No. 819,813. PATENTED MAY 8, 1906.

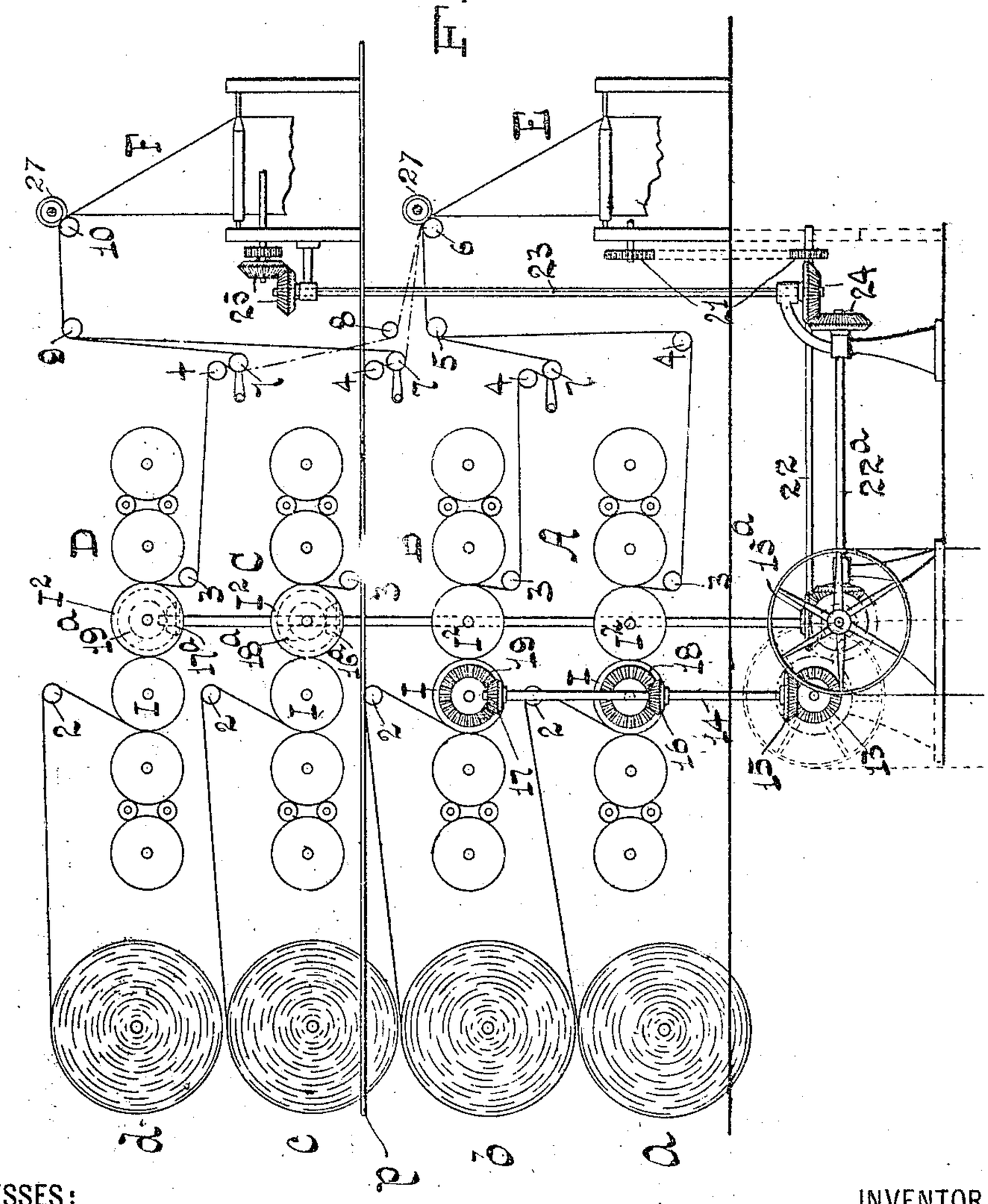
W. SCOTT.

PRINTING MACHINE.

