Dec. 21, 1937. F. LAMATSCH 2,102,631

DRIVE FOR PRINTING MACHINES

Filed Feb. 26, 1934 5 Sheets-Sheet 1

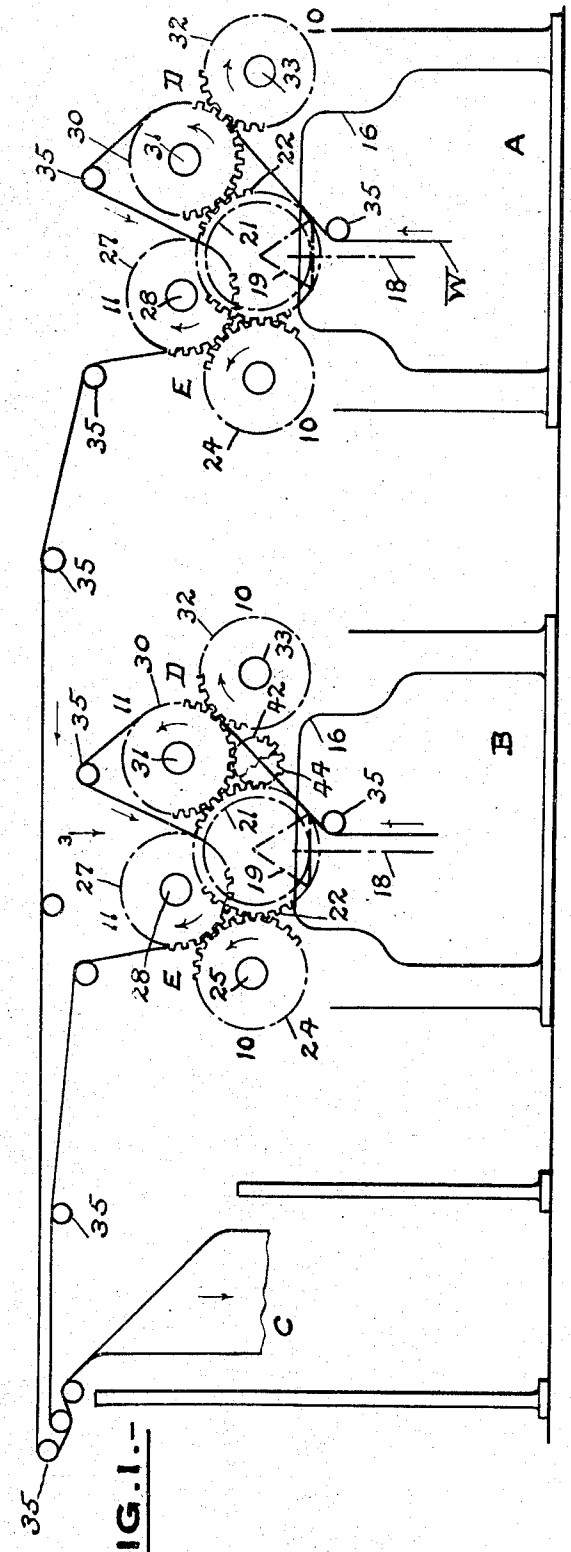

FIG. 1.

