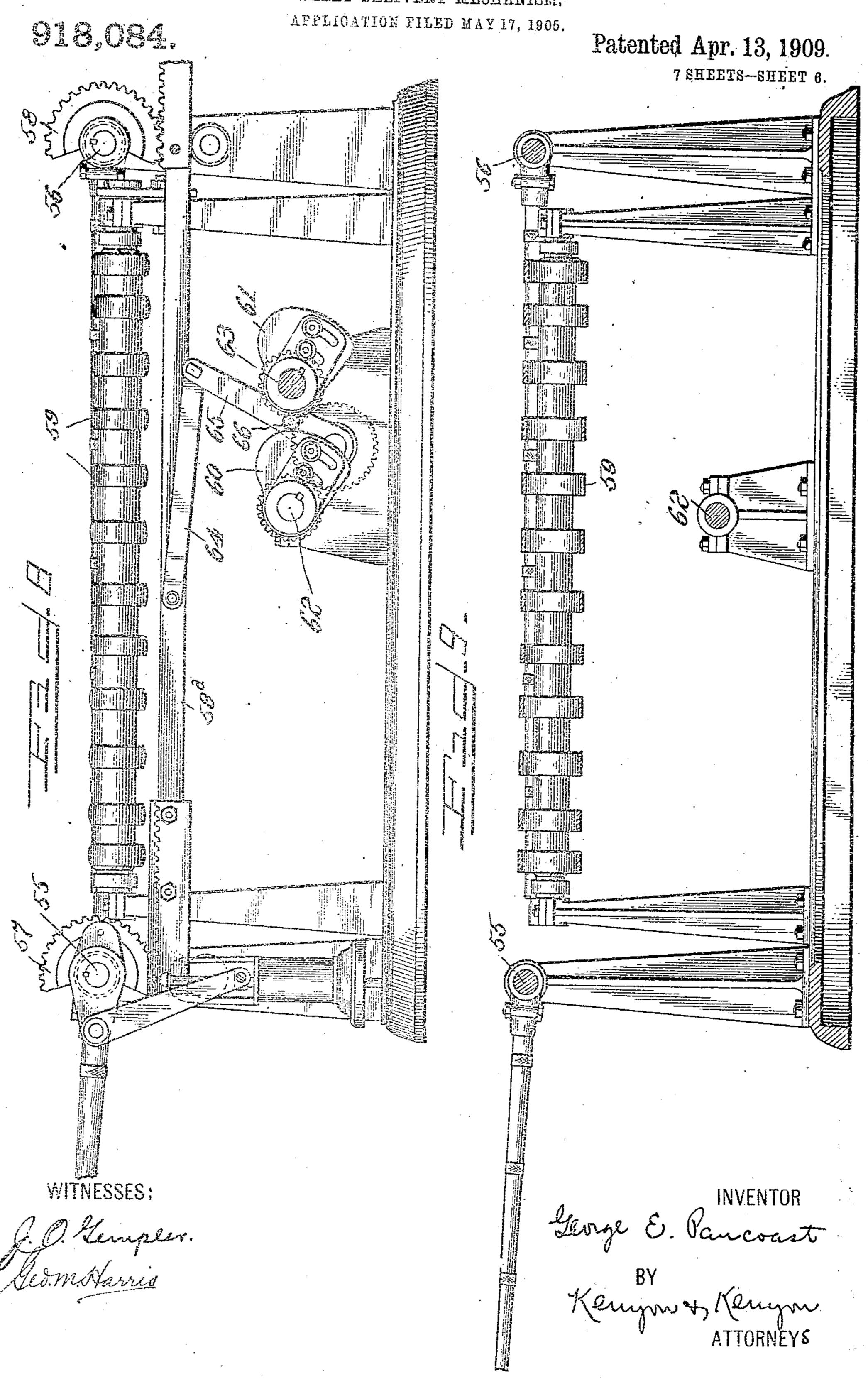
SHEET DELIVERY MECHANISM.
APPLICATION FILED MAY 17, 1905.



