

No. 707,101.

Patented Aug. 19, 1902.

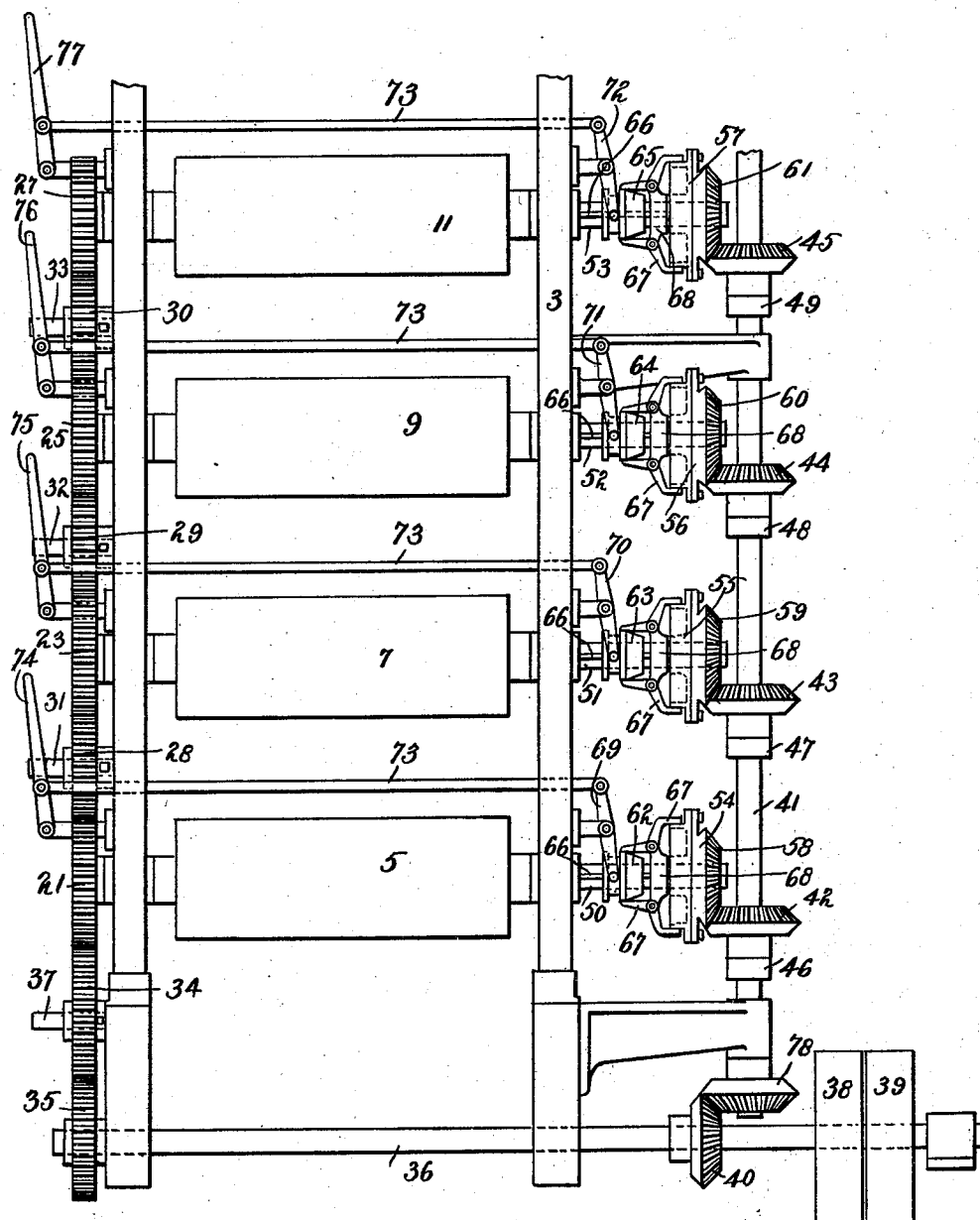
S. G. GOSS.
PRINTING PRESS.

(Application filed Apr. 28, 1897.)

(No Model.)

4 Sheets—Sheet 1.

Fig. 1.