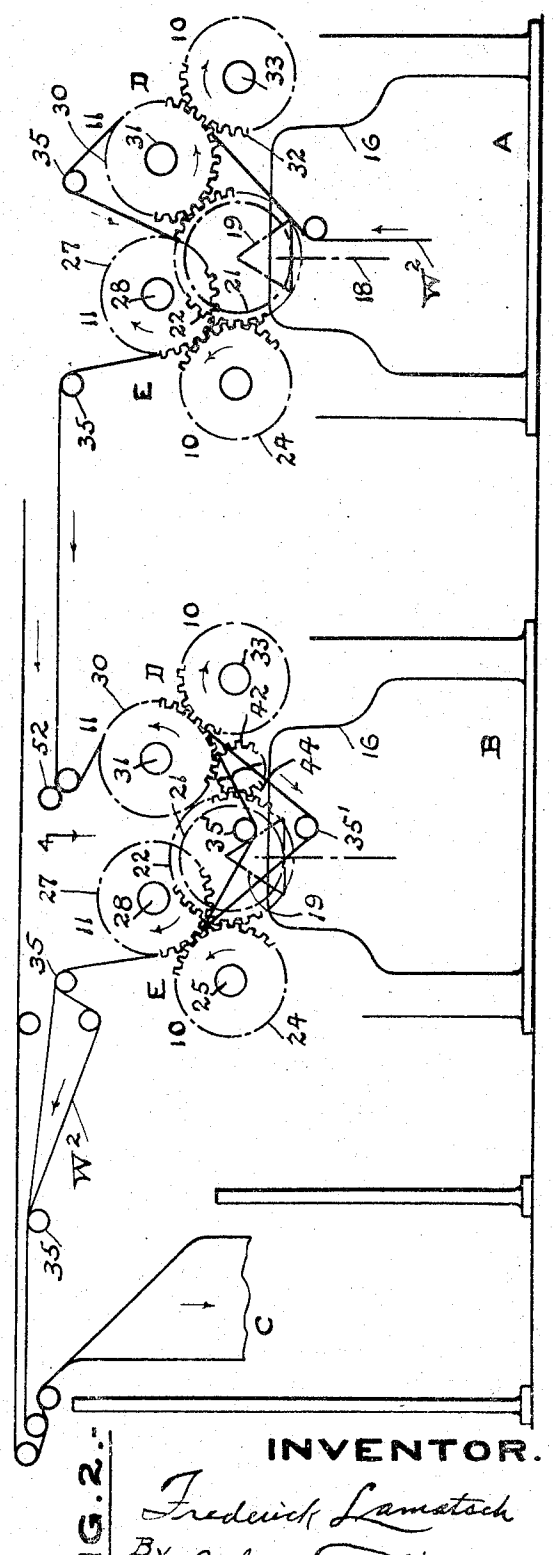

FIG. 2.

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Dec. 21, 1937. F. LAMATSCH 2,102,631