APPLICATION FILED APR. 19, 1895.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

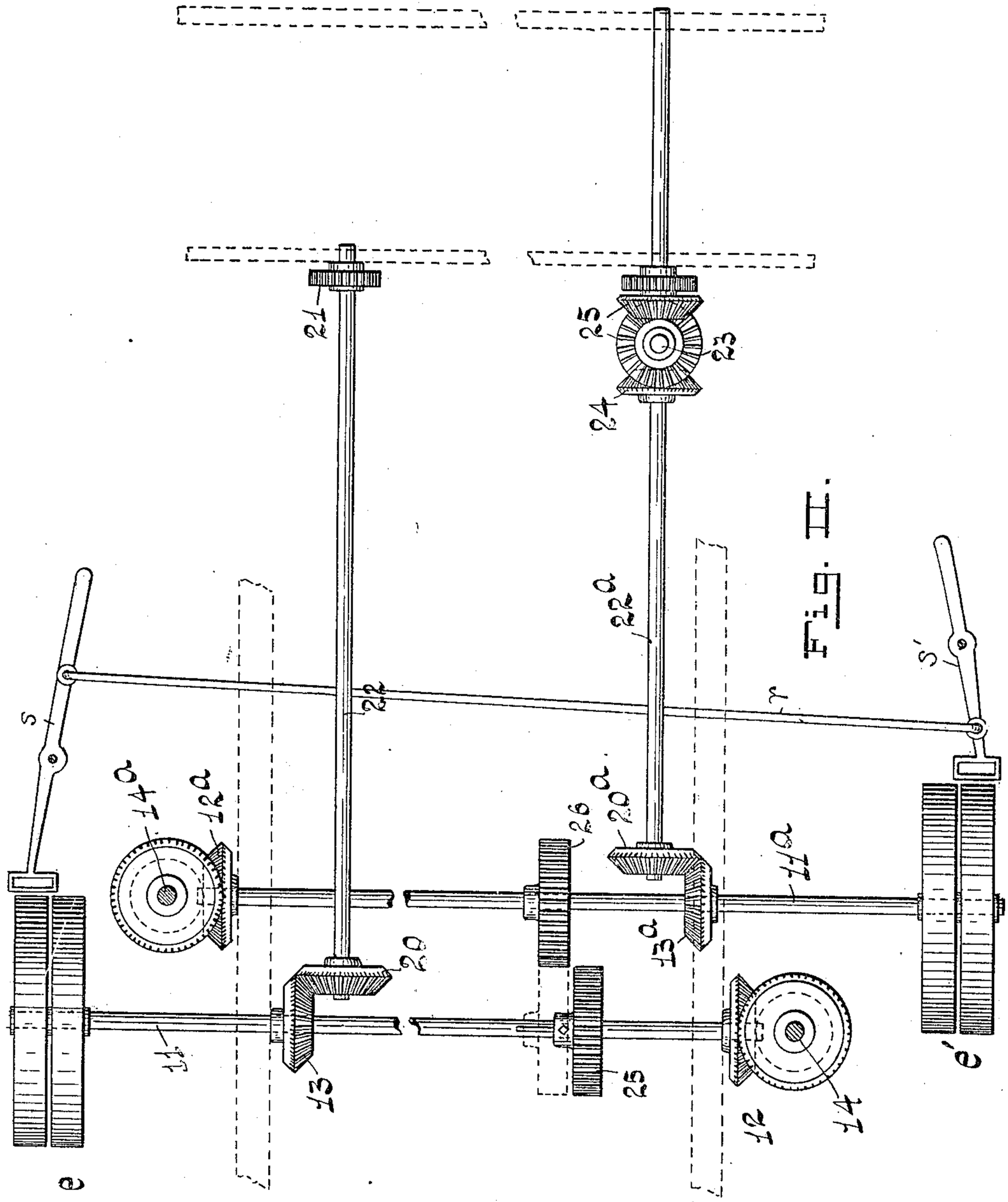

Fig. 5.

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3 SHEETS—SHEET 3.

