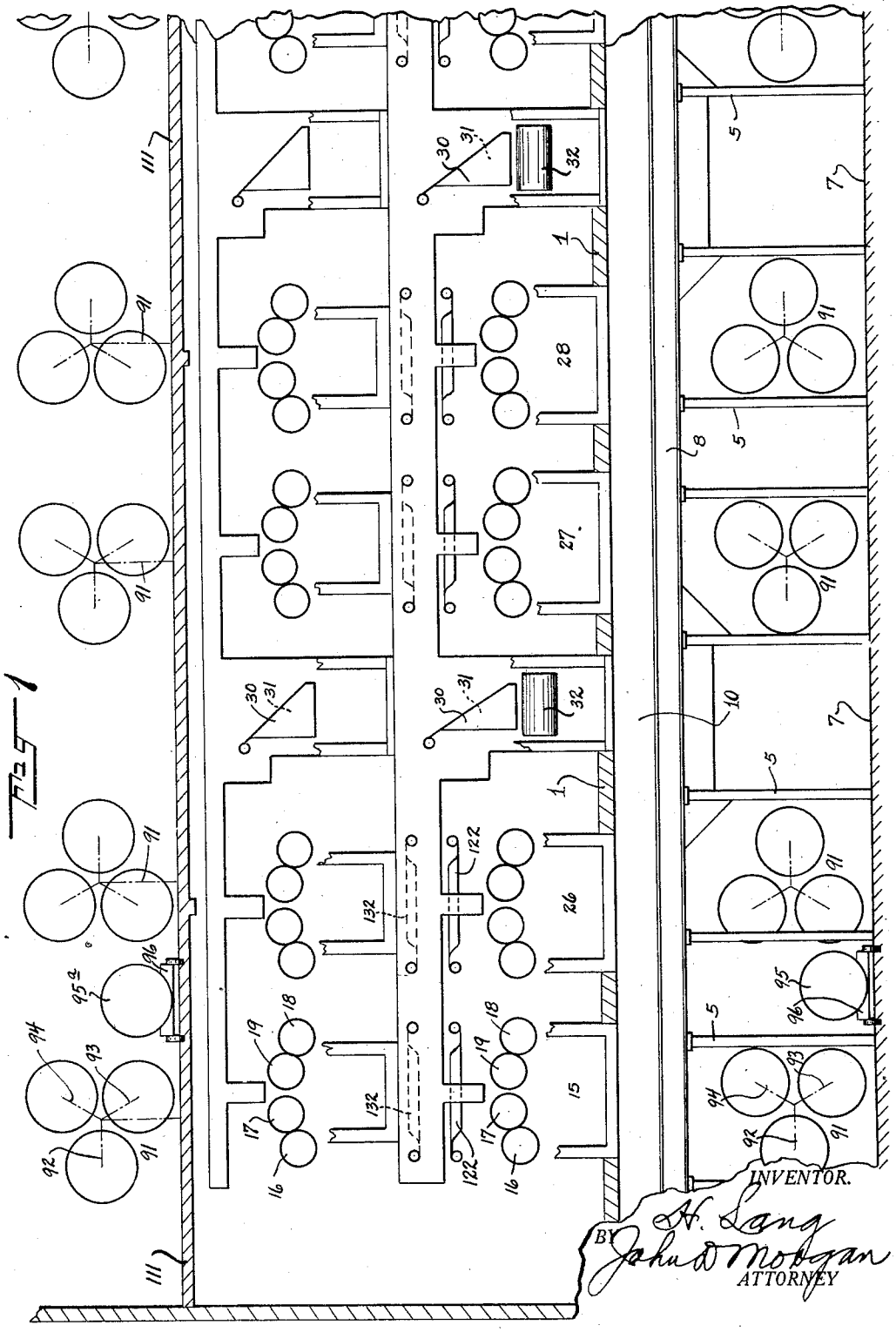
April 19, 1932. H. LANG 1,854,848

PRINTING PRESS

Filed May 19, 1927 4 Sheets-Sheet 1



April 19, 1932. H. LANG 1,854,848

