

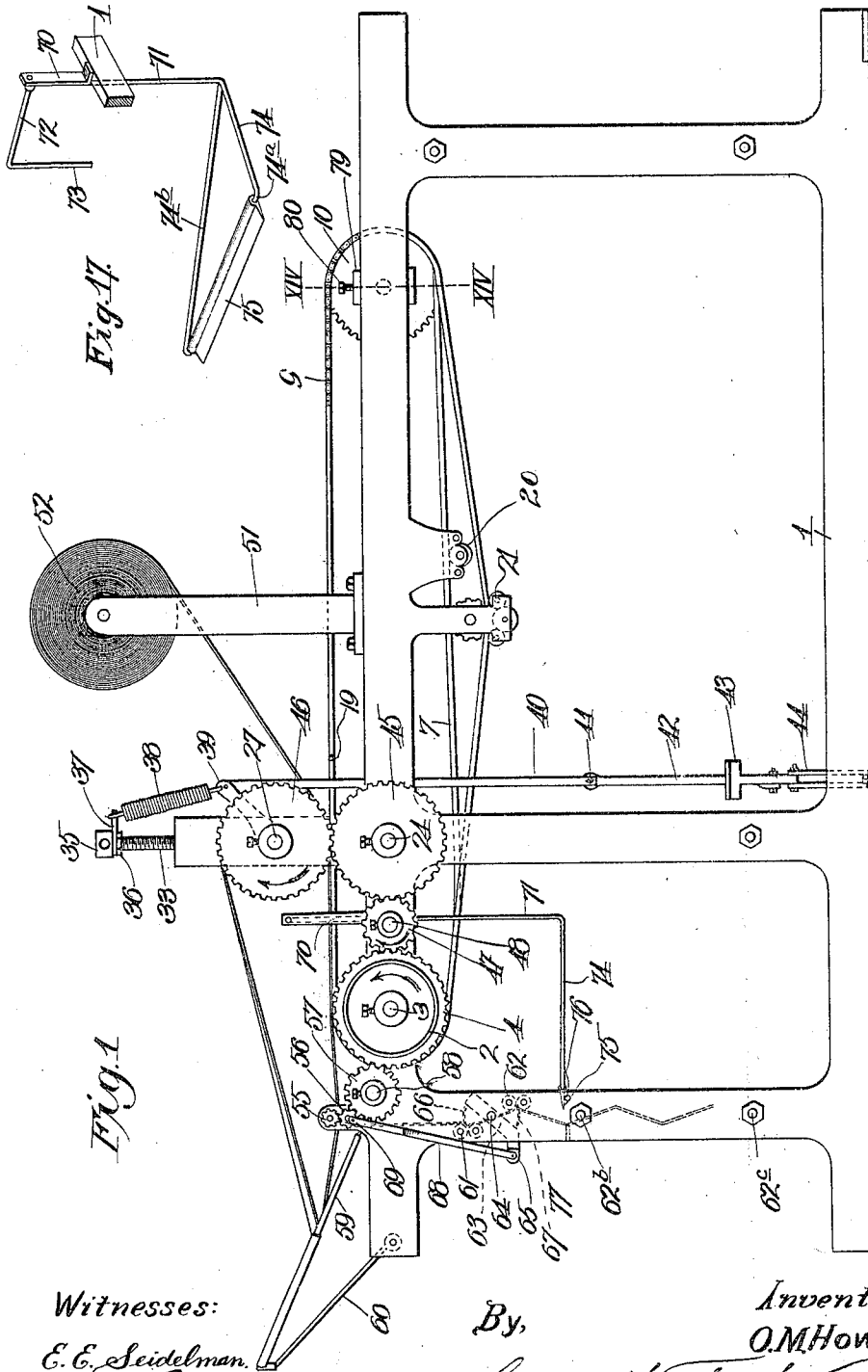
O. M. HOWARD.
PRINTING PRESS.

APPLICATION FILED AUG. 25, 1908.

Patented July 25, 1911.

5 SHEETS-SHEET 1.

998,848.



Witnesses:

E. E. Seidelman.
H. C. Rodgers.

By,

George C. Howard Atty.