Witnesses.
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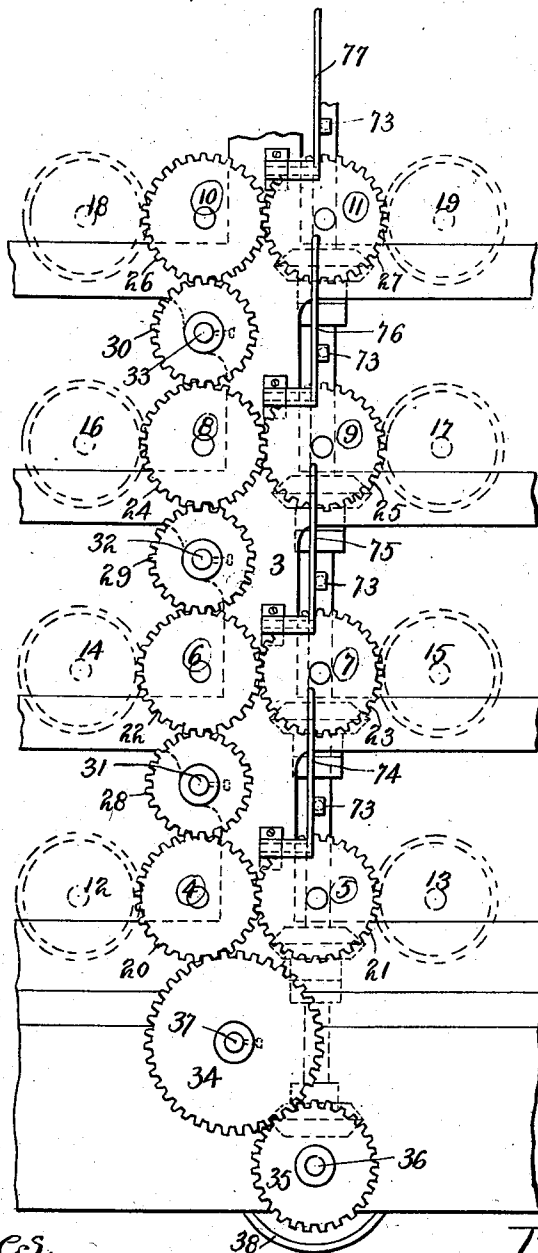
S. G. GOSS.
PRINTING PRESS.

(Application filed Apr. 23, 1897.)

(No Model.)

4 Sheets—Sheet 2.

Fig. 2.



Witnesses.
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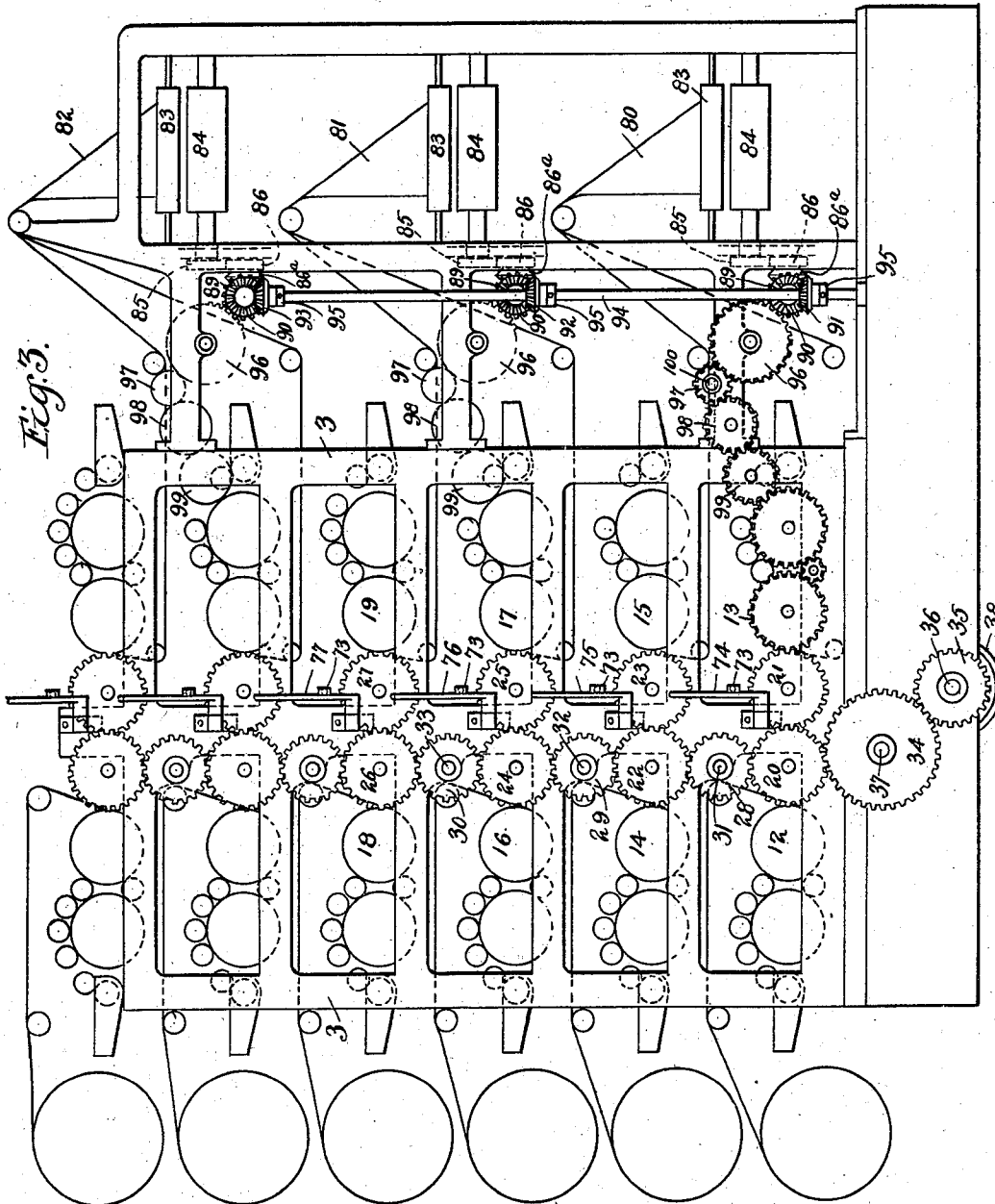
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PRINTING PRESS.