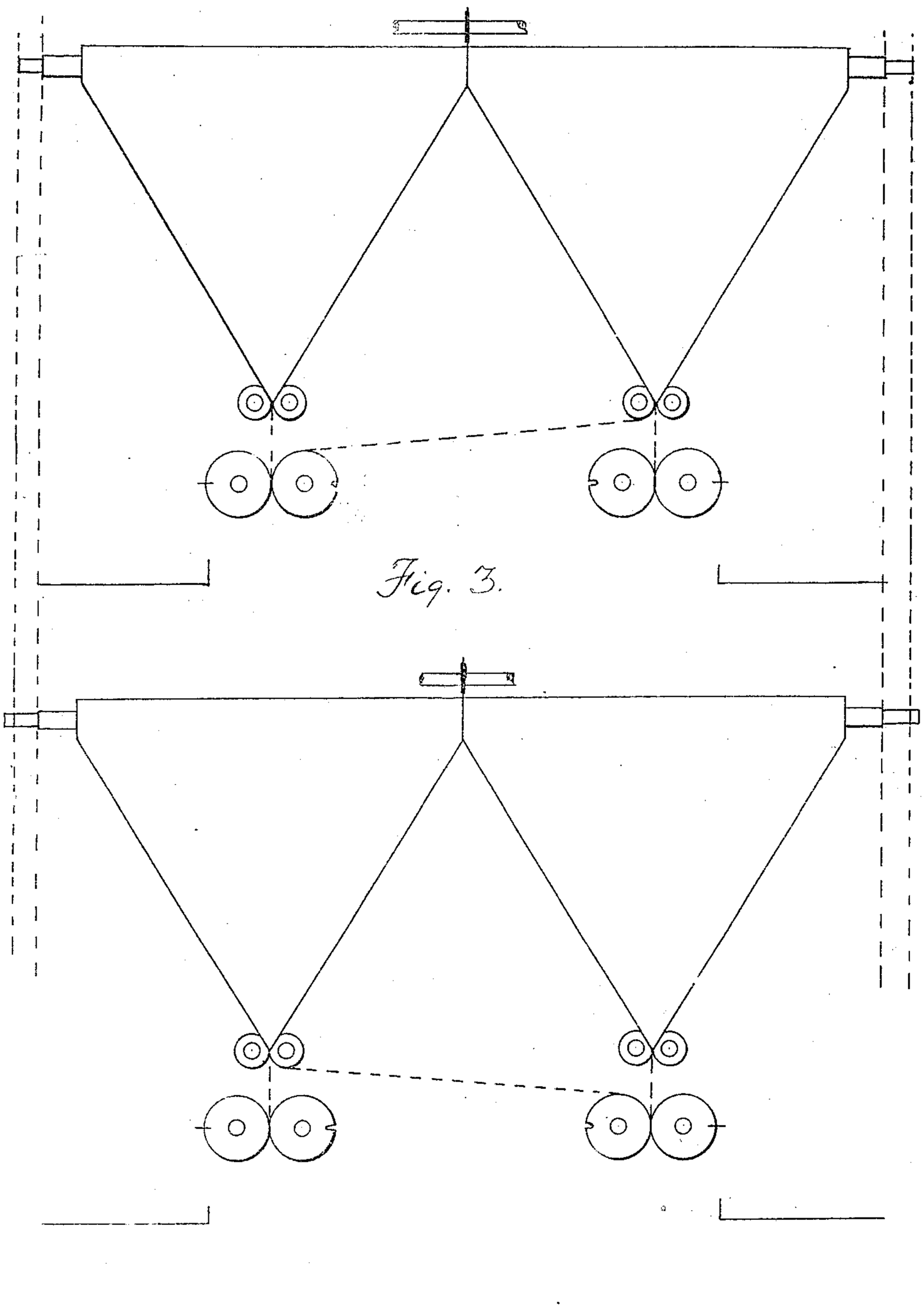

Fig. 3.

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UNITED STATES PATENT OFFICE.

WALTER SCOTT, OF PLAINFIELD, NEW JERSEY.

PRINTING-MACHINE.

No. 819,813. Specification of Letters Patent. Patented May 8, 1906.

Application filed April 19, 1895. Serial No. 546,316.

To all whom it may concern:

Be it known that I, WALTER SCOTT, a citizen of the United States, and a resident of Plainfield, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Printing-Machines, of which the following is a specification.