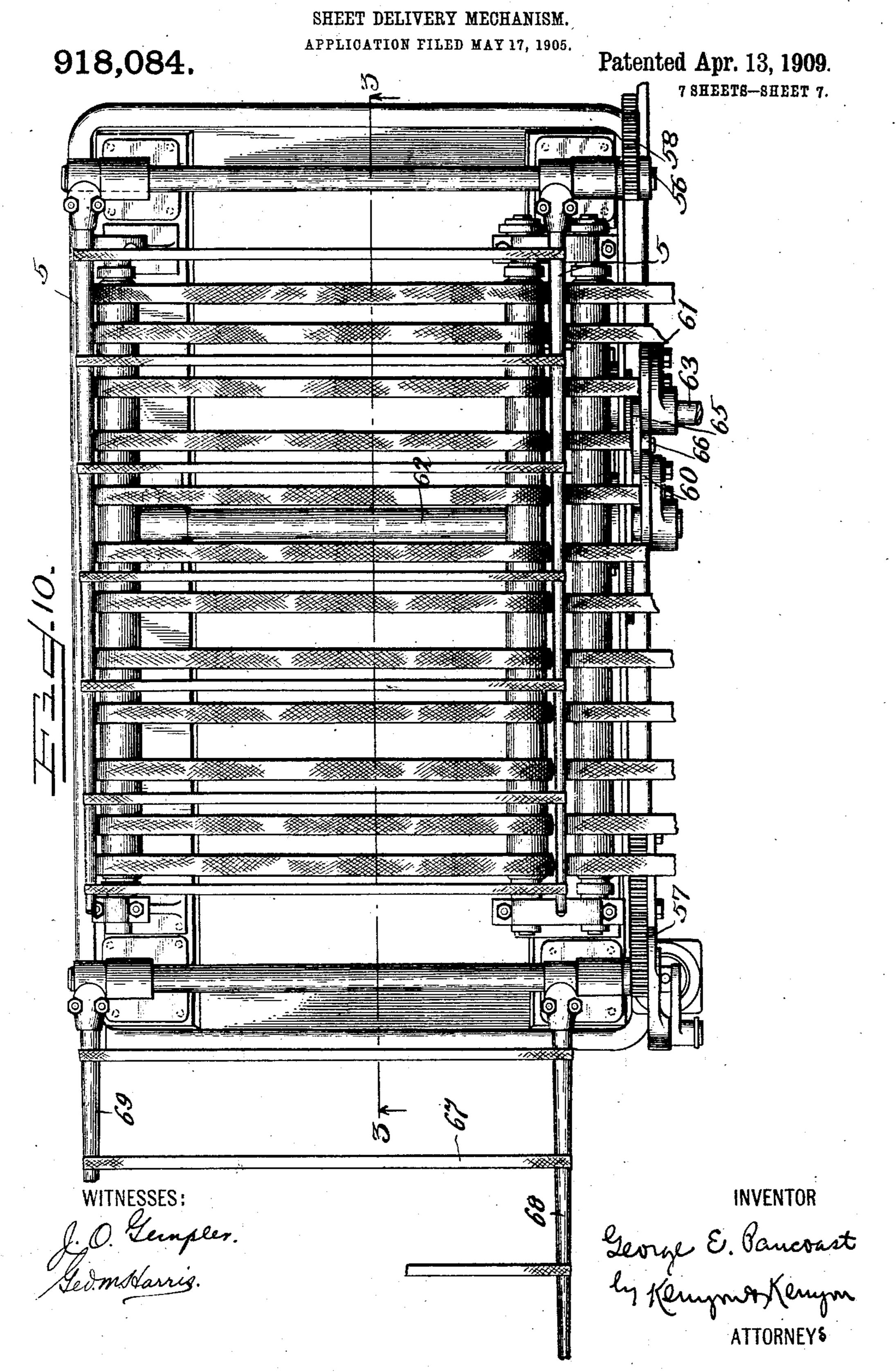
G. E. PANCOAST.



G. E. PANCOAST.
SHEET DELIVERY MECHANISM.



G. E. PANCOAST.



UNITED STATES PATENT OFFICE.

GEORGE E. PANCOAST, OF NEW YORK, N. Y., ASSIGNOR TO AMERICAN LITHOGRAPHIC COMPANY, A CORPORATION OF NEW YORK.

SHEET-DELIVERY MECHANISM.

No. 918,084

Specification of Letters Patent.

Patented April 13, 1909.

Application filed May 17, 1905. Serial No. 260,777.

To all whom it may concern.

Be it known that I, George E. Pancoast, a citizen of the United States, and a resident of New York, county and State of New York, bave invented certain new and useful Improvements in Sheet-Delivery Mechanisms, of which the following is a specification.