DRIVE FOR PRINTING MACHINES

Filed Feb. 26, 1934 5 Sheets-Sheet 2

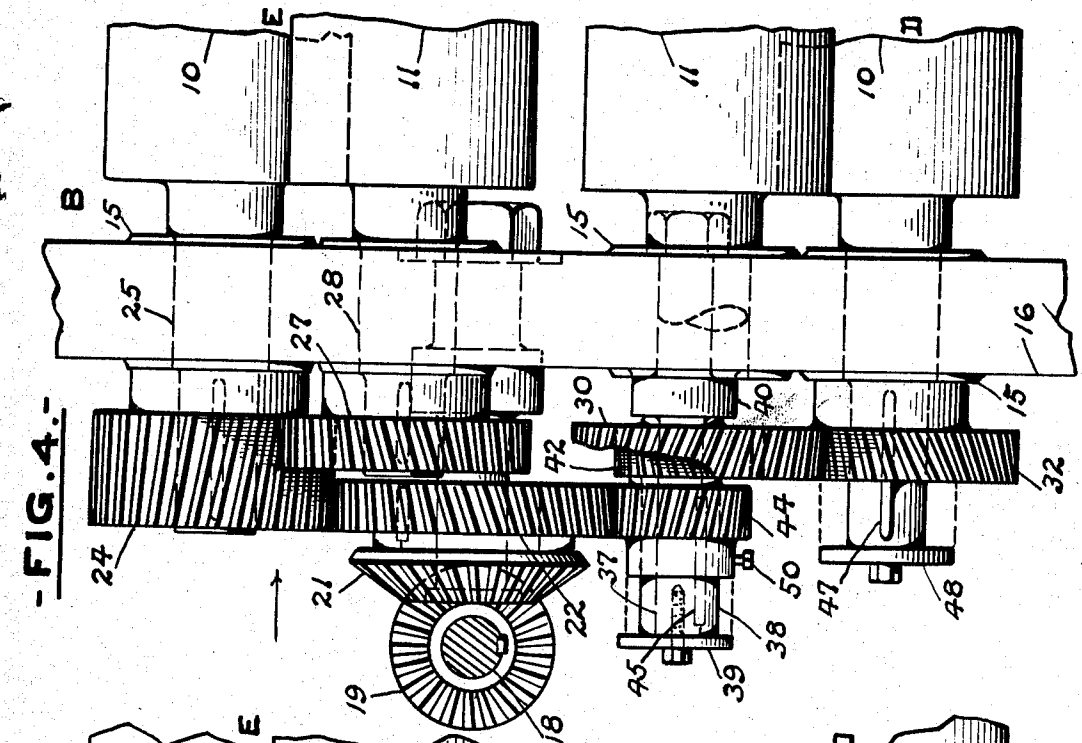

FIG. 4.

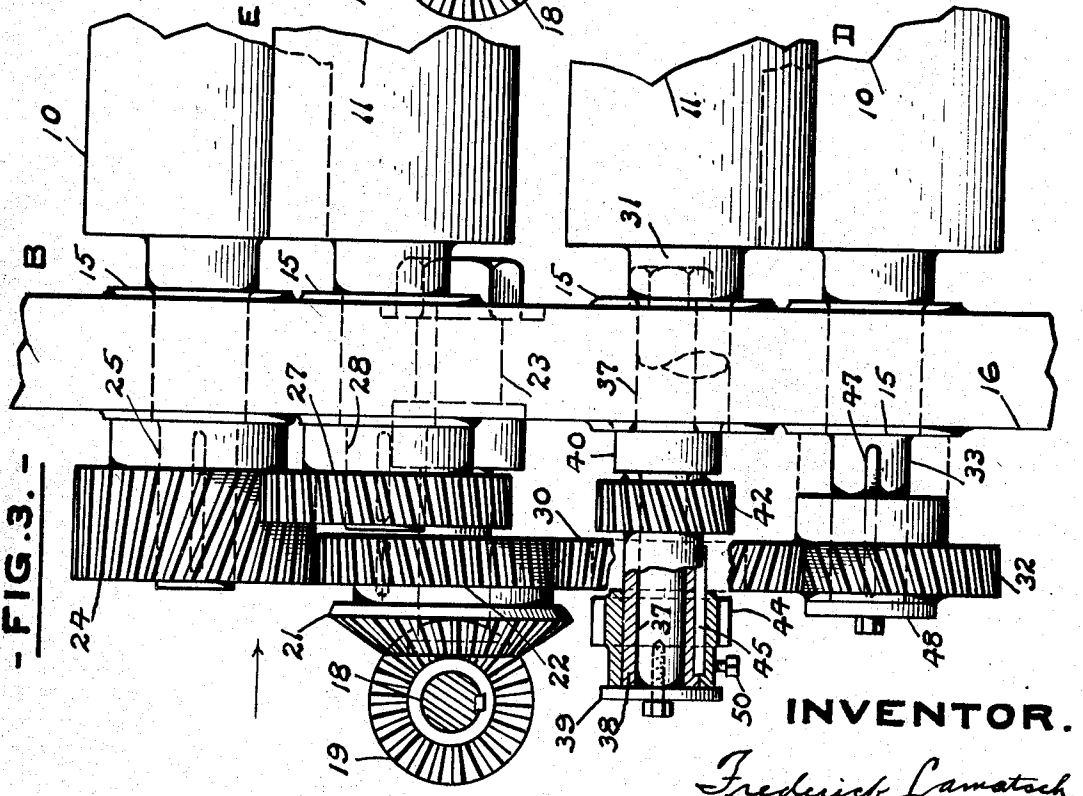

FIG. 3.