This invention relates to that class of printing-machines wherein a plurality of webs are first perfected and then taken to one or more folding mechanisms, whence the products are delivered. These printing and folding machines are designed for a variety of uses. Thus all the webs may go to one folding and cutting machine to form one product or the webs or sections thereof may be associated in various ways and led to two or more folding and cutting mechanisms, thus giving as many products. Machines of this class and their limitations and defects are well known in the art. Thus if a machine be of a capacity for producing a copy containing a great many pages and two or more copies of a few pages, and it is desired to have products containing the fewer pages many adjustments have to be made in order to do so, and to avoid running the whole machine.

One object of this invention is to produce two or more like or unlike printed products from webs of paper by perfecting machines used independently to do so, and which may be connected together and all the webs be associated to make one product. Of course the capability of producing two independent products by means of sets of web-perfecting form and impression cylinders includes the capacity of running but one such set to make one product, if so desired. The webs may be associated, folded, and cut and collected in any desired or known manner, and I remark that the sequence of these operations may be varied to suit, and some of them may be omitted, or the products may be delivered flat or folded one or more times, as may be desired.

To these ends the invention consists of combinations of groups of web-perfecting form and impression cylinders, (each perfecting-press comprising two sets of printing mechanisms and each of said sets comprising a form and an impression cylinder,) with a driving mechanism for each group, said driving mechanisms acting independently of each other. The webs from the various groups may be associated to form one product. In order to prevent possible differences in the speeds of the cylinders of the various groups when associating all the webs to form one product, the driving mechanisms are connected together so that the cylinders will have the same surface speed. When the driving mechanisms are not connected together, any group may be stopped, started, or used independently of all the other groups, and the groups may be used to produce duplicate matter or to produce unlike matter, as newspapers, magazines, &c. The inking apparatus may be of any suitable character. When there are two or more web-perfecting presses in each group, the inking apparatus for each press may be independent or all may be operated from one source of power.

The preferred form of the invention is shown in the accompanying drawings, forming part hereof, in which—

Figure 1 is a side elevation of a printing mechanism comprising four rotary web-perfecting printing-presses and two folders, the framework being omitted for the sake of clearness. Fig. 2 is a plan view showing the driving mechanisms for the printing-presses shown in Fig. 1. Fig. 3 is an end view showing four folders arranged in pairs on different levels, the pairs being one over the other.

Referring to the drawings, four perfecting-presses A B C D are shown placed one above another, the cylinders of each press being in a horizontal plane and the presses being parallel or substantially parallel with each other. A platform *p* extends along each side of the framework for the workmen to stand upon.

There is a roll or web of paper, as *a b c d*, for each printing-press shown. The webs *a b c d* are led over guide-rollers 2 to their respective presses, where they are perfected, and thence to guide-rollers 3, from which they are led to other guide-rollers 4. From these rollers 4 the course of the webs will depend upon the size of the product which is to be delivered. The webs *a b* are led to and associated upon a roller 5 and are thence led over a roller 6 to the folding-machine E, where they get a longitudinal fold, and other folds, if desired, before delivering. The web *b* is led about an adjustable roller 7, by means of which it is brought into proper register with

the web *a* on the roller 5. If all the webs are to go to the same folding-machine, the webs *c d* are led about adjustable rollers 7 and over rollers 8, if desired, and associated with the webs *a b* upon the roller 6 of the folding-machine E. If, however, the webs *c d* are to be folded separately from the webs *a b*, they are led about their adjustable rollers 7 to the roller 9, where they are associated. Thence they are led to the roller 10 of the folding-machine F, where they may be folded as often as desired and then delivered, it being understood in all cases that the folding-machines E F may or may not contain mechanism for suitably severing the webs transversely, as the said severing may take place before the matter reaches the folder.