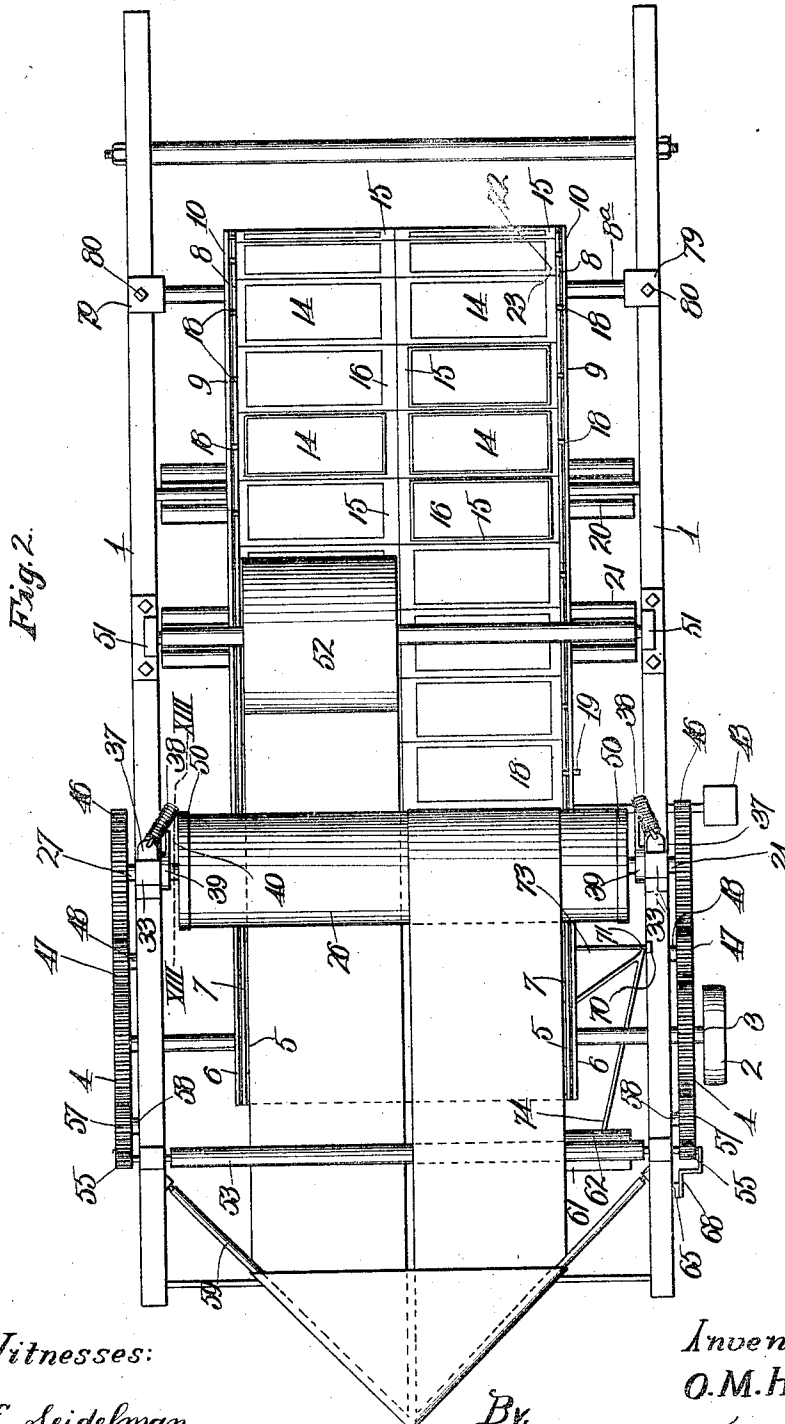
Inventor

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5 SHEETS—SHEET 2.