PRINTING PRESS

Filed May 19, 1927 4 Sheets-Sheet 2

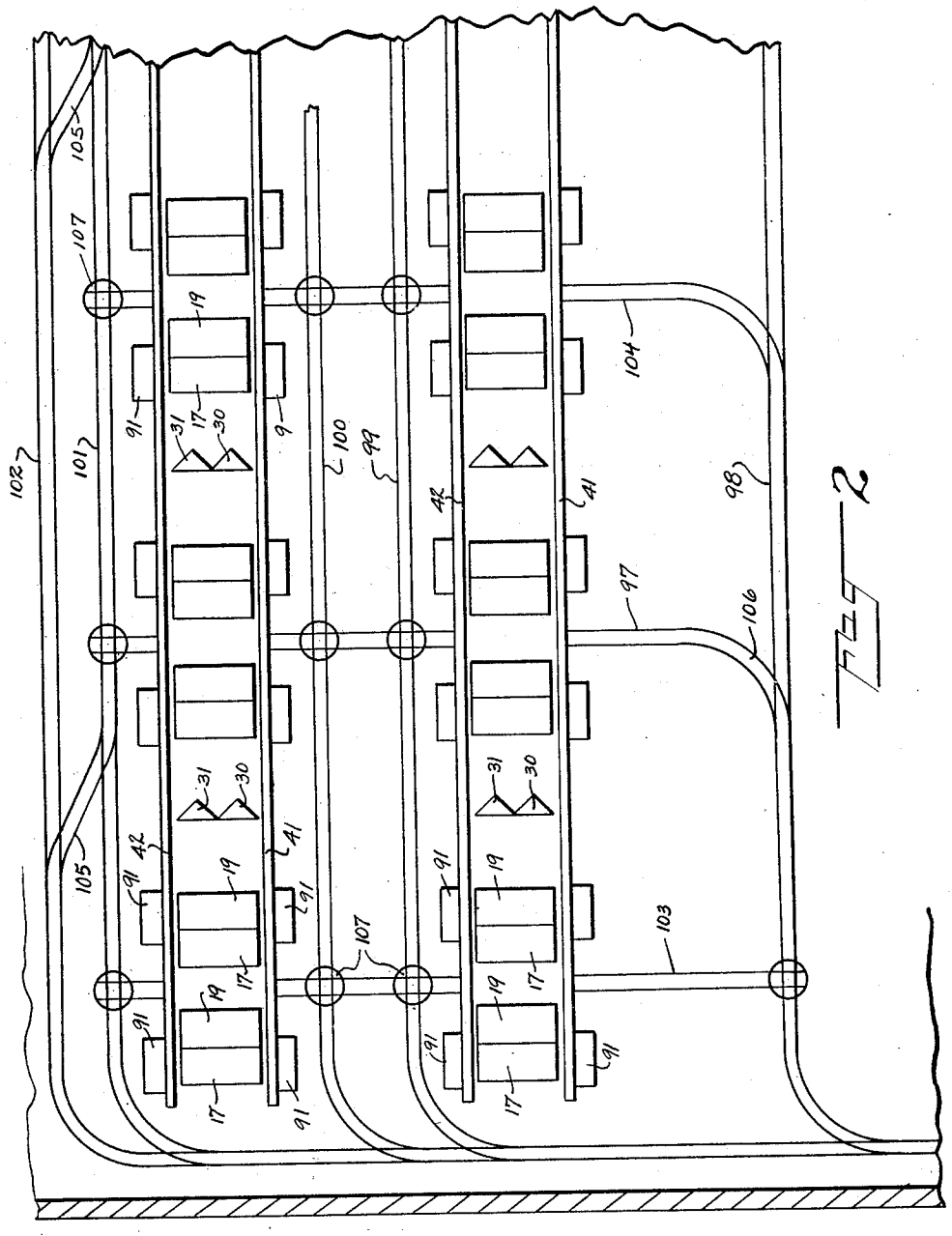


Fig. 2

INVENTOR,
H. Lang
BY John D Morgan
ATTORNEY.