This invention relates to sheet delivery mechanisms for printing presses and other 10 machines for manipulating paper; and while as to some of its features it is useful in various relations, it is more particularly directed to the delivery of printed sheets in

flat form. The invention has for an object to provide a sheet delivery mechanism which is adapted to deliver sheets at a high rate of speed; also to provide a machine which is adapted to deliver sheets issuing from a printing press 20 or similar machine in close succession or with slight spaces between them; also to provide a mechanism which is adapted to deliver printed sheets without contacting with the freshly printed surfaces; also to provide 25 a mechanism whereby the operation of placing blank sheets between the printed sheets to prevent offset, or "slip sheeting" as it is termed in the art, may be easily and economically effected. These and other 30 objects of the invention will in part be obvious and in part will be more fully set forth

in the following description.

My invention consists in the novel parts, improvements, and combination herein shown and described

The drawings, which are referred to herein and form a part hereof, illustrate two embodiments of the invention together with modifications of certain features thereof, the same serving in connection with the description herein to explain the principles of the invention.

Of the drawings, Figure 1 is a longitudinal vertical section of a delivery mechanism constructed in accordance with my invention; Fig. 2 is a transverse section of the same on an enlarged scale, the section being taken on the line A, B of Fig. 1, looking in the direction of the arrows 2; Fig. 3 is a longitudinal section of the same on a still larger scale, the section being taken on the line A, B of Fig. 1, looking in the direction of the arrows 3; Fig. 4 is a plan view of the same; Fig. 5 is a longitudinal central section of a modified form of the mechanism;

Fig. 6 is a transverse section of the same on an enlarged scale, the section being taken on the line C, D of Fig. 5, looking in the direction of the arrows 6; Fig. 7 is a plan view of the same; Figs. 8 and 9 are transverse sectional views on an enlarged scale illustrating more in detail certain features of the invention; and Fig. 10 is a plan view of the same.

Like reference numerals refer to like parts.

A delivery mechanism constructed in accordance with one feature of the invention includes in combination, means for conveying the sheets from the printing press or other machine, and a plurality of devices for transferring the sheets from the conveying means to suitable receiving means, at least one of said devices being constructed to transfer its sheets in a direction which may be generally defined as widthwise of the path of the sheets in the conveying means.

75

In accordance with one embodiment of the invention, the device for transferring the sheets widthwise of the conveying means is in the form of an oscillating fly frame, which first moves the sheets at right angles to the width of the sheet path and then swings them over in the direction of the width of the path and deposits them in a reversed position upon a suitable receiving means arranged at the side of the conveying means.

85

In accordance with one feature of the invention, a plurality of the transferring devices are provided, the same operating on opposite sides of the pathway to transfer the sheets in opposite directions and alternately, 90 first on one side of the pathway, and then on the other.

In accordance with another feature of the invention, the conveying means includes a plurality of sheet pathways, with each of sheet pathways, with each of which one or more transferring devices cooperate; and conformably with one embodiment of this feature, means are provided for directing the sheets issuing successively from a single source alternately or in rotation to the several pathways of the conveying means.

Referring now to the particular embodiment of the invention illustrated in Figs. 1, 2, 3, and 4, the sheet conveying means includes a set of tapes 1, which, as shown, are mounted upon a pair of transverse shafts 2 and 3 which receive motion from any suitable source of power. At the opposite sides of the horizontal sheet pathway formed by 110

the upper stretches of the tapes 1 are mounted a pair of sheet transferring devices 4 and 5 (see Figs. 3 and 4). These sheet transferring devices may be constructed in any 5 suitable manner to adapt them to properly coöperate with the sheet conveying means. Where the sheet conveying means comprises sets of tapes, as shown, the sheet transferring means are, preferably and in accordance 10 with one feature of the invention, constructed in the form of fly frames, each consisting of two side arms 6 and 7 fixed at one end to a rock-shaft 8 and carrying a series of transverse members 9 adapted to lie between the 15 upper stretches of the tapes 1 when the fly frame is in its sheet receiving position. The rock-shaft 8 may be operated in any suitable manner to cause the fly frame to move back and forth from its sheet receiving position to 20 a suitable receiving device, as a table 10 located at the side of the conveying means, as shown in plan in Fig. 4. As indicated in the drawing, the shaft 8 is operated by a pinion 11 secured to one end of the shaft, the pinion 25 meshing with an oscillating segment 12 connected by a link 13 with a rock-arm 14 having a roller arranged to run in contact with a suitable cam 15 on a driving shaft 16. As shown, the operating mechanisms for the 30 two sheet transferring devices 4 and 5 are of like construction and coöperate with the same cam 15, the rollers on the rock arms 14 being held in contact with the cam by a tension spring 17 connecting the two rock arms 35 and said cam being so formed as to cause the sheet transferring devices to operate alternately, one being moved into operative position when the other is moved out, and vice versa.