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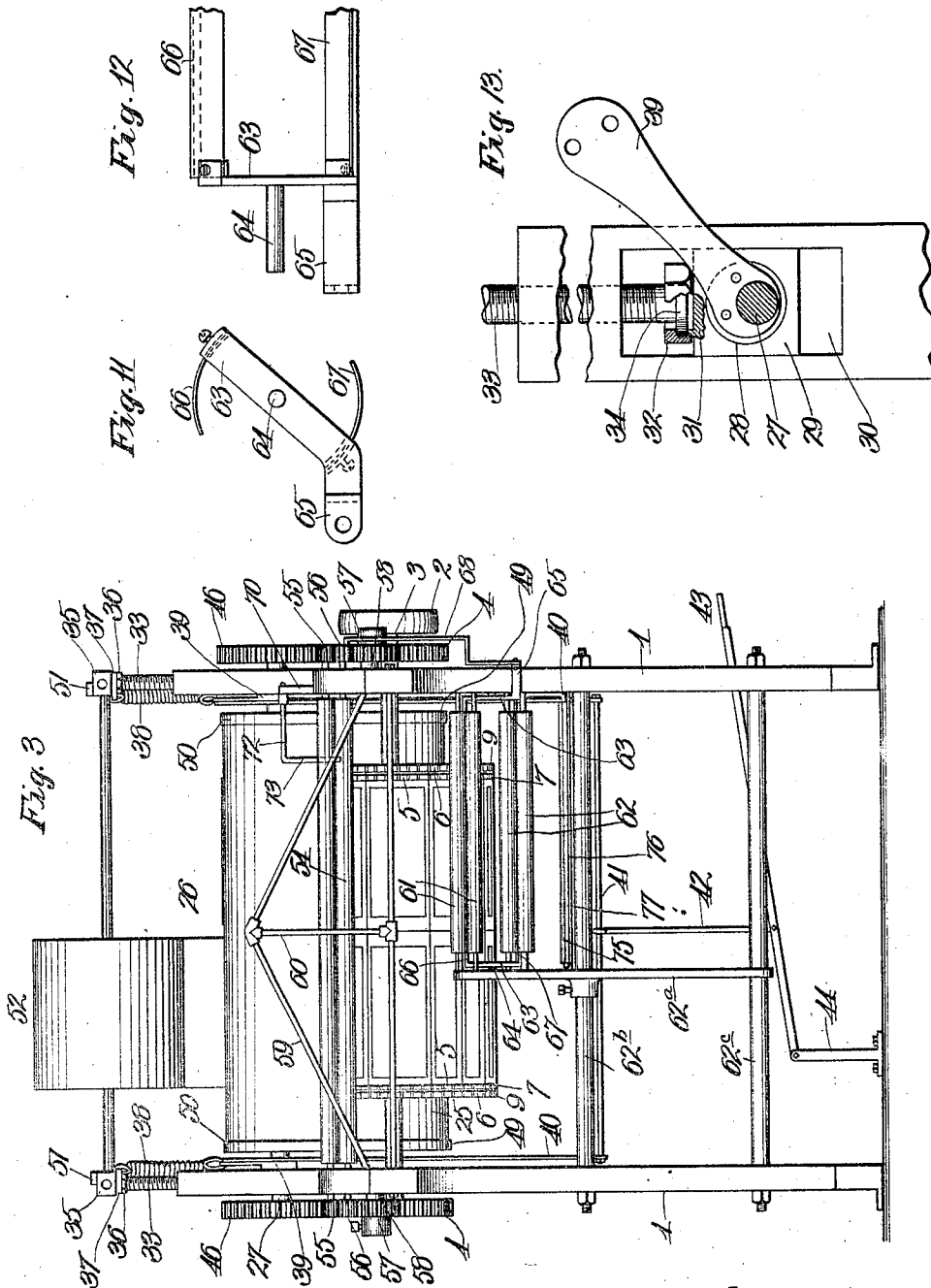
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5 SHEETS-SHEET 3.

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Witnesses:

E. E. Seidelman.
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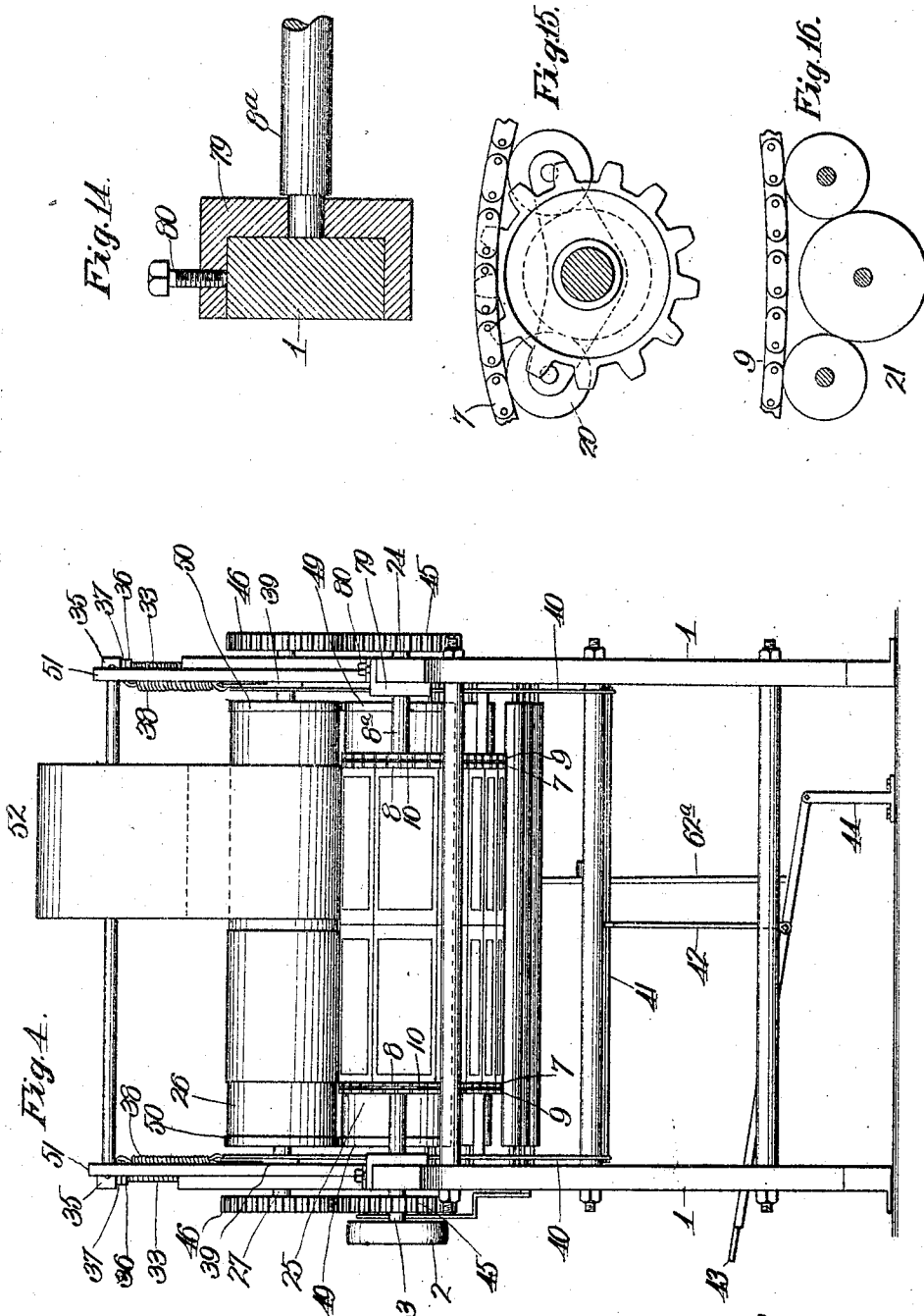
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UNITED STATES PATENT OFFICE.

ORANGE M. HOWARD, OF KANSAS CITY, MISSOURI.

PRINTING-PRESS.

998,848.

Specification of Letters Patent.

Patented July 25, 1911.

Application filed August 25, 1903. Serial No. 450,226.

To all whom it may concern:

Be it known that I, ORANGE M. HOWARD, 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 Printing-Presses, of which the following is a specification.

This invention relates to printing presses and has for its object to produce a machine for printing both sides of a web of paper and creasing such printed web in parallel lines in opposite directions so that it may be collapsed along such lines like an accordion, to book form with alternate folds forming the hinge points for the leaves.

A further object is to produce means for severing the printed web coincidentally with certain of said creases so that the books shall contain an equal number of leaves.

A further object is to produce a pair of endless conveyers, one equipped with a sectional bed adapted to carry the type or printing plates and the other with frames for printing the border lines and carrying when desired, cross bars for printing dashes, headings, lines or page embellishments.

A further object is to produce means for separately inking the type or printing plates and the border, in different colors if desired.