April 19, 1932. H. LANG 1,854,848

PRINTING PRESS

Filed May 19, 1927 4 Sheets-Sheet 3

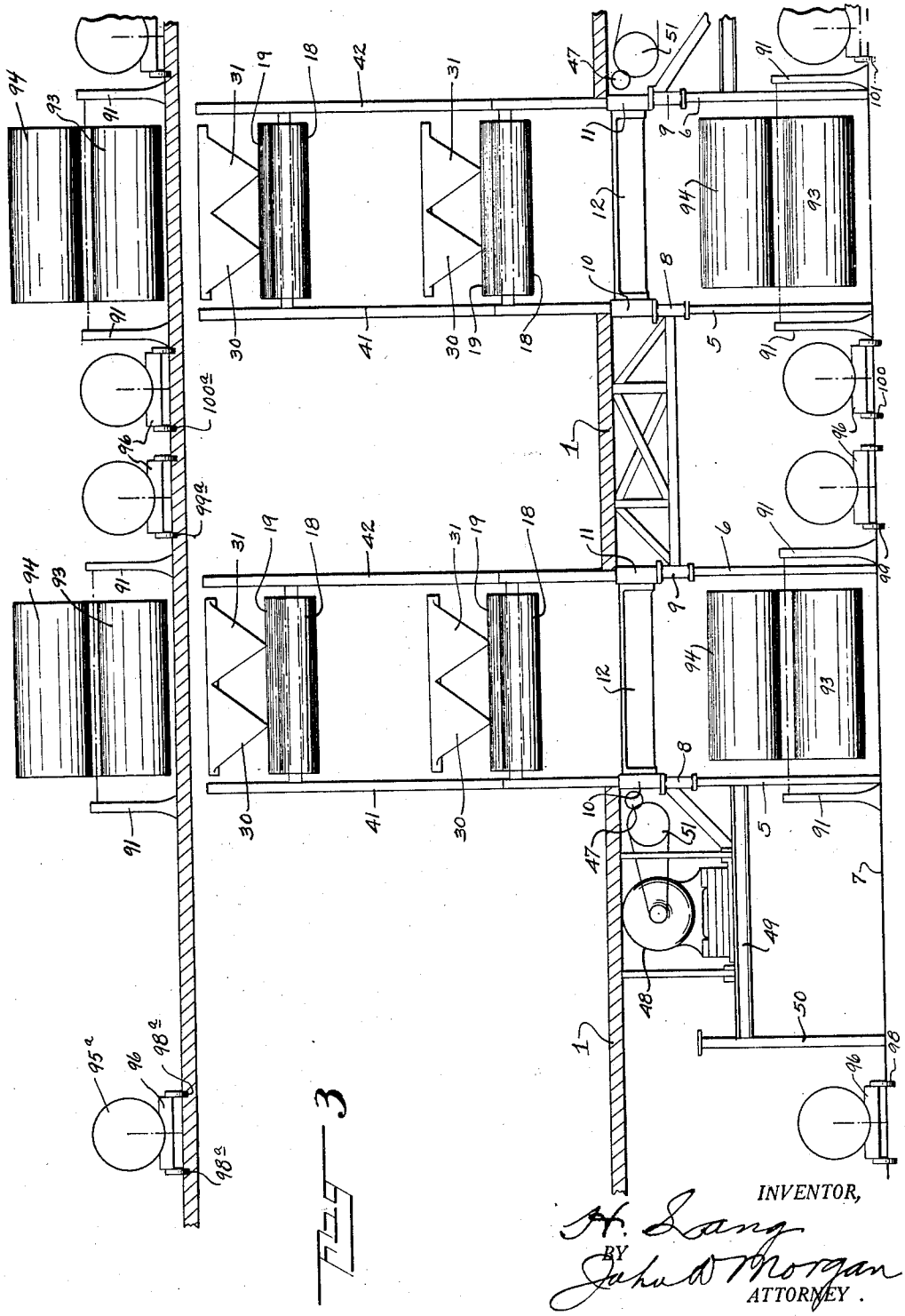


Fig. 3

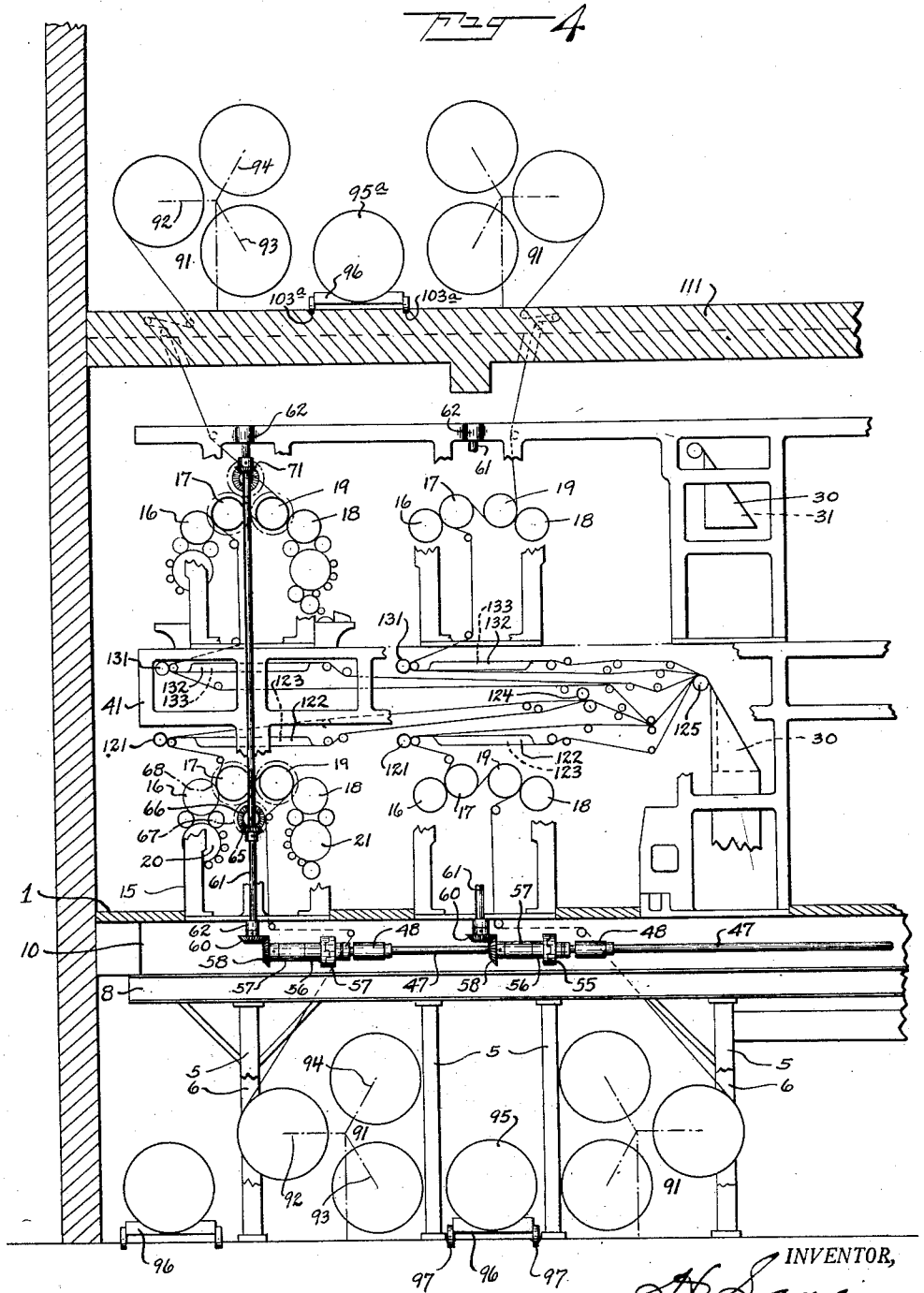
INVENTOR,
H. Lang
BY
John D. Morgan
ATTORNEY.

April 19, 1932. H. LANG 1,854,848

PRINTING PRESS

Filed May 19, 1927 4 Sheets-Sheet 4

Fig 4



INVENTOR,
H. Lang
BY
John D Morgan
ATTORNEY.

Patented Apr. 19, 1932

1,854,848

UNITED STATES PATENT OFFICE

HUBERT LANG, OF CHICAGO, ILLINOIS, ASSIGNOR TO GOSS PRINTING PRESS COMPANY, A CORPORATION OF ILLINOIS

PRINTING PRESS

Application filed May 19, 1927. Serial No. 192,634.

The invention relates to rotary printing presses, and more especially to novel and useful improvements in the general structure and arrangement of such presses, and of the web supply means in connection therewith and of the means for associating and folding the perfected webs.

Objects and advantages of the invention will be set forth in part hereinafter, and in part will be obvious herefrom, or may be learned by practicing the invention. The invention consists in the novel parts, constructions, combinations, arrangements and improvements herein shown and described.

The accompanying drawings, herein referred to and constituting a part hereof, illustrate one exemplary embodiment of the invention and together with the description serve to explain the principles thereof.

Of the drawings:

Fig. 1 is an elevation, largely diagrammatic, of a printing press embodying the invention;

Fig. 2 is a diagrammatic top plan of the lefthand part of Fig. 1;

Fig. 3 is an end elevation, greatly enlarged, corresponding to Figs. 1 and 2; and

Fig. 4 is an enlarged elevation corresponding to the left-hand end of Fig. 1.

The invention is directed in part to a novel and exceedingly efficient arrangement and combination of rotary printing mechanism of the unit type, the folding mechanisms, the web guiding and handling devices and the web roll supplies for the printing units, and also preferably to embody these in a novel and improved arrangement and combination with the building structure.

The invention in certain of its aspects is directed to means and mechanism for providing the utmost in efficiency, ease, flexibility, and speed in supplying, maintaining and handling the entire web supply to a multi-unit fast rotary press, and especially such a press consisting of a large number of perfecting mechanisms of the unit type, arranged in two superimposed horizontal linear series. It is very desirable to minimize the handling of the web rolls, to render the supply to each printing unit independent of the other units, as the requirements of the various units may vary in quantity or time or both; to avoid unnecessary handling of the supply rolls, to effect such handling with the minimum of labor, and to maintain the roll handling mechanisms away from the press and from the press room.

The invention is further directed in certain of its features to providing means for directing and associating the webs, full width and slit, from the various printing units, selectively to the various formers and folders, to produce the widely varying sizes of products required from day to day and in the various editions, and to give the greatest flexibility and smallest page unit variations practicable in the increases and decreases between sizes of products produced by the machines.