The sheets may be presented to the conveying tapes 1 by any suitable means. As shown, the sheet receiving means includes a set of tapes 18, which receive the sheets from the press or other machine, said tapes being 45 mounted on transverse shafts and receiving motion from any suitable source, as the train

of gears 19 and 20.

Where the sheets are presented to the delivery mechanism in close succession, so 50 that one sheet cannot be taken away by one of the transferring devices 4 and 5 and the other transferring device brought to position in time to receive the next sheet, the sheet conveying means may be provided 55 with a plurality of sheet pathways and means provided whereby the successive sheets issuing from the press are presented to different pathways, one or more sheet transferring devices being arranged to coöperate with 60 each pathway.

As shown, a second pathway is provided in the sheet conveying means, the same consisting in part of the upper and lower sets of cords or tapes 21 and $2\bar{2}$ and in part of a set 65 of tapes 23, which as shown are arranged in 1

the same plane as the tapes 22 and form a continuation of the pathway provided between the tapes 21 and 22. Any suitable means may be provided for transferring the sheets from the tapes 23, or the sheets may be 70 transferred directly from the tapes 22.

As shown, a second set of sheet transferring device 24 and 25 are provided (see Fig. 4), the same being arranged on opposite sides of the set of tapes 23, and as shown being the 75 same in construction as the transferring devices 4 and 5 and operated by similar mechanism from a cam 26 on the shaft 16. The sheets transferred by these devices may be deposited on a suitable sheet receiving 80 means, as the tables 27 and 28 arranged at the opposite sides of the machine. Any suitable means may be provided for presenting the sheets alternately to the two pathways of the conveying means. As shown, 85 the tapes 18 are mounted on a frame 29, which is pivoted at or near the end adjacent to the press so that its opposite end may be moved upwardly and downwardly from a position adapted to direct the sheets into the 90 tapes 1 to a position adapted to direct the sheets between the tapes 21 and 22.

The frame may be operated by any suitable means. As shown, it is provided with an arm or yoke 30 (see Fig. 2), having a stud 95 roller adapted to cooperate with a suitable cam 31 on the shaft 16. In accordance with the construction described, the sheets will be delivered onto four receiving tables, two arranged on each side of the press. To 100 facilitate the operation of slip sheeting, the mechanism is so constructed that the tables at each side of the press will be separated by a space sufficient to receive a supporting table 32 for the slip sheets, so that one 105 operator at each side of the machine will be enabled to insert the slip sheets between the sheets deposited on the two tables at the opposite sides of the slip sheet table.

In accordance with the construction shown 110 in Figs. 5, 6, and 7, the conveying means is provided with four sheet pathways 34, 35, $\bar{3}6$, and 37, the pathways $3\bar{5}$, 36, and 37 being formed in part by the upper and lower sets of tapes 35°, 36°, and 37°, respectively. As 115 shown, a single sheet transferring means is arranged to cooperate with each of the pathways 34, 35, 36, and 37, said transferring devices consisting, as shown, of oscillating fly frames 38, 39, 40, and 41, respectively, (see 120 Fig. 7). As shown, these fly frames are constructed like the fly frames described in connection with the form of device shown in Figs. 1, 2, 3, and 4, and they are operated by similar mechanism from the cams 38^a, 125 39a, 40a, and 41a on the longitudinal drive

shaft 42. As shown, the several sheet transferring devices deposit the sheets upon the tables 43, 44, 45, and 46, said tables being suitably ar- 130

ranged at opposite sides of the machine. As shown, the sheet receiving tables at the opposite sides of the machine are so located that a slip sheet receiving table 47 may be arranged 5 between them. The part of the sheet conveying means which receives the sheets from the press or other machine is preferably constructed to deliver the sheets in succession to the several pathways. As shown, a set of 10 tapes 48 is mounted on a frame 49 adapted to oscillate about one end, said frame being operated at suitable intervals by a cam 50 arranged on the shaft 42, the connections between the cam and the shaft consisting, as 15 shown, of a pair of levers 51 and 52, which bear at one end on the cam 50 and are connected at the other end to the side members of the frame 49 by links 53 and 54 (see Fig. 6). In Figs. 8, 9, and 10 a modified form of