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(No Model.)

4 Sheets—Sheet 3.



Witnesses.

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Patented Aug. 19, 1902.

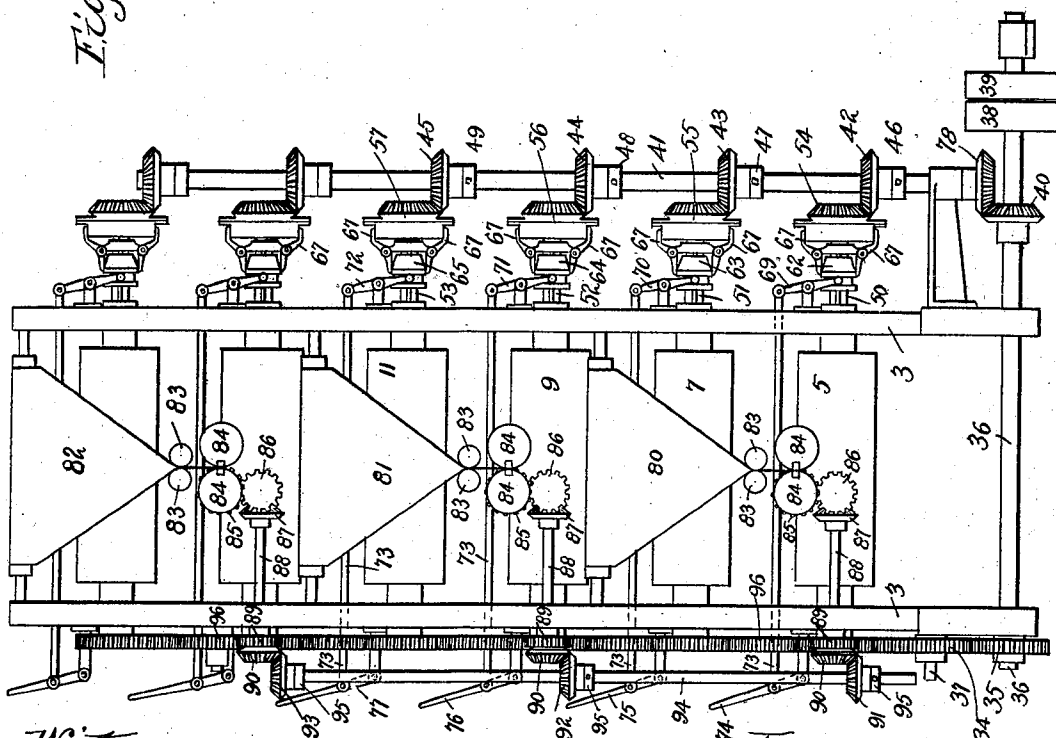
S. G. GOSS.
PRINTING PRESS.

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(No Model.)

4 Sheets—Sheet 4.

Fig. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

SAMUEL G. GOSS, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE GOSS PRINTING PRESS COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

PRINTING-PRESS.