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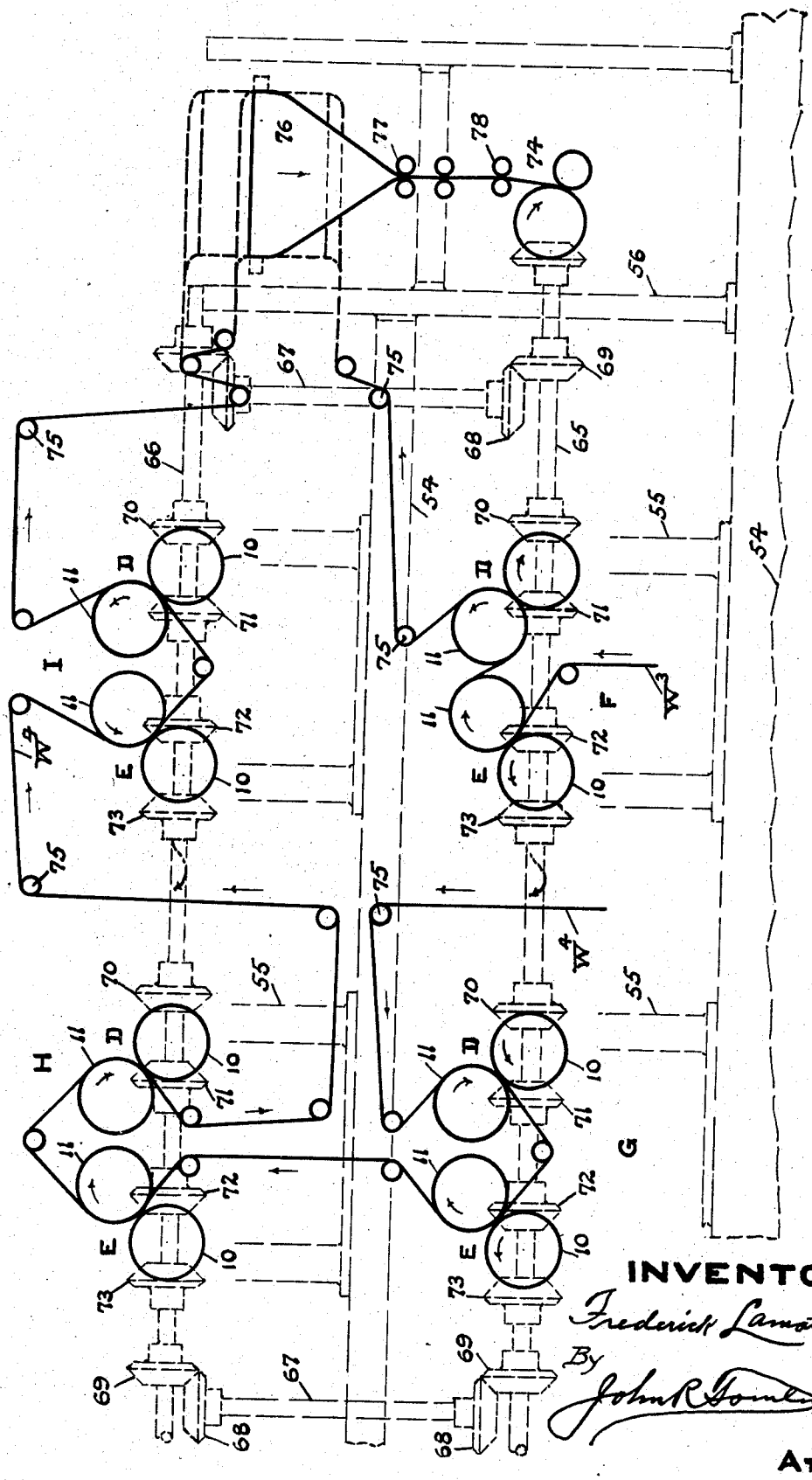
Dec. 21, 1937. F. LAMATSCH 2,102,631

DRIVE FOR PRINTING MACHINES

Filed Feb. 26, 1934 5 Sheets-Sheet 3



-FIG.5.-

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Dec. 21, 1937. F. LAMATSCH 2,102,631