The general arrangement of printing and folding units in the present preferred embodiment of the invention, exemplarily illustrated herewith, comprises, broadly considered, a plurality of longitudinally-disposed series of rotary perfecting printing units, one series superimposed over the other, and both series mounted in the press frame. A pair of formers is located in each series at the end of, or operatively interposed between, preferably every second rotary perfecting printing unit in each horiozntal series of printing units. The two pairs of formers are preferably in alinement one above the other, with a cross folder below each set of two vertically disposed pairs of formers, with the usual facilities (not shown) for leading the longitudinally folded webs from any of the formers to either of the folders. That is, there are pairs of formers at the end of every group of four super-imposed printing units, i. e. also between every two such adjacent groups, and the formers are in two pairs, one pair above the other, and two cross folders side by side, one beneath each of the two superimposed formers of each pair.

The web supply for a press such as I have broadly described, comprises, in substantial alinement with each of the perfecting printing units of the lower horizontal longitudinal series, a web supply for said perfecting unit.

These web supply mechanisms may be of any suitable form, as for instance the Stone or Klein types, with the web running upwardly to its printing unit. A series of tracks are arranged upon the floor level of the web-supplying mechanism for the trucks carrying the new supply rolls in between each pair of these web supply mechanisms, so that a new roll may be supplied as needed to the web mechanism at either side.

On the floor of the building just above the printing press, and in substantial alinement with their corresponding printing units, are web supply mechanisms for the respective perfecting printing units of the upper longitudinal series, the web leads passing downwardly through the floor to the corresponding printing units. On this floor, and at the level of these web supplying mechanisms are track-ways for the trucks carrying the new supply rolls, the tracks being arranged to present a new supply roll between each pair of web supply mechanisms, so that the new roll may be supplied to either of the mechanisms.

Thus the bringing of the web supply rolls in the press room, the hoisting of the web rolls contiguously to and up above the press frame, and the mounting thereof upon and above the press frame, and other disadvantages are entirely obviated, and the work of supplying new web rolls to the individual printing units is entirely segregated from the press and its operation, and is effected by merely running the web rolls along a common level, and the varying needs of the different web supply mechanisms are efficiently, easily and uninterruptedly served.

The press structure proper, in accordance with certain features of the invention, is carried upon the lowermost floor, that is, the floor level of the lower web supply mechanisms, the horizontal base frame of the press being carried on beams resting on pillars carried on this floor. The two superimposed, horizontally disposed, lineal series of perfecting printing units are mounted in the press frame, and the press room floor is substantially on the level of the press frame. The web supply mechanisms for the upper series of printing units are preferably on the next floor above of the building structure, and the tracks for supplying these mechanisms are carried on this floor.

While the foregoing general description, for convenience, covers only two horizontal linear series of printing units, it will be understood that there may be a plurality of such groups of two series of such press units in superposition, located side by side, as shown in the drawings, and that certain features, such as the web roll transporting tracks, may be common to all the side by side groups.

For the purpose of directing and associating the perfected webs, a slitter mechanism is provided, and a pair of angle or turner bars for each of the perfecting units of the lower horizontal series is mounted above that unit in the press frame, and driving and guiding rollers lead the webs, as variously associated, to the heads of the respective or selected formers. Likewise, for each of the perfecting units in the upper horizontal and longitudinally disposed series, a slitting mechanism is provided, and a pair of angle bars is mounted in the press frame beneath the printing unit, and there are guiding and driving rollers for directing the webs as variously associated to the heads of either the upper or lower formers.

The driving mechanism for the press comprises, as embodied, a horizontal line of shafting, extending along and carried upon the base of the press frame, with clutches for each of the superimposed vertical sets of press units, and with one, or as many more motors as may be desired or useful. From this horizontal shaft, a vertically-disposed shaft extends upwardly at each vertical set of printing units, and has a separate drive to the printing units. Due to the arrangement of the web supply, that for the lower of each of these units being below, and the web supply for the upper unit being above, the drive is preferably arranged so that the cylinders of one unit drive in one direction and those of the other unit in the opposite direction. There is thus a direct lead to each unit from its web supply, and the perfected webs pass between the inking mechanisms to the slitting mechanism. The web thence passes beneath the upper unit, and the web from below passes above its lower unit, to the respective angle bars, and thence to the forwarding and guiding rollers, and to the formers as may be desired or necessary for the particular size or association sequence for the particular product being run.

Further features of the printing press of my present invention will be primarily set forth in connection with the following detailed description, and it will be understood that the foregoing general description and the following detailed description are explanatory and exemplary of the invention but are not restrictive thereof.