20 operating mechanism for a pair of alternately operating sheet transferring devices is illustrated. As here shown, the rock shafts 55 and 56 of the sheet transferring devices are provided with gear segments 57 and 58, re-25 spectively, which mesh with racks formed at the opposite ends of a transverse bar 58° so that when one transferring device is moved into position to receive the sheet from the conveying tapes 59, the other will be moved 30 to transfer the sheet widthwise of the tape pathway and deposit it at one side of the conveying means, and vice versa. The bar may order that this bar may positively be moved 35 in opposite directions so that the movements of the sheet transferring devices may be positive and definite, irrespective of any resistance which may be encountered thereby, as for example, air pressure upon the sheets be-40 ing transferred, a pair of complementary cams 60 and 61 are provided, the same being mounted on a pair of shafts 62 and 63 positively geared to rotate in unison, as shown. These cams are connected to the bar 58 by 45 link 64 and rock arm 65; having a stud roller 66 arranged between the cams 60 and 61 so as to be positively moved thereby, first in one

direction and then in the other. The cams 60 and 61 are preferably so mounted on their 50 shafts that they may be adjusted angularly as may be required to give the sheet transferring devices the proper relative movement. As shown in Fig. 10, the members 67, which extend between the arms or fingers 68 and 69 55 of the fly frame, may be formed of flexible | 4. A sheet delivery mechanism including 120 cords or tapes suitably stretched to give in combination, means for conveying the them the required sheet supporting power.

mechanism is used in connection with a 60 printing press and the sheets are presented to the sheet conveying means with the printed side up, the sheets may be properly delivered without having their printed faces brought | into contact with any part of the mechanism,

way is formed in part by upper and lower tapes, the upper tapes or cords will be slightly separated from the lower ones so that they will not contact with the sheets except the latter be accidentally lifted as by a current 70 of air.

It will also be observed that a mechanism constructed in accordance with the principles herein explained may be arranged to properly deliver the sheets in flat condition 75 and with great rapidity, even where the sheets leave the printing press or other machine in close succession. Means are afforded also whereby the slip sheets may be inserted where the sheets are delivered from the press 80 with great rapidity.

Other advantages of the construction described will be obvious to those skilled in the art.

My invention in its broader aspects is 85 not limited to the particular constructions herein shown and described, as many changes may be made therein without departing from the main principles of the invention and without sacrificing its chief ad- 90 vantages.

What I claim is:

1. A sheet delivery mechanism including in combination, means for conveying the sheets issuing successively from a single 95 source, and a plurality of devices for transferring the sheets from the conveying means be operated in any suitable manner. In to different points of delivery, one of said devices being constructed to transfer its sheets widthwise of their path in the con- 100 veving means.

2. A sheet delivery mechanism including in combination, means for conveying the sheets issuing successively from a single source, and a plurality of devices for trans- 105 ferring the sheets from the conveying means to different points of delivery, said devices being constructed to transfer the sheets widthwise of their paths in the conveying means.

3. A sheet delivery mechanism including in combination, means for conveying the sheets issuing successively from a single source, and a plurality of devices for transferring the sheets from the conveying means 115 to different points of delivery, said devices being constructed to transfer the sheets in opposite directions widthwise of their paths in the conveying means.

sheets issuing successively from a single It will be observed that where this delivery | source, and a plurality of devices for transferring the sheets from the conveying means to different points of delivery, said devices 125 being constructed to transfer the sheets alternately in opposite directions widthwise of their paths in the conveying means.

5. A sheet delivery mechanism including 65 it being understood that where a sheet path- in combination, means for conveying the 130

sheets issuing successively from a single source, and a plurality of devices for transferring the sheets from the conveying means to different points of delivery, one of said 5 devices being constructed to reverse the sheets and to transfer them widthwise of

their path in the conveying means.

6. A sheet delivery mechanism including in combination, means for conveying the 10 sheets issuing successively from a single source, and a plurality of devices for transferring the sheets from the conveying means to different points of delivery, said devices being constructed to reverse the sheets and 15 to transfer them alternately in opposite directions widthwise of their paths in the conveying means.

7. A sheet delivery mechanism including in combination, means for conveying the 20 sheets having a plurality of sheet pathways, and means for transferring the sheets from each of said pathways to a suitable point of delivery, one of said transferring means being constructed to transfer its sheets 25 widthwise of their path in the conveying

means.