With these general objects in view the invention consists in certain novel and peculiar features of construction and organization as hereinafter appear; and in order that it may be fully understood reference is to be had to the accompanying drawings, in which—

Figure 1 is a side view of a printing press embodying my invention. Fig. 2 is a top plan view of the same. Fig. 3 is a front view of the same. Fig. 4 is a rear view of the same. Fig. 5 is an enlarged plan view of a part of the machine. Fig. 6 is a section on the line VI—VI of Fig. 5. Fig. 7 is a section of a part of one of the printing border-frames. Fig. 8 is a sectional view of a bed-section of the endless conveyer for the printing plates. Fig. 9 is a vertical section showing the jointed relation between adjacent members of the printing-plate-carrying bed sections. Fig. 10 is a plan view of the construction shown by Fig. 9. Fig. 11 is an enlarged end view of the oscillatory creaser. Fig. 12 is a side view of the same. Fig. 13 is an enlarged view on line XIII—XIII of Fig. 2. Fig. 14 is an enlarged section on

the line XIV—XIV of Fig. 1. Fig. 15 is an enlarged view of a part of the inking mechanism for the printing plates. Fig. 16 is an enlarged detail of a part of the mechanism for inking the border frames. Fig. 17 is a detail perspective view of the movable cutting blade and the swing frame carrying the same.

In the said drawings, 1 indicates a suitable frame.

2 indicates a drive belt-wheel mounted upon one end of a transverse shaft 3 journaled in the frame and provided at opposite sides of the same with similar drive gear wheels 4 and secured upon the shaft at equal distances from its center by preference, is a pair of sprocket wheels 5 and outward of said sprocket wheels and also secured upon said shaft are sprocket wheels 6. The sprocket wheels 5 are connected by endless chains 7 extending longitudinally of the machine and parallel with each other to a pair of sprocket wheels 8 on a shaft 8^a suitably journaled as hereinafter explained, wheels 6 being also connected by parallel chains 9 to a similar pair of sprocket wheels 10 on shaft 8^a.

11 indicates a series of bed plates provided with trunnions 12 journaled in opposite links of chain 7, the front edge of each bed plate being provided with a plurality of arc-shaped passages 12^a struck from the lower front corner of the plate and receiving slidingly arc-shaped arms 13 projecting rearwardly and downwardly from the upper rear corners of the adjacent plate, as shown clearly in Figs. 9 and 10, this arrangement connecting the plates reliably together without interfering with the relative change of position which occurs as the carrying chains 7 round the sprocket wheels 5 and 8, the said bed plates turning pivotally to some extent on their trunnions 12 as they round said sprocket wheels with said chains.

14 indicates two series of printing plates upon the bed plates or sections 11, a pair of said printing plates being arranged in alignment with each other and transversely across each bed plate or section, the series of printing plates at one side of the longitudinal center of the conveyer being adapted to print one side of a web of paper hereinafter referred to, and the other series the opposite side of such web, the printing plates of each series being spaced a slight distance apart. The two series of plates are also

spaced apart and at equal distances from the longitudinal center of the conveyor, the inner ends of the plates being preferably the head ends though the outer ends of said plates may be the head ends if desired.

The printing plates are of uniform length and width though in practice some of them will consist of two sections as shown in Figs. 5 and 6, and in some cases more than two sections, but in any event the length of the plates whether composed of one or a plurality of sections, will be the same.

15 indicates rectangular border frames adapted to snugly inclose the printing plates and rest upon the underlying bed plates or sections when traveling in the plane of the upper strands of the conveyers, the said frames being provided with border ribs 16 to print borders around the imprints made by the printing plates.

17 indicates transverse ribs which may be employed singly or in multiple to connect opposite ribs of the border frame between sections of a printing plate as indicated in Figs. 5 and 6, these ribs 17 being adapted to print dashes, headings, etc. or they may be employed in such form and in such proportion as to print symbols or embellishments of any kind.

Each frame 15 is provided centrally of its ends with outwardly projecting step-shaped trunnions 18, said trunnions being step-shaped so as to bridge over or under and thus avoid chains 7, and said trunnions pivotally engage certain links of chains 9, and one or more of said trunnions is provided with an extension 19 for a purpose which hereinafter appears. The lower strands of chains 7 and consequently the lower strand consisting of bed plates 11 constituting the sectional bed and the printing plates 14 carried thereby extend over and in engagement with an inking mechanism 20 of any suitable type. The lower strands of chain 9 and hence the border plates 15 are permitted to sag below the plane of the lower strands of chains 7 so as to space the printing plates and border frames apart to permit them to be separately inked, this being especially desirable where ink of two different colors is to be employed, 21 representing the inking mechanism for the said border frames. To maintain the border frames in proper operative relation to each other when spaced from and not supported by the sections 11 of the bed, they are connected together in the same manner that said bed sections are connected, that is to say each border frame is provided with arc-shaped openings 22 for the reception of correspondingly shaped arms 23 projecting rearwardly from the adjacent bed-section.