DRIVE FOR PRINTING MACHINES

Filed Feb. 26, 1934 5 Sheets-Sheet 4

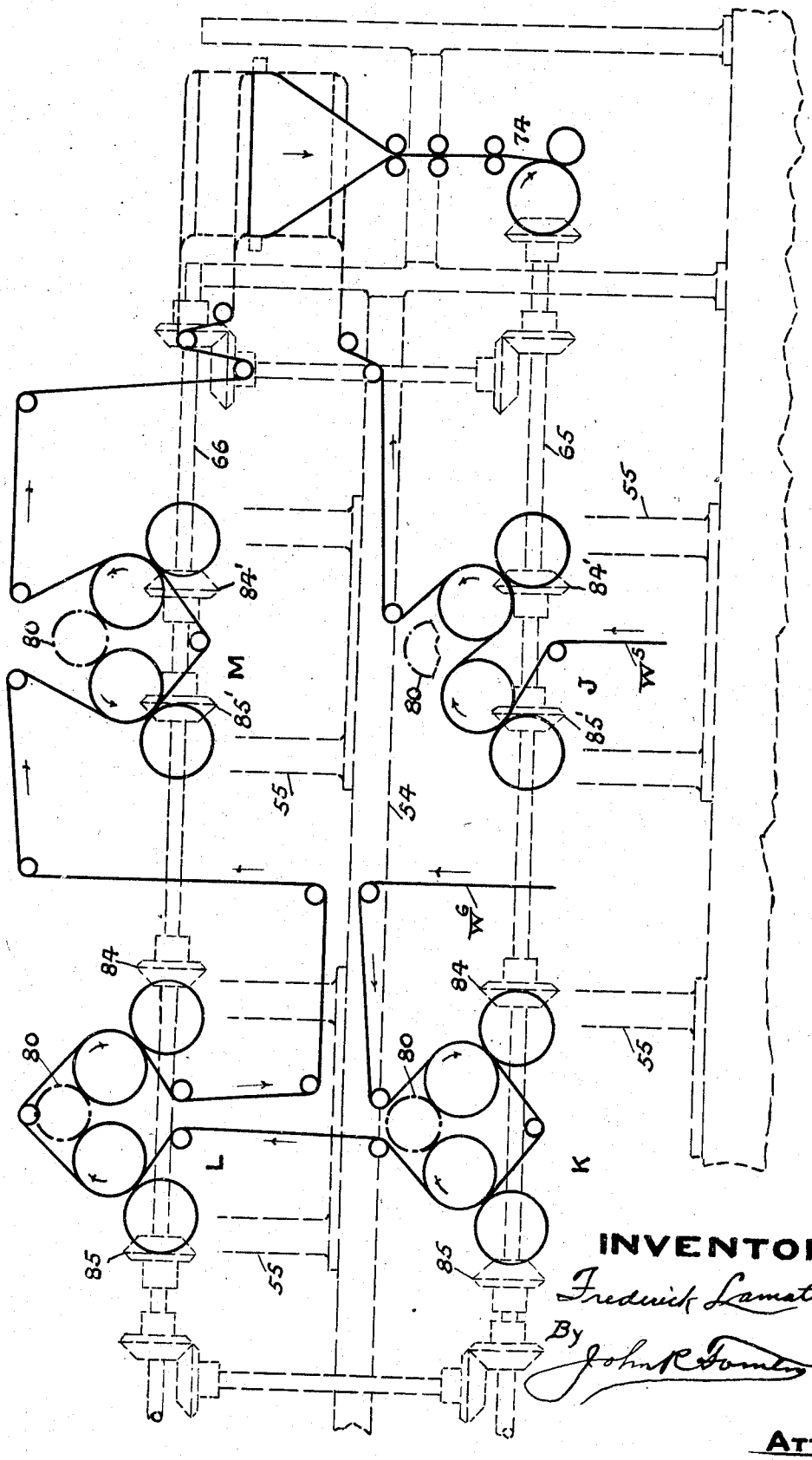

FIG. 6.