Referring now in detail to the embodiment of the invention, illustrated by way of example in the accompanying drawings, the press is built and installed in a definite relation to the building structure itself. As shown a floor 1 is substantially at the floor level of the press, but as embodied the press structure is carried from the floor beneath, as will be clear from the drawings. As so shown two series of supporting columns 5 and 6 are carried upon a sub-floor 7 of the building structure, and supported upon the tops of, and extending along the respective

series of pillars 5 and 6, are horizontally-disposed beams 8 and 9. Upon the tops of these beams, respectively, are carried the side frames 10 and 11 of the press base frame, which also has suitable cross members 12.

In the present embodiment the press is of the line unit type, and one series 15 of perfecting units is shown consisting of an impression cylinder 17 and a cooperating plate cylinder 16 and an impression cylinder 19 and a cooperating plate cylinder 18. Plate cylinder 16 is provided with an inking mechanism 20, shown diagrammatically, and which may be of any known or suitable form, and a like inking mechanism 21 is provided for the plate cylinder 18. Similar rotary perfecting printing units 26, 27, 28 and 29 are shown in this particular series, which may comprise any number of units, and these remaining units need not be described in detail.

A folding mechanism is interposed at suitable intervals and in desired relation to the printing units, and as shown herein a folding mechanism is located between printing units 26 and 27. This mechanism comprises two formers 30 and 31 for the upper series of printing units, and a like pair of formers 30 and 31 for the lower series of printing units, and there is a cross folder 32 in line with and beneath the formers 30, and a similar cross folder in line with and beneath the formers 31. A like folding mechanism is shown between the printing units 28 and 29, and in like relation. It will be understood, however, in so far as concerns many aspects of the invention, that the location of the folding units with respect to the printing units may be widely varied, as well as the construction of the folding units themselves.

In accordance with one feature of the invention, the two superimposed, horizontally disposed, linear series of units are carried by the one press frame structure. Accordingly the side frame members 41 and 42 of the press rest upon the corresponding base frame members 10 and 11, and carry the respective superimposed printing units of both the first and second horizontal series. The folding mechanisms in the second series may be arranged in any desired manner, and one such arrangement locates them in vertical alinement with the folding units of the lower linear series of presses, and they are accordingly so shown in the drawings.

Any suitable or other desired form of driving mechanism may be employed. As shown, however, the driving mechanism comprises a horizontal shaft 47 journalled in brackets 48, carried upon the base frame member 10 of the press. The shaft 47 is driven in any suitable manner, but as shown a motor 48 is carried upon a support 49, mounted on pillars 50 and also carried by the press supporting pillars. A speed reduction drive 51 connects from the motor to the shaft 47.

Means are provided for driving each of the printing units independently from the shaft 47, and as embodied said means comprise respectively a clutch 55, one member of which is fixed on the shaft 47, and the other member of which is fixed to a sleeve 56 journalled in a bracket 57, mounted on the base member 10 of the press frame. Fixed to the sleeve 56 is a beveled gear 58, which meshes with a beveled gear 60 fixed to a vertically-disposed shaft 61, which shaft is journalled in bearings 62 carried on the press frame, this shaft extending upwardly past a printing unit in both the first and second series of units. The drive from shaft 61 to the printing unit in the lowermost series comprises a beveled gear 65, fixed to rotate with, but slidable along shaft 61, and meshing with a beveled gear 66, which is a part of a compound gear having also a spur gear 67, journalled on the machine frame. This spur gear meshes with a spur gear 68 on the shaft of one of the cylinders of one of the printing couples. The remaining cylinders of the two perfecting printing couples and of their inking mechanisms may be geared together in any desired manner. The beveled gear 65 may be slipped on shaft 61 out of mesh with bevel gear 66 to silence the particular printing unit. A similar beveled gear 71 is mounted to rotate with, but slidable along shaft 61 to drive the uppermost printing unit, and the driving connections therefrom may be the same or similar and need not be described in detail. This gear 71 may likewise be slipped on its shaft 61 out of mesh with its driven bevel gear to silence this printing unit.

Web supply means are provided by the invention comprising a web roll supply and tension regulating means in connection therewith, the diagrammatically illustrated form thereof being of a well-known commercial type in which the web rolls are individually replenishable and an exhausted web roll can be replaced without changing the web leads from the web-supply mechanism to the printing units. In connection therewith are trackways at the level of the web supply for the lower series of line printing units and also trackways at the level of the web supply for the upper line units, whereby a new web roll may be run in on the tracks substantially at the level of any of the numerous sources of web supply, either above or below.