8. A sheet delivery mechanism including in combination, means for conveying the sheets including a plurality of pathways, 30 and means for transferring the sheets from each of said pathways to a suitable point of delivery, said sheet transferring means being constructed to transfer the sheets widthwise, of their respective paths in the conveying 35 means.

9. A sheet delivery mechanism including in combination, means for conveying the sheets including a plurality of pathways, and means for transferring the sheets from 40 each of said pathways to a suitable point of delivery, said sheet transferring means being constructed to transfer the sheets in opposite directions widthwise of their paths

in the conveying means.

45 10. A sheet delivery mechanism including in combination, means for conveying the sheets including a plurality of pathways, and means for transferring the sheets from each of said pathways to a suitable point of de-50 livery, one of said sheet transferring means being constructed to reverse the sheets and to transfer them widthwise of their path in the conveying means.

11. A sheet delivery mechanism including 55 in combination, means for conveying the sheets including a plurality of pathways, and means for transferring the sheets from each of said pathways to a suitable point of delivery, said sheet transferring means being 60 constructed to reverse the sheets and to transfer them in opposite directions widthwise of their paths in the conveying means.

12. A sheet delivery mechanism including in combination, means for conveying the 65 sheets including a plurality of pathways, a

plurality of devices for transferring the sheets from each of said pathways to suitable points of delivery, one of the sheet transferring devices for each pathway being constructed to transfer its sheets widthwise of their path 70

in the conveying means.

13. A sheet delivery mechanism including in combination, means for conveying the sheets issuing successively from a single source, said means including a plurality of 75 pathways, and a plurality of devices for transferring the sheets from each of said pathways to suitable points of delivery, said devices being constructed to transfer the sheets widthwise of their respective paths. 80

14. A sheet delivery mechanism including in combination, means for conveying the sheets including a plurality of pathways, and a plurality of devices for transferring the sheets from each of said pathways to suit- 85. able points of delivery, the devices for transferring the sheets from each pathway being constructed to transfer the sheets in opposite directions widthwise of their path in the conveying means.

15. A sheet delivery mechanism including in combination, means for conveying the sheets including a plurality of pathways, and a plurality of devices for transferring the sheets from each pathway to suitable points 95 of delivery, the sheet transferring devices for each pathway being constructed to reverse the sheets and to deliver them widthwise of

their path in the conveying means.

16. A sheet delivery mechanism including 100 in combination, means for conveying the sheets including a plurality of pathways, and a plurality of devices for transferring the sheets from each of said pathways to suitable points of delivery, the sheet transferring 105 devices for each pathway being constructed to reverse the sheets and to transfer them alternately in opposite directions widthwise of their path in the conveying means.

17. A sheet delivery mechanism including 110 in combination, means for conveying the sheets including a plurality of pathways, and a plurality of devices for transferring the sheets from each of said pathways to suitable

points of delivery.

18. A sheet delivery mechanism including in combination, means for conveying the sheets, and a plurality of devices for transferring the sheets from the conveying means, one of said devices being constructed to de- 120 posit its sheets at a point adjacent to one edge of the conveying means.

, 19. A sheet delivery mechanism including in combination, means for conveying the sheets, and a plurality of devices for trans- 125 ferring the sheets from the conveying means and depositing them at points adjacent to the edges of the conveying means.

20. A sheet delivery mechanism including in combination, means for conveying the 130

sheets, and a plurality of devices for transferring the sheets from the conveying means and depositing them alternately at points adjacent to the opposite edges of the conveying means.

21. A sheet delivery mechanism including in combination, means for conveying the sheets, and a plurality of devices for transferring the sheets from the conveying means, 10 said devices being constructed to reverse the sheets and deposit them at points adjacent

to the edge of the conveying means.

22. A sheet delivery mechanism including in combination, means for conveying the 15 sheets, and a plurality of devices for transferring the sheets from the conveying means, said devices being constructed to reverse the sheets and deposit them alternately at points adjacent to the opposite edges of the convey-20 ing means.

23. A sheet delivery mechanism including in combination, means for conveying the sheets, and a plurality of devices for transferring the sheets from the conveying means, 25 one of said devices being constructed to deposit its sheets at the side of the conveying means and substantially in the plane of their

path therein.