SPECIFICATION forming part of Letters Patent No. 707,101, dated August 19, 1902.

Application filed April 23, 1897. Serial No. 633,421. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL G. GOSS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Printing-Presses, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to printing-presses, and particularly to presses composed of a number of sets of printing mechanism mounted in a common frame and arranged to operate as a single machine and to be driven from a common source of power. In presses of this description it has heretofore been attempted to so construct the driving connections that the different sets of printing mechanism could be operated as independent presses, an arrangement the desirability of which is obvious, as otherwise if the paper to be printed required the use of one only of the sets of printing mechanism it would be necessary, nevertheless, to run the entire press. Previous efforts along this line, however, so far as I am aware, have been unsuccessful, as while presses have been produced in which the different sets of printing mechanism have been capable of operating to produce independent as well as joint products and could in some cases be stopped independently they could not be started independently, it being necessary to stop the entire press before a set of printing mechanism theretofore idle could be started up, thus negating to a great extent the advantages of the construction.

My present invention in a secondary sense consists in certain improvements by which the different sets of printing mechanism may each be started as well as stopped independently of the other sets of printing mechanism and without stopping such other sets of printing mechanism as might be in operation at the time, thereby making it possible to run the different sets of printing mechanism as separate or distinct presses, as desired. Primarily, however, my present invention has for its object to provide a new and improved press of the general type above referred to and having three or more sets of printing mechanism in which the different sets of

printing mechanism will not only be capable of operation as distinct presses, but the different sets of printing mechanism or certain of them may be coupled together and run as a single press with a plurality of sets of cylinders and such sets of printing mechanism so coupled together be started, stopped, or otherwise operated as a single machine and independently of the other sets of printing mechanism belonging to the machine as a whole. This operation makes it possible and practicable to combine in a single machine a large number of sets of printing mechanism, as in view of my invention by such combination the capabilities of the press are in no way restricted and all the advantages of the combination are retained without the disadvantages which have heretofore stood in the way of the practicability of such an arrangement.

To this end my invention primarily consists in providing a plurality of sets of printing mechanism mounted in a common frame and having connecting devices for connecting them independently to a source of power, with separate mechanism by which a plurality of such sets of printing mechanism may be coupled together, thus making the sets so coupled in effect a single set or press and capable of operation as such and independently of the other sets of printing mechanism which go to make up the machine as a whole. By "sets of printing mechanism" as herein used I mean to include not alone two pairs of form and impression cylinders, but also sets of printing mechanism comprising multiples of a single set as well as such other forms of printing mechanism as are capable of use in the manner stated.

My invention further consists in providing a press having the connecting mechanism above described, with means for assembling and folding sheets or webs from the different printing mechanisms and for folding the product from two or more of the different sets of printing mechanism together independently of the product of other sets of printing mechanism, the different folding devices being so arranged that they may be operated independently of each other and in connection

tion with different sets of the various sets of printing mechanism which go to make up the press as a whole.

My invention also comprises certain improvements in structural details, which will be hereinafter pointed out.

Referring to the accompanying drawings, the following is a detailed description of the embodiment therein shown of my invention.

Figure 1 is an end elevation of part of a press, showing my improvements; and Fig. 2 is a partial side elevation. Fig. 3 is a diagrammatic side elevation of a press, illustrating my improvements; and Fig. 4 is an end elevation of the same.

I shall now describe the primary and secondary features of my invention, referring more particularly to Figs. 1 and 2, wherein I have shown only four sets of printing mechanism.

3 indicates the frame of the press.

4 5, 6 7, 8 9, 10 11 indicate the impression-cylinders of four sets of printing mechanism.

12 13, 14 15, 16 17, 18 19 indicate the form-cylinders of such sets of printing mechanism.

20 21, 22 23, 24 25, 26 27 indicate a number of gears mounted on the shafts of the impression-cylinders 4 5, 6 7, 8 9, 10 11, respectively.

28 indicates a pinion which meshes with the gears 20 and 22. 29 indicates a similar pinion, which meshes with the gears 22 and 24.

30 indicates a pinion which meshes with the gears 24 and 26.

The pinions 28 29 30 are mounted on elongated studs 31 32 33, respectively, and are movable upon said studs out of their engagement with their respective gears. It is evident that when the pinions 28 29 30 are in mesh with their respective gears all the sets of printing mechanism will be connected together and may be driven from a common shaft.