The web supply rolls for the printing units of the lower line series are located approximately directly beneath the printing units supplied therefrom, with the web leading upward, and running between the two inking mechanisms into the two printing couples, thence upwardly to the slitter and turning bars, and thence to the folding mecha-

nism. The inking mechanisms and the plate cylinders are thereby left entirely free of access on both sides. In like manner the respective sources of web supply for the printing units of the upper line series are located above and in substantial alinement with the printing unit supplied thereby, the web lead being downward, through the two printing couples, thence downwardly between the two inking mechanisms, thence beneath the upper horizontal line of printing units to the slitter, the turning bars, and thence folding mechanisms, either upper or lower.

Referring now in detail to one of the sources of web supply, for instance one of the units in the lower horizontal line series (which will suffice for all of the units), the supply unit 91 is provided with three web roll supports 92, 93 and 94. This mechanism may be of a well-known commercial form and need not be described in detail. One of the web rolls 92 is feeding into the press, and is provided with a suitable tension controlling and speed regulating mechanism (not shown). Another web roll, as 94, is in position to be pasted to the web of roll 92 as it becomes exhausted and to supply the press without necessitating stoppage thereof. The other web roll support, as 93, is in position to take on a fresh web supply roll, and the various supports are rotatable to bring the rolls successively into the positions for the sequence of operation just described.

A new web roll 95 is shown mounted on a truck 96, running on the tracks 97, and is in position to supply the web feeding unit either at the right or the left thereof, this one track supplying both units. The track system is shown in Fig. 2, having a plurality of tracks 98—102 extending lengthwise of the horizontal lines of press units, and with transverse tracks 97 and 103, 104 extending inwardly between each pair of successive printing units, and preferably extending entirely across the press when this comprises a plurality of side-by-side horizontal series of printing units, provided with cross tracks like 105—106 or with turn tables 107.

In accordance with certain features of the invention, as already indicated, the web supply mechanisms for the printing units of the upper horizontal series are located above and in substantial vertical alinement with the corresponding printing units, and the trackways for bringing in the new rolls are likewise on the level of these web supply mechanisms. Accordingly, the web supply units, which may be of the form already described, are supported on the floor 111, and the system of trackways on this floor may be the same or similar to that already described, and Fig. 2 may be taken as a representation of the trackways either on this floor 111, or on the lowermost floor 7. Thus the fresh supply roll 95*a* is brought in on the truck or carrier 96, and on the level of any and all of the web supply mechanisms for the upper horizontal series of printing units. Thus the work and disturbance, and consequent inconvenience, of hoisting the heavy web supply rolls adjacent to the press are avoided, as also long web leads between the source of web supply and the printing units, with the consequent inconvenience, interference with access to the press, and increased danger of web breakage.

The particular form of folding means herein embodied has already been generally described, and so far as concerns many features of the invention the means for guiding and handling the perfected webs between the respective printing units and the folding mechanisms may be of any known or suitable form. As embodied, the webs from the lower printing units run past slitters 121, which centrally slit the webs, and above this lower horizontal series of printing units are provided pairs of corresponding half-angle bars 122 and 123. A suitable system of guiding and driving rollers 124 may be provided to bring the webs in any desired or predetermined association to the head of either or both of the pairs of formers 30 and 31.

In like manner the perfected web from the respective printing units of the upper horizontal series are run past slitters 131, and pairs of half angle bars 132 and 133 are provided below the respective printing units. The webs run from the angle bars to the driving and guiding rollers 125 and from thence selectively, as desired, to the formers. The webs may be associated vertically and may be cross-associated in any desired manner to produce any of the various products and sequences of which the press is capable.

From all the foregoing it will be understood that a mechanism has been provided constituting an exemplary embodiment of the invention, and realizing the objects and advantages herein set forth, together with other objects and advantages. It will be understood further that departures may be made from the exact mechanism as shown and described, within the scope of the accompanying claims, without departing from the principles of the invention and without sacrificing its chief advantages.

What I claim is:—

1. A rotary printing press including in combination two horizontally and longitudinally disposed linear series of perfecting printing units, a press frame in which said series are mounted one above the other, web supply mechanism for the various printing units, means for directing the perfected webs downwardly from the printing units of said upper series, means for directing the perfected webs upwardly from the printing units of said lower series, directing and turning means for said webs located between the units of said superposed series and a common

folding mechanism to which the webs may be selectively directed.

2. A rotary printing press including in combination two horizontally and longitudinally disposed linear series of perfecting printing units, a press frame in which said series are mounted one above the other, web supply mechanism for the various printing units, means for directing the perfected webs downwardly from the printing units of said upper series, means for directing the perfected webs upwardly from the printing units of said lower series, angle bars located beneath the units of said upper series for the webs from said series, angle bars located above said lower series for the webs from said series, and a common folding mechanism to which the webs may be selectively directed.