24. A sheet delivery mechanism including 30 in combination, means for conveying the sheets, and a plurality of devices for transferring the sheets from the conveying means and depositing them alternately at opposite sides of the conveying means and substan-35 tially in the plane of their path in the conveying means:

25. A sheet delivery mechanism including in combination, means for conveying the sheets, and a plurality of devices for trans-40 ferring the sheets from the conveying means, said devices being constructed to reverse the sheets and to deposit them at the side of the conveying means and substantially in the

plane of their path therein.

45 26. A sheet delivery mechanism including in combination, means for conveying the sheets including a plurality of sheet pathways, and means for transferring the sheets from each of said pathways, one of said sheet transferring means being constructed to deposit its sheets at a point adjacent to the edge of the conveying means.

27. A sheet delivery mechanism including in combination, means for conveying the sheets, and means for transferring the sheets 55 sheets including a plurality of sheet pathways, and means for transferring the sheets from each of said pathways and depositing them at a point adjacent to the edge of the

conveying means.

60 28. A sheet delivery mechanism including in combination, means for conveying the sheets including a plurality of sheet pathways, and means for transferring the sheets from each of said pathways and depositing

them alternately at points adjacent to the 65 opposite edges of the conveying means.

29. A sheet delivery mechanism including in combination, means for conveying the sheets including a plurality of sheet pathways, and means for transferring the sheets 70 from each of said pathways, said sheet transferring means being constructed to reverse the sheets and deposit them at the side of the conveying means.

30. A sheet delivery mechanism including 75 in combination, means for conveying the sheets including a plurality of sheet pathways, and a plurality of devices for transferring the sheets from each of said pathways. one of said devices being constructed to de- 80 posit its sheets at the side of the conveying means and substantially in the plane of their

path therein.

31. A sheet delivery mechanism including in combination, means for conveying the 85 sheets including a plurality of sheet pathways, and a plurality of devices for transferring the sheets from each of said pathways, the devices for transferring the sheets from each of said pathways being constructed to 90 deposit the sheets alternately at opposite sides of the pathway and in substantially the plane thereof.

32. A sheet delivery mechanism including in combination, means for conveying the 95 sheets, and a plurality of devices for transferring the sheets from the conveying means, one of said devices consisting of an oscillating fly frame constructed to transfer its sheets widthwise of their path in the convey- 100

ing means.

33. A sheet delivery mechanism including in combination, means for conveying the sheets, and a plurality of oscillating fly frames for transferring the sheets from the convey- 105 ing means widthwise of their path therein.

34. A sheet delivery mechanism including in combination, means for conveying the sheets, and a plurality of oscillating fly frames constructed to transfer the sheets in opposite 110 directions widthwise of their paths in the conveying means, the sheet engaging portions of said fly frames being arranged parallel with the line of movement of the sheets in the conveying means.

35. A sheet delivery mechanism including in combination, means for conveying the from the conveying means widthwise of their path of movement therein, the sheet engag- 120 ing portions of said sheet transferring means being normally arranged in lines parallel to the line of movement of the sheets in the con-

veying means. 36. A sheet delivery mechanism including 125 in combination, means for conveying the sheets including a plurality of sheet pathways, means whereby the sheets are pre-

sented to the said pathways successively, and a plurality of devices for transferring the sheets from the conveying means, one of said devices being constructed to deposit its sheets at the side of the conveying means.

37. A sheet delivery mechanism including in combination, means for conveying the sheets including a plurality of pathways, means whereby the sheets are presented to the pathways successively, and a plurality of devices for transferring the sheets from the conveying means and depositing them at the side of the conveying means.

38. A sheet delivery mechanism including in combination, means for conveying single sheets in flat form, and a plurality of devices for transferring the sheets from the conveying means to suitable points of delivery, said devices being constructed to deposit the sheets in separate adjacent piles and to leave the top of said piles and the space between

them unobstructed whereby slip sheets may be readily inserted between the sheets deposited on each pile.

39. A sheet delivery mechanism including 25 in combination, means for conveying single sheets in flat form, a plurality of devices for transferring the sheets from the conveying means and depositing them in a plurality of unobstructed adjacent piles at each side of 30 the conveying means, whereby slip sheets may be readily inserted between the sheets deposited on the piles at each side of the machine.

In testimony whereof I have signed my 35 name to this specification, in the presence of two subscribing witnesses.

GEORGE E. PANCOAST.

Witnesses:
W. P. Ten Eyck
JACOB MILLER