34 indicates a gear which meshes with the gear 20 and with a gear 35, mounted upon a drive-shaft 36, preferably arranged transversely below the press. The gear 34 is mounted upon a stud 37 and is movable thereupon out of mesh with the gears 20 and 35.

38 39 indicate fast and loose pulleys on the shaft 36.

40 indicates a beveled gear mounted upon the shaft 36.

41 indicates a vertical shaft arranged beside the press at the opposite side from that at which are arranged the gears 20 to 27. The shaft 41 carries a series of beveled gears 42 43 44 45, which are keyed thereto and may be made movable vertically thereupon, although such vertical movement is not essential. Collars 46 47 48 49 serve to hold said gears, respectively, up in operative position.

50 51 52 53 indicate the shafts of the cylinders 5 7 9 11, respectively.

54 55 56 57 indicate a series of friction clutch members loosely mounted upon the ends of the shafts 50 51 52 53, respectively, and having beveled gears 58 59 60 61 on their

outer faces, which beveled gears mesh, respectively, with the beveled gears 42 43 44 45.

62 63 64 65 indicate a series of beveled friction clutch members which are mounted upon the shafts 50 51 52 53, respectively, and move longitudinally thereof. Feathers 66 are provided, one on each of said shafts, to cause the clutch members 62 63 64 65 to rotate therewith. The beveled clutch members 62 63 64 65 are adapted to engage clutch-arms 67, carried by collars 68, to connect said clutch members and the clutch members 54 55 56 57, respectively.

While the form of friction-clutch shown is that which I prefer to use, I do not wish to limit myself to the use of such clutch, as other suitable friction-clutches may be used. Furthermore, as regards the primary feature heretofore pointed out, broadly considered my invention is not limited to the use of friction-clutches, as other suitable connecting mechanism adapted for making connection with moving driving mechanism may be used. Friction-clutches, however, I consider the best for the purpose.

The clutch members 62 63 64 65 are moved upon their respective shafts by means of levers 69 70 71 72, respectively, said levers being connected by connecting-rods 73 to a series of hand-levers 74 75 76 77 at the other side of the press. The levers 74 75 76 77 are preferably arranged at one side of the press, as shown; but they may be otherwise arranged, if desired.

78 indicates a beveled gear which is mounted upon the lower end of the shaft 41 and meshes with the beveled gear 40.

In Figs. 3 and 4 I have illustrated a more complete press showing the arrangement of the folding devices and the mechanism for operating the same so that webs from different sets of printing mechanism may be assembled, or when two or more adjacent sets of printing mechanism are coupled together and operated as single press independently of the other sets of printing mechanism the webs from such coupled sets of printing mechanism may be assembled and folded independently of the folding devices of the other sets of printing mechanism, which may be operating or silent, as desired.

The construction of the folding apparatus and the mechanism for driving the same are as follows:

80 81 82 indicate formers having nipping-rollers 83 at their apexes.

84 indicates cutting-cylinders, which carry gears 85, only one gear being shown, however, with each pair of cylinders. One of the gears 85 of each pair of cutting-cylinders meshes with a gear 86, which is connected to a beveled gear 86^a, the latter meshing with a gear 87, mounted upon a shaft 88, each of said shafts carrying near its outer end a gear 89 and a beveled gear 90, as shown in Fig. 4. The beveled gears 90 of the different folders 80 81 82 mesh, respectively, with bev-

eled gears 91 92 93, mounted upon a vertical shaft 94, as shown in Fig. 4. The beveled gears 91 92 93 are vertically adjustable upon the shaft 94 and are held in place by collars 95. The various shafts 88 are driven by gears 96, which mesh with the gears 89, the gears 96 being driven through the instrumentality of gears 97 98 99, which form a train of gearing connecting said shafts 88 with the printing mechanisms, as indicated in Fig. 3. One of the gears 96, 97, 98, or 99 of each train is adjustable, so that it may be moved out of mesh with the other gears of the train in order that the driving mechanism of each folder may be cut off when desired from the printing mechanism, by which it is arranged to be directly driven. For this purpose in the drawings I have shown the gears 97 as being mounted upon elongated studs 100, so that they may be shifted thereupon out of engagement with the gears 96 and 98.

By the above-described construction any one of the folding devices may be driven from any desired set of printing mechanism, or each pair of sets of printing mechanism may be arranged to drive a single folder, and the operation of any folder may be entirely independent of the other folders. When the different folders are used, each with two sets of printing mechanism, forming three distinct presses, the pinions 91 92 93 are moved out of mesh with their respective pinions 90, each folder being driven through a train of gears connecting it directly with one of the sets of printing mechanism.