3. A rotary printing press including in combination two horizontally and longitudinally disposed linear series of perfecting printing units having the inking mechanism located beneath the printing cylinders to provide manways between adjacent couples, a press frame in which said series are mounted one above the other, web supply mechanism for the various printing units, means for directing the perfected webs downwardly from the printing units of said upper series, means for directing the perfected webs upwardly from the printing units of said lower series, means for driving the printing units in said upper and lower series in reverse directions, directing and turning means for said webs located between the units of said series of units and a common folding mechanism to which the webs may be selectively directed.

4. A rotary printing press including in combination two horizontally and longitudinally disposed linear series of perfecting printing units, a press frame in which said series are mounted one above the other, web supply mechanism for the various printing units, means for directing the perfected webs downwardly from the printing units of said upper series, means for directing the perfected webs upwardly from the printing units of said lower series, means for driving the printing units in said upper and lower series in reverse directions, means for selectively silencing the drive for individual units, directing and turning means for said webs located between said series of units and a common folding mechanism to which the webs may be selectively directed.

5. A rotary printing press including in combination two horizontally and longitudinally disposed linear series of perfecting printing units, a press frame in which said series are mounted one above the other, web supply mechanisms located above said upper series to supply webs to the units of said upper series, web supply mechanisms to supply webs to the printing units of said lower series, web directing and turning means mounted in the press frame between said upper and lower series of printing units, folding mechanism and means for selectively directing the printed webs thereto.

6. A rotary printing press including in combination two horizontally and longitudinally disposed linear series of perfecting printing units, a press frame in which said series are mounted one above the other, web supply mechanisms located above said upper series to supply webs to the units of said upper series, web supply mechanisms to supply webs to the printing units of said lower series, angle bars and web rollers for the perfected webs from the units of said upper series, angle bars and web rollers for the perfected webs from the units of said lower series, said upper set of angle bars and web rollers being directly below the units of said upper series and said lower set of angle bars and web rollers being directly above the units of said lower series, folding mechanism and means for selectively directing the webs thereto.

7. A rotary printing press including in combination two horizontally and longitudinally disposed series of perfecting printing units, a press frame in which said series are mounted one above the other, web supplying means, web slitting means directly in line between said upper and lower series, folding mechanism including a pair of formers for said upper series, a pair of formers for said lower series, cross folders for the formers, and means for directing the printed webs from the upper and lower series selectively to the various formers.

8. A rotary printing press including in combination two horizontally and longitudinally disposed series of perfecting printing units, a press frame in which said series are mounted one above the other, web supplying means, web slitting means, turner bars and web rollers located between said superposed upper and lower series of printing units, folding mechanism including a pair of formers for said upper series, a pair of formers for said lower series, cross folders for the formers, and means for directing the printed webs from the upper and lower series selectively to the various formers.

9. A rotary printing press including in combination two horizontally and longitudinally disposed series of perfecting printing units, a press frame in which said series are mounted one above the other, web supplying means, web slitting means, turner bars for the webs from the upper printing units located directly beneath said upper series, turner bars for the webs from said lower printing units located directly above said lower series, folding mechanism including a pair of formers for said upper series a pair of formers for said lower series, cross folders for the

formers, and means for directing the printed webs from the upper and lower series selectively to the various formers.

10. A rotary printing press including in combination two horizontally and longitudinally disposed series of perfecting printing units, a press frame in which said series are mounted one above the other, web supplying means, web slitting means, turner bars and web rollers located between said superposed upper and lower series of printing units, folding mechanism including a pair of formers for said upper series, a pair of formers for said lower series, cross folders for the formers, and means for directing the printed webs from the upper and lower series selectively to the various formers.

11. A rotary printing press including in combination two horizontally and longitudinally disposed series of perfecting printing units, a press frame in which said series are mounted one above the other, web supplying means, for supplying webs from above to the printing units of said upper series, web supplying means for supplying webs from below to the printing units of said lower series, web slitting means, turner bars and web rollers located between said superposed upper and lower series of printing units, folding mechanism including a pair of formers for said upper series, a pair of formers for said lower series, cross folders for the formers, and means for directing the printed webs from the upper and lower series selectively to the various formers.

12. A rotary printing press including in combination two horizontally and longitudinally disposed linear series of perfecting printing units, a press frame in which said series are mounted one above the other, web supply mechanisms for the respective printing units of said lower series located below the series and in substantial alinement with their respective printing units and on a level with trackways for supplying fresh rolls to said web supply mechanisms, and web supply mechanisms for the respective printing units of said upper series located above said upper series and in substantial alinement therewith and on a level with trackways for supplying fresh rolls to said last-mentioned web supply mechanisms, means for slitting, guiding and turning the perfected webs in the space between said superimposed series of printing units, folding mechanism and means for selectively directing the webs thereto.

In testimony whereof, I have signed my name to this specification.

HUBERT LANG.