For the purpose of more readily utilizing the capacity of the above-described machines I prefer to drive them, as will now be described. The machines shown are arranged to be driven in pairs by separate means, the arrangements being such, however, that when the webs from the two pairs are to be combined into one product the machines may be driven at the same surface speeds. The machines A and B are driven from the belt-pulleys *e* on the shaft 11, one of said pulleys being fast and the other loose, as common. This shaft 11 extends transversely of the machine, parallel or substantially parallel with the axes of the cylinders thereof and carries bevel-gears 12 13. On one side of the machine, preferably on the side opposite the pulleys *e*, is an upright shaft 14, which carries the bevel-gears 15 16 17, of which the first meshes with gear 12, the second with a gear 18 on an impression-cylinder of machine A, and the last with a gear 19 on a like cylinder of machine B. The folding-machine E is driven from shaft 11 by means of gears 13 20 21 and the shaft 22. The mechanism for driving the upper pair of printing-machines and folder F consists of pulleys *e'*, shafts 11^a 14^a 22^a, gears 12^a 13^a 15^a 16^a 17^a 18^a 19^a 20^a, corresponding parts in the mechanism for driving the presses C and D having the same references with the superior indices added as the corresponding parts in the mechanism for driving the presses A and B and the shaft 23 and gears 24 $25^\times$. It will be noted that the impression-cylinders I I^2 of the presses shown in the drawings are arranged in parallel vertical planes and that the cylinders I of the lower pair of presses are the ones driven by the shaft 14, while cylinders I^2 of the upper pair of presses are the ones driven by the shaft 14^a. This is the preferred arrangement of parts. It is obvious, however, that other arrangements may be made and the distinctive features of the invention still be retained.

If copies containing more than eight pages are to be produced, the shafts 11 11^a are connected together by means of the gears 25 26 thereon, one of said gears, as 25, being movable longitudinally of its shaft and splined thereto, so that these gears may be connected and disconnected at will, and the webs are all taken to one folder. In this way copies containing ten, twelve, fourteen, and sixteen pages may be produced and, if sheets are collected, double the number of pages named.

It must be understood that in the foregoing it is assumed that the presses use what is commonly called "single-width" webs and that there is no association of sections of one and the same web or webs nor any collecting of successive cuts and that the forms are of a size for two of them to take up the full width of the web, leaving the usual margins; but it is obvious that in so far as the driving mechanism is concerned it is immaterial whether the presses be of a single or greater width or whether the folders E F each be replaced by two folders or how the webs be split or handled to get more than sixteen-page products.

It is obvious that more or less than two pairs of form and impression cylinders may be used in each group of printing-presses having a common driving mechanism and that there may be more than two groups.

The belt-shifters *s s'* for the pulleys *e e'* may be connected together by any suitable means whenever the driving mechanisms are coupled to run all the presses at the same speed. The means shown for this purpose consists of a rod *r*, which has its ends turned at right angles to its body, which ends are set into holes in the shifters whenever it is desired to join them together, so that one driving mechanism cannot be stopped or started without stopping the other or starting it, as the case may be.

It will be noted that the upright shaft 14 is geared to the first impression-cylinders of sets of printing mechanism A and B and shaft 14^a to the second impression-cylinders of the sets of printing mechanism C and D, thus giving free access to all the impression and form cylinders from one or the other side of the machine.

While the upright shafts 14 and 14^a are shown at opposite sides of the machine, it is obvious that they could be placed on the same side without departing from this invention. The same remark applies to the driving-pulleys also.

Fig. 3 is an end view showing four folders arranged vertically above each other by pairs on different levels. In this figure each of the folders E F shown in Fig. 1 is replaced by two folders whose delivery apparatuses are merely indicated in Fig. 3. The webs are of double width and are split. The folded halves of these webs may go each to its own folder and there be folded, cut, and delivered, or the folded halves of the double-width webs may be associated in various ways to form products of the desired number of pages.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a printing-press, the combination with a plurality of sets of printing mechanism arranged one above another in a common frame, of a plurality of independent driving mechanisms, means for driving certain of said sets of printing mechanism by one of said driving mechanisms and certain other of said sets of printing mechanism by another of said driving mechanisms, and a plurality of folding mechanisms, substantially as described.

2. In a printing-press, the combination with a plurality of sets of printing mechanism arranged one above another in a common frame, of a plurality of independent driving mechanisms, means for driving certain of said sets of printing mechanism by one of said driving mechanisms and certain other of said sets of printing mechanism by another of said driving mechanisms, means for coupling said driving mechanisms together so that they will operate jointly, and a plurality of folding mechanisms, substantially as described.