The operation of my improved printing-press is as follows: When it is desired to run all the sets of printing mechanism together as one press, this may be accomplished by driving the intermeshing gears 20 21, 22 23, 24 25, 26 27 from the shaft 36, and, if desired, power may be applied at both ends of the cylinder-shafts by throwing the clutches mounted upon said shafts into operation, causing the power to be applied also through the vertical shaft 41. If it be desired to operate each of the different sets of printing mechanism as a separate press, the intermediate pinions 28 29 30 are moved upon their respective studs out of mesh with the adjacent gears. The different sets of printing mechanism may then be driven through the shafts 36 and 41 by throwing the different clutches into operation, and by this construction each of the separate sets of printing mechanism may be stopped or started independently of the others and, in fact, be operated in every respect as a distinct and independent press. Where it is desired to make use of this feature of my invention, it is necessary that the connecting devices by which the different sets of printing mechanism are connected to the driving-shaft be so constructed that the connection with the driving-shaft will not be abrupt, starting the newly-connected mechanism up initially at full speed, as in that case damage to the press

would almost inevitably result, as the web would thereby be broken if the press were not seriously damaged. Moreover, the sudden shock would result in injury to the other sets of printing mechanism of the machine, so that a positive unyielding connection cannot be made where it is desired to operate the different sets of printing mechanism in the manner just described. Again, if it be desired to operate the four sets of printing mechanism illustrated in Figs. 1 and 2 as two independent presses the intermediate pinion 29 will be moved out of mesh, the intermediate pinions 28 and 30 being in mesh with their respective gears. Then the two upper sets of printing mechanism will constitute one press, the lower two constituting another press, and by means of the levers 74 or 75 the lower press may be stopped or started, and similarly the upper press may be stopped or started by operating the levers 76 or 77. When the different sets of printing mechanism are operated as independent presses, the gear 34 should be moved out of mesh with the gear 20. The two lower folders 80 81 would be operated with the two sets of printing mechanism through their respective trains of gears, the beveled gears 91 92 being out of mesh with the gears 90, so that the two folding mechanisms would be entirely independent of each other and dependent for their operation upon the sets of printing mechanism to which they were connected. It will thus be seen that when two sets of printing mechanism are coupled together, as above described, the press composed of such coupled printing mechanisms is controlled by a single lever—as, for instance, if the two upper printing mechanisms in Figs. 1 and 2 of the accompanying drawings were to be coupled together they could be controlled by operating either the lever 76 or the lever 77, whichever lever being used the starting or stopping of the two sets of printing mechanism being simultaneous. This operation is an exceedingly important one, inasmuch as where two sets of printing mechanism are combined to form a single press and to deliver a single product it is necessary that the printed pages shall register, and consequently very careful adjustment of the different cylinders is necessary before the press is started, as should the starting of the two sets of printing mechanism not be simultaneous the webs from such two sets would fail to register. It is therefore impracticable to drive two sets of printing mechanism in unison and to start and stop them in unison where they are connected to the source of power only by independently-operable connecting devices.

The above-described combinations and arrangements are some of those which may be made with apparatus embodying my invention, and various other combinations may be made—as, for instance, three sets of printing mechanism may be combined to form a single press—the other set of printing mechanism,

or, where more than four sets are provided, the other sets of printing mechanism being driven separately or together, in each case the different coupled sets of printing mechanism being controlled by a single clutch or other connecting device, and various combinations other than those above described may be made.

By providing means for starting and stopping the different sets of printing mechanism independently and arranging for forming various combinations of such sets of printing mechanism many advantages are secured—as, for instance, if the sets of printing mechanism are arranged as two independent presses the plates may be placed on the cylinders of one without interfering with the work of the other, or should it be necessary on account of accident to stop one press such stoppage will not affect the operation of the other. Consequently my improvements result in great economy of operation of the press, as in prior constructions where a plurality of printing mechanisms have been driven from a common driving device, as a shaft, when it became necessary to stop one set of printing mechanism before it could be started up again all had to be stopped, and in no case have means been provided whereby a plurality of sets of printing mechanism mounted in a common frame could be coupled together and placed under the control of a single driving device and then operated independently of the other sets of printing mechanism composing the press as a whole; nor in presses of this character have folders been provided arranged to be driven independently of each other by the different sets of printing mechanism, so that the product of each separate set of printing mechanism when operated independently could be delivered independently of the product of the other sets of printing mechanism going to make up the entire press.