From the foregoing it will be apparent that after the printing plates and border frames are separated and individually inked

by inking mechanisms 20 and 21 respectively, they will reassume their original relation as they pass upwardly around sprocket wheels 10 and thus be prepared in their forward travel to simultaneously perform their printing function.

24 is a transverse shaft arranged horizontally and arranged in frame 1 between the upper and lower strands of the conveyers and mounted rigidly on said shaft is a roller 25 having its topmost point in the plane or the underside of the upper strands of chains 7 and 9 and the bed plates or sections to provide resistance to downward movement of said parts when the paper web is pressed down upon the printing plates and border frames by means of the roller 26 overlying roller 25 and likewise mounted on a transverse shaft 27, provided with circular cams 28 journaled in bearing boxes 29 slidably mounted in vertical slots 30 in the frame. Said bearing boxes are equipped with upwardly projecting externally threaded circular flanges engaged by flanged nuts 32, and extending through said nuts and the overlying parts of the frame are adjusting screws 33, said screws being equipped at their lower ends with heads 34 swiveled in said nuts and at their upper ends with heads 35 by which they are turned for the purpose of vertically adjusting boxes 29.

36 are nuts mounted on screws 33 and between said nuts and heads 35 the screws are provided with rearwardly projecting arms 37 connected by retractile springs 38 with levers 39 of shaft 27, the tendency of the springs 38 being to hold the levers 39 yieldingly elevated and the circular cams 38 in such position that shafts 27 are depressed to hold roller 26 likewise depressed. For the purpose of raising roller 36 to an inoperative position, the levers 39 are provided with a pivotally depending rod 40 connected at their lower ends by a cross rod 41, connected by a link 42 to a treadle or foot-lever 43 fulcrumed on a bracket 44 bearing a fixed or rigid relation with frame 1. Mounted upon the ends of shafts 24 and 27 are intermeshing gear wheels 45 and 46 respectively and engaging gear wheels 45 are idler gear pinions 47 journaled upon stub-shafts 48 projecting outward from the sides of frame 1, said gear wheels 48 meshing with drive gears 4 to be operated by the same and hence impart rotation to rollers 25 and 26 as indicated by the arrows in Fig. 1, it being noticed in this connection that to reliably space rollers 25 and 26 apart to properly accommodate the passage between them of the superposed printing bed plates or sections, printing plates, border frames, and paper web engaging spacing bands 49 and 50 are secured on the ends of said rollers respectively.

51 indicates a pair of standards mounted on opposite sides of the frame and forming

parent that I have produced a printing press embodying the features of advantage enumerated as desirable in the statement of the object of the invention, and while I have illustrated and described the preferred embodiment of said invention, I reserve the right to make such changes in its form, proportion, detail construction and organization as properly fall within the spirit and scope of the appended claims.

Having thus described the invention what I claim as new and desire to secure by Letters Patent, is:—

1. A printing press, comprising a suitable frame, a pair of shafts journaled therein, a pair of sprocket wheels journaled on each shaft, endless chains connecting said sprocket wheels, bed-plate sections linked together and pivotally carried by said chains, a pair of sprocket wheels mounted on each of the shafts at the outer sides of the first-named sprocket wheels, a pair of endless chains connecting said outer sprocket wheels, and border frames pivoted at their opposite ends to the last-named chains and linked together and adapted at times to rest flatly down upon the said bed-plate sections.

2. A printing press, comprising a suitable frame, a pair of shafts journaled therein, a pair of sprocket wheels journaled on each shaft, endless chains connecting said sprocket wheels, bed-plate sections linked together and pivotally carried by said chains, a pair of sprocket wheels mounted on each of the shafts at the outer sides of the first-named sprocket wheels, a pair of endless chains connecting said outer sprocket wheels, border frames pivoted at their opposite ends to the last-named chains and linked together and adapted at times to rest flatly down upon the said bed-plate sections, and means for spacing the first-named chains and bed-plates and the last-named chains and border frames apart for a part of their travel.