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DRIVE FOR PRINTING MACHINES

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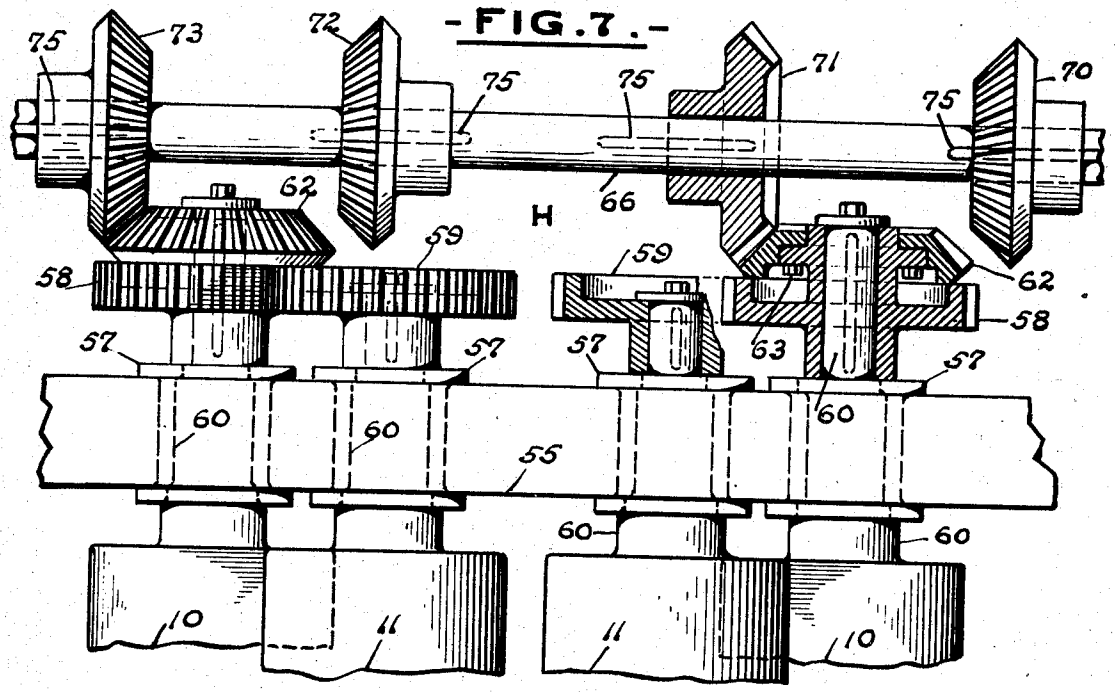
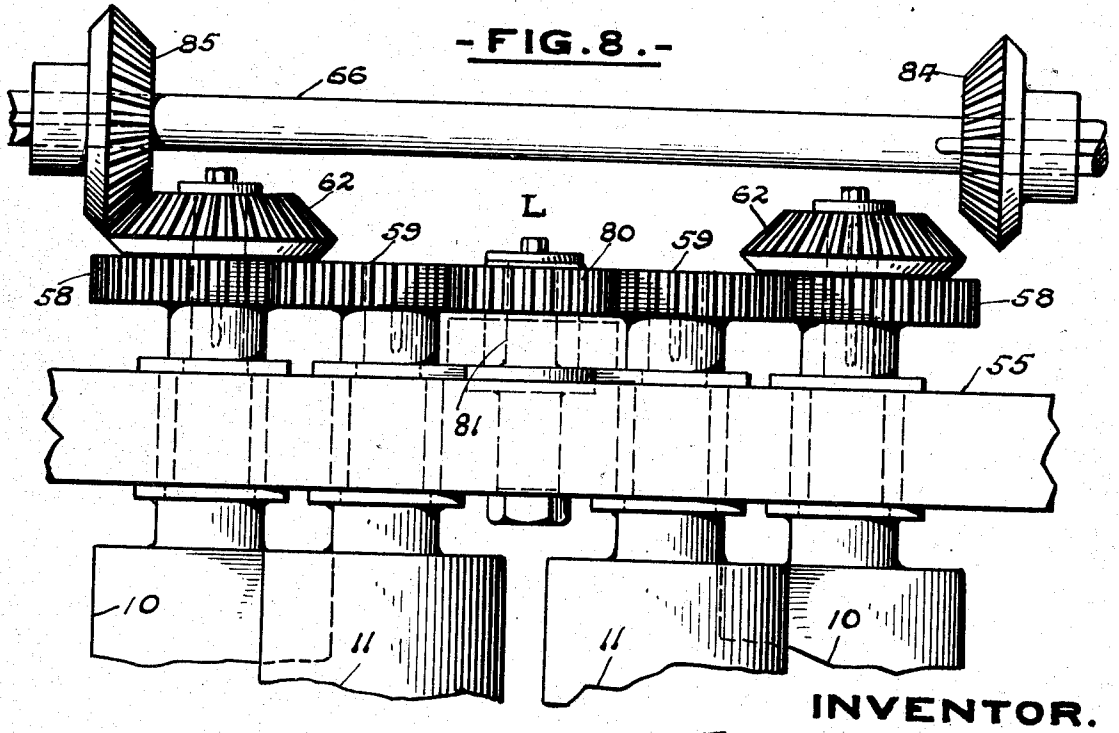
-FIG. 7.-