I have described my improvements in detail; but I do not wish to be limited to the specific construction shown and described, as many variations or modifications may be made without departing from my invention. Furthermore, my invention, broadly considered, is not limited to the use of a main driving-shaft arranged as shown, as various modifications of such arrangement may also be made; nor is my invention limited to the use of a vertical driving-shaft with clutches for driving the different sets of printing mechanism independently, although such arrangement is the best at present known to me.

That which I claim as my invention, and desire to secure by Letters Patent, is—

1. In a printing-press, the combination with a plurality of sets of printing mechanism mounted one above another in a common frame, of a common source of power for driving said sets of printing mechanism, and means for starting and stopping one of said sets of printing mechanism independently of

the other and while such other is in motion, substantially as described.

2. In a printing-press, the combination with a plurality of sets of printing mechanism mounted one above another in a common frame, of a common source of power for driving said sets of printing mechanism, means for coupling together certain of said sets of printing mechanism, and means for starting and stopping such coupled sets of printing mechanism simultaneously and independently of the condition of the other set or sets of printing mechanism composing the press as a whole, substantially as described.

3. In a printing-press, the combination with a plurality of sets of printing mechanism arranged one above another, of a driving-shaft, independently-operable devices for connecting each of said sets of printing mechanism to said driving-shaft while said shaft is in motion, and mechanism independent of said connecting devices for driving said sets of printing mechanism from said driving-shaft, substantially as described.

4. In a printing-press, the combination with a plurality of sets of printing mechanism arranged one above another, of a driving-shaft, a clutch operable while the shaft is in motion for connecting one of said sets of printing mechanism to said shaft, and coupling mechanism for coupling a plurality of said sets of printing mechanism together, whereby a plurality of sets of printing mechanism may be started by operating said clutch, substantially as described.

5. In a printing-press, the combination with a plurality of sets of printing mechanism arranged one above another, of a drive-shaft, a clutch operable while the shaft is in motion for connecting one of said sets of printing mechanism to said shaft, and gears for coupling a plurality of said sets of printing mechanism together, substantially as described.

6. In a printing-press, the combination with a plurality of sets of printing mechanism arranged one above another, and a series of gears connecting said sets of printing mechanism together in series, certain of said gears being movable out of engagement with other gears of the series to permit independent operation of certain of said sets of printing mechanism, of a driving-shaft, means for driving said gears from said driving-shaft, independent coupling devices for coupling said sets of printing mechanism independently to said driving-shaft, and means for operating said coupling devices while said shaft is in motion, substantially as described.

7. In a printing-press, the combination with a plurality of sets of printing mechanism arranged one above another, and a series of gears connecting said sets of printing mechanism together in series, certain of said gears being movable out of engagement with other gears of the series to permit independent operation of certain sets of printing mechanism,

of a driving-shaft, means for driving said gears from said driving-shaft, a vertical driving-shaft, means for driving said latter shaft, a series of coupling devices independent of said gears between said vertical shaft and the sets of printing mechanism, and levers for operating said coupling devices independently of one another, substantially as described.

8. In a printing-press, the combination with a plurality of sets of printing mechanism arranged one above another, of a horizontal driving-shaft, a vertical driving-shaft arranged on one side of the press, a series of beveled pinions carried by said vertical shaft, a series of friction-clutches carried by said sets of printing mechanism and having beveled pinions adapted to mesh with said beveled pinions carried by said vertical shaft, means for operating said friction-clutches to connect and disconnect said sets of printing mechanism with said vertical shaft, and means independent of said clutches for coupling together a plurality of said sets of printing mechanism, substantially as described.

9. In a printing-press, the combination with a plurality of sets of printing mechanism arranged one above another, of a horizontal driving-shaft, a vertical driving-shaft arranged on one side of the press, a series of beveled pinions carried by said vertical shaft, a series of clutches carried by said sets of printing mechanism and having beveled pinions adapted to mesh with said beveled pinions carried by said vertical shaft, means for operating said clutches to connect and disconnect said sets of printing mechanism with said vertical shaft, a series of working gears for driving said sets of printing mechanism, adjustable intermediate pinions for connecting said sets of printing mechanism in series and for disconnecting them, and means for driving said gears from the horizontal driving-shaft, substantially as described.