3. A printing press, comprising a suitable frame, a pair of shafts journaled therein, a pair of sprocket wheels journaled on each shaft, endless chains connecting said sprocket wheels, bed-plate sections linked together and pivotally carried by said chains, a pair of sprocket wheels mounted on each of the shafts at the outer sides of the first-named sprocket wheels, a pair of endless chains connecting said outer sprocket wheels, border frames pivoted at their opposite ends to the last-named chains and linked together and adapted at times to rest flatly down upon the said bed-plate sections, means for arching the lower strand of the first-named chains and the bed-plate sections carried thereby, and means for depressing the lower strand of the second pair of chains and the border frames carried thereby.

4. A printing press, comprising a suitable

frame, means carried by said frame for feeding a web of paper continuously, means for making imprints upon the same, two pairs of rollers arranged at opposite sides of the paper after it has received the imprints, and an oscillatory creaser arranged between said pairs of rollers and provided with creasing blades at opposite sides of the web of paper and parallel with said rollers to simultaneously press the paper in opposite directions between said pair of rollers and crease it in parallel lines in opposite directions at opposite sides of each imprint thereon.

5. A printing press, comprising a suitable frame, means carried by said frame for feeding a web of paper continuously, means for making imprints upon the same, means for creasing said paper in parallel lines and opposite directions alternately, a stationary cutting blade, a movable cutting blade, and a traveling pin to operate the movable cutting-blade and cause the same to cooperate with the stationary blade in severing the paper web along certain of its crease lines.

6. A printing press, comprising a suitable frame, a pair of superposed driven rollers, an endless conveyer having its upper strand interposed between said rollers and embodying bed-plate sections pivotally linked together, a pair of printing plates arranged end to end upon each bed-plate section and transversely of the conveyer, a shaft suitably journaled and equipped with a paper roll above one of the series of printing plates rearward of said pair of rollers, a second pair of driven rollers forward of and parallel with the first-named pair and adapted to receive the paper web extending forwardly from the roll after it has passed between the upper roller of the first-named pair and the underlying printing plates, and a guide at the front end of the frame for engagement by the paper web after it has passed between said second pair of rollers to cause the paper web to travel laterally and then rearwardly in the vertical plane of the other series of printing plates to permit the paper to extend thence rearwardly over and around the upper roller of said first-named pair of rollers and forwardly between the same and said second series of printing plates and then forwardly between said second pair of rollers.

7. A printing press, comprising a suitable frame, a pair of superposed driven rollers, an endless conveyer having its upper strand interposed between said rollers and embodying bed-plate sections pivotally linked together, a pair of printing plates arranged end to end upon each of said bed-plate sections and transversely of the conveyer, a shaft suitably journaled and equipped with a paper roll in the vertical plane of one of the series of printing plates and rearward of said

journals for the shaft or spindle of a roll 52 of printing paper, the paper web extending downwardly and forwardly under roller 26 vertically over the left hand series of printing plates and border frames, it being noticed that the width of the paper is slightly less than half the length of the transversely arranged bed plates or sections. After passing under roller 26, the paper web extends forwardly and between a pair of horizontal rolls 53 and 54 journaled in the frame 1 and equipped at their ends with intermeshing gear wheels 55 and 56 respectively, the last-named gear wheels being engaged by idler gear wheels 57 meshing with drive gears 4 and journaled on stub shafts 58 projecting outwardly from the frame. From rolls 53 and 54 the paper web extends under the left hand arm of the V-shaped paper guide frame 59 secured to the frame 1 at its ends and braced at its apex from said frame by a brace 60. The paper guide frame 59 is preferably pitched upwardly toward its apex end and its arms are disposed at angles of forty-five degrees to the longitudinal center of the machine and at ninety degrees to each other so that the paper web shall extend upward and over said arm transversely of the machine and then over and under the companion arm, and thence extend upwardly and rearwardly over and around and under roller 26, and thence forwardly and again between rolls 53 and 54 and from the latter downwardly between a pair of superposed rolls 61 and a pair of similar rolls 62, both sets of rolls being journaled at opposite ends in frame 1, and a bar 62^a secured on tie-rods 62^b and 62^c connecting the sides of the frame. An oscillatory creaser is also journaled in frame 1 and bar 62^a centrally between said sets of rolls 61 and 62 and is constructed as follows:—63 is a pair of parallel bars provided with outwardly projecting trunnions 64 engaging the frame and said bar 62^a, and forwardly projecting angle ears 65, and connected by a pair of thin creasing plates 66 and 67, of such form and arrangement that, when the creaser is oscillated, they press the paper extending through the creaser between them, respectively between rolls 61 and rolls 62, the result of this action being to simultaneously produce parallel creases in opposite directions in the paper web, the oscillation of the creaser being effected by links 68 pivotally connecting ears 65 with wrist-pins 69 of gear wheels 56, and in this connection it will be understood that the parts are so proportioned that the creases are formed in the web of paper centrally between the imprints thereof, it being further noted that by causing the paper to travel as explained, its position is reversed as it passes over the right-hand series of printing plates and border frames in order that such series of