-FIG. 8.-



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Patented Dec. 21, 1937

2,102,631

UNITED STATES PATENT OFFICE

2,102,631

DRIVE FOR PRINTING MACHINES

Frederick Lamatsch, Grantwood, N. J., assignor, by mesne assignments, to R. Hoe & Co., Inc., New York, N. Y., a corporation of New York

Application February 26, 1934, Serial No. 713,058

18 Claims. (Cl. 270—5)

This invention relates to certain improvements in printing machines, and more particularly to the drive mechanism therefor.

Web printing machines have been heretofore driven through the intermediation of various instrumentalities, such as gears, chains, belts and the like, from any suitable source of power, usually an electric motor or motors. Gears are more frequently employed to drive printing machines, and these gears are usually positioned at both sides of the printing machine, or each unit thereof, or at the opposed terminals of the printing cylinder shafts. In some instances, the power is imparted to the machine, or each unit thereof, at one side, and then transmitted through a shaft or shafts to the opposed side of the machine where the components of the press, or each unit thereof, are synchronized or driven in predetermined relationship through intermeshing gears. In other types of printing machines, certain operative components are driven by gears positioned at one side of the machine, and other components driven by gears positioned at the opposed side, and in these arrangements the power is transmitted across the machine through drive shafts, thereby subjecting these shafts to tortional stresses and strains. The machine in performing its intended functions encounters varying resistances, or fluctuating operating loads, and the power transmitting shafts which extend entirely or partly across the machine being, as explained, subjected to tortional stresses tend to set up vibration as these tortional stresses are suddenly increased and diminished in conformity with the increase or decrease of the operating loads.

Where power is imparted to one side of the machine and then transmitted through relatively long shafts to operating components positioned on the opposed side of the machine, the tortional strain or twist of each shaft causes minute desynchronization of the immediate operating component, and when power is carried through a number of shafts the aggregate effect of these tortional strains produce desynchronizating movement of sufficient amplitude to effect register, and especially when superposed printing is being produced.

Furthermore, the tortional twist of the power transmitting shafts tend to whip the intermeshing gears when load fluctuations incident to the normal operation of rotary web printing machines of the newspaper type and the like occur, thereby causing "gear streaks" which are manifested in the production of contrasting bands or zones of relatively light or dark printing which extend longitudinally of the printing cylinders. This gear whipping action caused by the tortional strain or twist of the power transmitting shafts also causes the affected gears to wear, thus producing lost motion or backlash, which, in turn, tends to produce or aggravate streaking and component desynchronization.

It is the especial object of the present invention to provide novel driving means for rotary web printing machines, and particularly printing presses of the unit type to thereby provide great flexibility in press arrangement and web routing.

A more specific object of the present invention is to provide a novel drive for each unit of a rotary web printing machine, the drive being so constructed and arranged that the synchronizing driving gears for the printing cylinders of each unit are operably positioned at one side of the unit, and the drive for the units geared directly to one of the synchronizing gears of the printing cylinders.

Another object of the present invention is the provision of a novel drive for a rotary web printing machine, in which the drive and synchronizing gears for each printing unit are located at one side of the machine and directly intermeshed, components of the drive being constructed and arranged for movement to and from operative engagement in order to effect the reversal of operating direction of a selected printing couple in a printing unit.

It is also an object of this invention to provide in a rotary web printing machine, a drive and synchronizing gear arrangement of generally improved construction, whereby the device will be simple, durable and inexpensive in construction, as well as conveniently accessible, practical, serviceable and efficient in its use.