10. In a printing-press, the combination with a plurality of sets of printing mechanism arranged one above another, of a horizontal driving-shaft, a series of working gears carried by said sets of printing mechanism at one side of the press, adjustable intermediate pinions for connecting said gears in series and for disconnecting them, a vertical shaft, means for driving said vertical shaft, a series of independent clutches connected to said sets of printing mechanism, and means whereby said clutches may be operated to connect them with said vertical shaft, substantially as described.

11. In a printing-press, the combination with a plurality of sets of printing mechanism arranged one above another, of a driving-shaft, independently-operable devices for connecting certain of said sets of printing mechanism to said driving-shaft while said shaft is in motion, a lever for operating each of said connecting devices, and means independent

of said drive-shaft for coupling together certain of said sets of printing mechanism, whereby a plurality of sets of printing mechanism may be simultaneously connected to said drive-shaft by operating a single lever, substantially as described.

12. In a printing-press, the combination with a plurality of sets of printing mechanism arranged one above another, of a vertical driving-shaft, independent coupling devices for each of said sets of printing mechanism, and means for operating said coupling devices to connect or disconnect each of said sets of printing mechanism from said vertical driving-shaft while said shaft is in motion independently of the other sets of printing mechanism, substantially as described.

13. In a printing-press, the combination with a plurality of sets of printing mechanism arranged one above another, of a vertically-arranged driving-shaft, a series of independently-operating friction-clutches for independently connecting and disconnecting said sets of printing mechanism and said driving-shaft, and levers for operating said friction-clutches, substantially as described.

14. In a printing-press, the combination with a plurality of sets of printing mechanism arranged one above another, of a driving-shaft, independently-operable friction-clutches for connecting certain of said sets of printing mechanism to said drive-shaft while said shaft is in motion, a lever for operating each of said clutches, and gears for coupling together certain of said sets of printing mechanism, whereby a plurality of sets of printing mechanism may be simultaneously connected to said drive-shaft by operating a single lever, substantially as described.

15. In a printing-press, the combination with a plurality of sets of printing mechanism arranged one above another, of means for starting and stopping different sets of printing mechanism independently, means for coupling together certain of said sets of printing mechanism, a plurality of folding mechanisms arranged one above another, and means for driving said folding mechanisms independently of one another and in combination with different sets of printing mechanism, substantially as described.

16. In a printing-press, the combination with a plurality of sets of printing mechanism arranged one above another, of a driving-shaft, independent clutches for driving said sets of printing mechanism from said shaft, means independent of said shaft for connecting certain of said sets of printing mechanism together, whereby a plurality of sets of printing mechanism may be started by operating a single clutch, and folding mechanism operating in connection therewith, substantially as described.

17. The combination with a set of printing mechanism, of a plurality of folding mechanisms, and means for operating said folding

mechanisms independently of one another from and in combination with the printing mechanism, substantially as described.

18. The combination with a plurality of 5 sets of printing mechanism, of a folding device, and means for driving said folding device from, and in combination with, different sets of printing mechanism operating separately, substantially as described.
19. In a printing-press, the combination 10 with a plurality of sets of printing mechanism arranged one above another, and a series of gears connecting said sets of printing mechanism together in series, certain of said gears 15 being movable out of engagement with other gears of the series to permit independent operation of certain of said sets of printing mechanism, of a driving-shaft, independent connecting devices for connecting certain of 20 said sets of printing mechanism independently to said drive-shaft, said connecting devices being operable while said shaft is in motion, substantially as described.
20. In a printing-press, the combination 25 with a plurality of sets of printing mechanism arranged one above another, of a vertical driving-shaft, a series of beveled pinions carried by said shaft, friction-clutches carried by certain of said sets of printing mechanism and having beveled pinions adapted to 30

mesh with said beveled pinions carried by said shaft, means for operating said friction-clutches to connect and disconnect said sets of printing mechanism and said shaft, and means independent of said shaft for coupling 35 together a plurality of said sets of printing mechanism, substantially as described.

21. In a printing-press the combination of three or more sets of printing mechanism arranged one above another in a common frame 40 and capable of operation as distinct and independent presses, means for coupling together certain of said sets of printing mechanism and means for starting and stopping said coupled sets and the other set or sets of 45 printing mechanisms independently of each other, substantially as described.

22. In a printing-press the combination of a plurality of sets of printing mechanism, means for starting and stopping certain sets 50 of printing mechanism independently, a plurality of folding mechanisms and means for driving said folding mechanisms independently of each other and in combination with different sets of printing mechanism, sub- 55 stantially as described.

SAMUEL G. GOSS.

Witnesses:

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JULIA M. BRISTOL.