printing plates and frames shall produce impressions upon the unprinted side of the web.

Assuming that it is desired to produce a booklet containing the same number of leaves as there are bed plates or sections, there will be one trunnion-extension 19 (see Fig. 5), for the purpose of operating the knife mechanism as it passes the latter, said knife mechanism being constructed as follows:—70 indicates a standard erected rigidly upon one side of frame 1 and pivoted to the upper end of the same is a swing frame adapted to swing in a plane parallel with the sides of frame 1, and provided at its upper end with an inwardly projecting arm 72 terminating in a depending portion 73. The lower end of arm 71 is provided with a forwardly projecting arm 74 having a laterally projecting arm 74^a which in length is about equal to the width of the paper web and occupies the same vertical plane as the creased portion of the web, the inner end of arm 74^a being connected to arms 71 and 74 by the oblique brace 74^b, it being noted that the depending portion 73 occupies the path of travel of the trunnion extension 19 so as to be struck and swung forward by said trunnion extension. The swing frame is equipped with a cutting blade 75 disposed rearward of the paper web and below rolls 62, and to steady said frame and limit the rearward swing thereof, a cross rod 76 is disposed below the blade and carried by frame 1 and bar 62^a. At the opposite side of the paper web and also carried by frame 1 is a stationary cutting blade 77 which blade is preferably disposed in such position with respect to cutting blade 75 and to the paper web that it will co-operate with the former, each time it is swung forward, in severing the paper along one of its crease or fold lines. It will thus be seen that the machine takes the paper from the rear and prints both sides of it, in two colors if desired, and eventually creases it and then severs it at predetermined lengths so that the creased severed portions may be collapsed into the form of booklets.

Should it be desired to vary the number of pages in the booklets it will be necessary to increase the number of bed plates or sections, printing plates and border frames and to correspondingly increase the length of the chains, it being also necessary to adjust sprocket wheels 8 and 10 rearward on the frame, and in order that this may be conveniently done the shaft 8^a of said sprocket wheels, is journaled in brackets 79 slidably mounted on the sides of frame 1, said brackets being equipped with set screws 80 for engagement with the sides of said frame to guard against accidental sliding movement of the brackets.

From the above description it will be ap-

pair of rollers, a second pair of driven rollers
forward of and parallel with the first-named
pair and adapted to receive the paper
web extending forwardly from the roller
5 after it has passed between the upper roller
of the first-named pair and the underlying
printing plates, a guide at the front end of
the frame for engagement by the paper web
after it has passed between said second pair
10 of rollers to cause the paper web to travel
laterally and then rearwardly in the vertical
plane of the other series of printing plates to
permit the paper to extend thence rear-
wardly over and around the upper roller of
15 said first-named pair of rollers and for-
wardly between the same and said second
series of printing plates and then forwardly

between the second pair of rollers, two pairs
of parallel rolls suitably journaled and ar-
ranged at opposite sides of the paper after 20
it has passed the second time between the
said second pair of rollers, and an oscillatory
creaser for pressing the paper simultaneously
in opposite directions between the said pairs
of journaled rolls to crease said paper from 25
one side margin to the other in parallel
lines in opposite directions.

In testimony whereof I affix my signature,
in the presence of two witnesses.

ORANGE M. HOWARD.

Witnesses:

H. C. RODGERS,
G. Y. THORPE.