3. In a printing-press, the combination with a plurality of sets of printing mechanism arranged one above another in a common frame, of a plurality of independent driving mechanisms, and means for driving certain of said sets of printing mechanism by one of said driving mechanisms and certain of said sets of printing mechanism by another of said driving mechanisms.

4. In a printing-press, the combination with a plurality of sets of printing mechanism, of driving-gears located at opposite sides of the press for driving the different sets of printing mechanism, and independent driving-shafts for communicating power to the driving-gears at the opposite sides of the press, whereby the different printing mechanisms may be operated as separate presses and one set of printing mechanism stopped without interfering with the other sets of printing mechanism.

5. In a printing-machine, the combination of two pairs of web-perfecting presses, the members of each pair being arranged one over the other, folding mechanism for each of said pairs of presses, independent driving mechanisms for said pairs of presses and their folding mechanisms, means for coupling said driving mechanisms together, and means for associating perfected webs; substantially as described.

6. In a printing-press, the combination with a plurality of sets of printing mechanism arranged one above another in a common frame, of a plurality of independent driving mechanisms, means for driving certain of said sets of printing mechanism by one of said driving mechanisms and certain of said sets of printing mechanism by another of said driving mechanisms, and means for coupling said driving mechanisms together, whereby the said sets of printing mechanism may be started and stopped independently one of another and may be driven together as one press or machine, substantially as described.

7. In a printing-press, the combination with a pluralty of sets of printing mechanism mounted in a common frame, of a plurality of driving mechanisms independent of each other, means for driving certain of said sets of printing mechanism by one of said driving mechanisms and certain other of said sets of printing mechanism by another of said driving mechanisms, and a plurality of folding mechanisms, substantially as described.

8. In a printing-press, the combination with a plurality of sets of printing mechanism, of driving devices at each side of the press, and independent driving-shafts for operating said driving devices at opposite sides of the press, substantially as described.

9. The combination of two printing-presses for perfecting webs and arranged one over the other, two horizontal drive-shafts, mechanism for connecting one of said shafts with one of said presses and the other shaft with the other press, and means for connecting and disconnecting said shafts at will, substantially as described.

10. The combination of groups of form and impression cylinders, said groups being arranged one above another, with a horizontal and an upright shaft and connections for each of said groups for driving the said cylinders thereof, and means for connecting said independent driving mechanisms at will, substantially as described.

11. The combination of two printing-presses for perfecting each a web and arranged one above another, two horizontal shafts, an upright shaft at each side of the machine, gearing connecting one of said upright shafts with one of said horizontal shafts and one of said presses and the other upright shaft with the other horizontal shaft and the other press, and means for connecting the horizontal shafts at will, substantially as described.

12. The combination of two printing-presses for perfecting each a web and arranged one above another, two horizontal shafts tight and loose pulleys on said horizontal shafts, gearing connecting one of said shafts with one of said presses and the other of said horizontal shafts with the other of said presses, belt-shifters, and means for connecting said shafts together and the belt-shifters together at will, substantially as described.

13. The combination of two web-presses arranged one above the other, a horizontal drive-shaft for each press, an upright shaft for each press driven by the corresponding horizontal shaft, gearing for connecting one

of said upright shafts with the first impression-cylinder of one of said presses and the other upright shaft with the second impression-cylinder of the other press, and means for connecting and disconnecting said horizontal shafts at will, substantially as described.

14. The combination of two web-presses arranged one over the other, a horizontal drive-shaft for each press, fast and loose pulleys on said shafts, gearing connecting one of said horizontal shafts with the first impression-cylinder of one of said presses and the other horizontal shaft with the second impression-cylinder of the other press, means for connecting and disconnecting said shafts with and from each other, belt-shifters, and means for connecting and disconnecting said shifters with and from each other, substantially as described.

15. The combination of a web-press, means for driving said press from one side of the machine, a lever at each side of the press, one of said levers throwing power on and off, and connections between said levers, whereby each may be used to throw the power on and off and the press be started and stopped from each side of the machine.

16. In a printing-press, the combination with a plurality of sets of printing mechanism, of a plurality of driving mechanisms independent of each other and driven by independent belts, means for driving certain of said sets of printing mechanism by one of said driving mechanisms and certain other of said sets of printing mechanism by another of said driving mechanisms, and means whereby all of said sets of printing mechanism may be driven from either of said belts.

17. In a printing-press, the combination with a plurality of sets of printing mechanism mounted in a common frame, of a plurality of independent driving mechanisms adapted to operate independently of each other, means for driving certain of said sets of printing mechanism by one of said driving mechanism and certain other of said sets of printing mechanism by another of said driving mechanism, means for coupling said driving devices together so that they will operate jointly to drive said sets of printing mechanism, and a plurality of folding mechanisms adapted to receive the webs from said sets of printing mechanism.

18. In a printing-press, the combination of two sets of printing mechanism arranged one above the other in a common frame, two independent driving mechanisms, and means for driving one of said sets of printing mechanism by one of said driving mechanisms and the other set of printing mechanism by the other driving mechanism.

19. In a printing-press, the combination of two sets of printing mechanism arranged one above the other on a common frame, two independent driving mechanisms driven by independent belts, means for driving one of said sets of printing mechanism by one of said driving mechanisms and the other of said sets of printing mechanism by the other driving mechanism, and means for driving both sets of printing mechanism by either of said driving-belts.

20. In a printing-press, the combination of two sets of printing mechanism arranged one above the other in a common frame, two independent driving mechanisms, means for driving one of said sets of printing mechanism by one of said driving mechanisms and the other set of printing mechanism by the other driving mechanism, and means for coupling said driving mechanisms together.

21. In a printing-press, the combination of two sets of printing mechanism arranged one above the other in a common frame, two independent driving mechanisms, means for driving one of said sets of printing mechanism by one of said driving mechanisms and the other set of printing mechanism by the other driving mechanism, means for driving both sets of printing mechanism by one set of driving mechanism, and means for coupling said driving mechanisms together.

22. In a printing-press, the combination of a plurality of sets of printing mechanism arranged one above another in a common frame, two driving-shafts for driving said sets of printing mechanism, means whereby either set of printing mechanism may be disconnected from its driving-shaft, two independent driving-belts, and means whereby said shafts may be driven from either of said belts, substantially as described.

23. In a printing-press, the combination with a plurality of sets of printing mechanism arranged one above another in a common frame, of driving-gears located at opposite sides of the press for driving the different sets of printing mechanism, and independent driving-shafts for communicating power to the driving-gears at the opposite sides of the press whereby the different printing mechanisms may be operated as separate presses and one set of printing mechanism stopped without interfering with the other sets of printing mechanism.

24. In a printing-press, the combination with a plurality of sets of printing mechanism arranged one above another in a common frame, 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 with their corresponding sets of printing mechanism.

25. In a printing-press, the combination with a plurality of sets of printing mech

ism arranged one above another in a common frame, of driving devices at each side of the press, and independent driving-shafts for operating said driving devices at opposite sides of the press.

26. The combination of two printing-presses for perfecting webs and arranged one over the other in a common frame, two horizontal drive-shafts, mechanism for connecting one of said shafts with one of said presses and the other shaft with the other press, and means for connecting and disconnecting said shafts at will.

27. The combination of groups of form and impression cylinders, said groups being arranged one above another in a common frame, with a horizontal and an upright shaft and connections for each of said groups for driving the said cylinders thereof, and means for connecting said independent driving mechanisms at will.

28. The combination of two printing-presses for perfecting each a web and arranged above one another in a common frame, two horizontal shafts, an upright shaft at each side of the machine, gearing connecting one of said upright shafts and one of said presses and the other upright shaft with the other horizontal shaft and the other press, and means for connecting the horizontal shafts at will.

29. The combination of two web-presses arranged one above the other in a common frame, a horizontal drive-shaft for each press, an upright shaft for each press driven by the corresponding horizontal shaft, gearing for connecting one of said upright shafts with the first impression-cylinder of one of said presses and the other upright shaft with the second impression-cylinder of the other press, and means for connecting and disconnecting said horizontal shafts at will.

Signed at New York, in the county of New York and State of New York, this 12th day of April, A. D. 1895.

WALTER SCOTT.

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