With these and other objects not specifically referred to in view, the invention consists in certain novel parts, arrangements and combinations, which will be described in connection with the accompanying drawings and the novel features pointed out in the claims hereunto appended.

For a complete disclosure of the invention, a detailed description of a preferred form and modifications of the drive for rotary web printing machines will now be given in connection with the accompanying drawings, forming a part of this specification, and wherein:—

Figure 1 is a diagrammatic elevation of a printing machine, depicting two printing units and a folder in line and showing the novel drive

applied to each unit, the web leads being arranged to print two perfected webs;

Figure 2 is a similar view, but depicting one of the printing units with a printing couple operating in reverse direction, and a common web lead-through both printing units;

Figure 3 is a fragmental plan view, parts appearing in section, showing the drive arrangement in an operating position depicted in Figure 1;

Figure 4 is a similar view, but showing the components of the drive arranged in the operating position shown in the unit at the left of Figure 2;

Figure 5 is a diagrammatic view of a modified drive arrangement;

Figure 6 is a similar view depicting a further modification;

Figure 7 is a fragmental plan view, parts appearing in section, of the drive arrangement disclosed in Figure 5; and

Figure 8 is a similar view of the drive arrangement shown in Figure 6.

Referring to the drawings, in which similar reference characters designate corresponding parts, the invention is shown in Figures 1, 2, 3 and 4 as applied to a printing machine including two printing units and a folder in line. The first printing unit is indicated at A, the second at B and the folder at C. Each unit includes two printing couples D and E, and each couple comprises a plate or form cylinder **10** and cooperating impression cylinder **11**. These cylinders are operably supported in bearings **15**, carried in the usual unit frames **16**. Each unit is provided with a drive shaft **18** operably supported by the frame in any preferred manner, not shown, and each shaft is provided with a bevel gear **19** which meshes with a similar bevel gear **21** secured to or formed as a part of a helical gear **22**. In the type of drive depicted in Figures 1, 2, 3 and 4, the bevel gear **21** and helical gear **22** are operably supported on a short shaft or stud **23** suitably secured to the unit frame **16**, and the gear **22** meshes at one side with a broad helical gear **24** carried by the shaft or trunnion **25** of the form cylinder **10** of the printing couple E, and the gear **24**, in turn, meshes with a helical gear **27** secured to the shaft or trunnion **28** of the impression cylinder **11** of the printing couple E. When the unit is arranged as depicted at A in Figures 1 and 2, and in Figure 3, the gear **22** meshes at its opposed side with a helical gear **30** secured to the shaft or trunnion **31** of the impression cylinder **11** of the couple D, and this gear **30** meshes with a similar gear **32** secured to the shaft or trunnion **33** of the plate cylinder **10** of the couple D.

By this arrangement, the power is transmitted from any suitable source, not shown, through the shaft **18**, drive gear **19**, gears **21**, **22** and **24** to the plate cylinder of the perfecting couple E, and this cylinder is synchronized with its cooperating impression cylinder through the intermeshing gear **27**. The first printing couple D is driven through gears **22** and **30**, and the plate and impression cylinders **10** and **11** of this couple are synchronized through gears **30** and **32**. With this arrangement the web W is led through the unit by suitable guide rollers **35** to perfect the web and finally to the folder C.

In the arrangement of the printing unit depicted at B in Figures 1 and 2, and in Figure 4, the gears described in connection with the unit A are employed, but in order to provide means for reversing the direction of rotation of one of the printing couples, idler gears are operably interposed between the gear **22** and the gear **30** of the impression cylinder **11** of the printing couple D. A shaft or stud **37** is secured to the frame **16** of the unit B, and a sleeve **38** is rotatably mounted thereon, the sleeve being held against longitudinal motion relative to the stud **37** between a terminal washer or member **39** and the bearing boss **40** formed on the stud **37**. A helical idler gear **42** is secured to the inner terminal of sleeve **38** and rotates therewith, and a second helical idler gear **44** is slidably mounted on the sleeve **38**, and is secured against rotary motion relative thereto by a suitable key or feather **45**. In this arrangement, the gears **30** and **32** are slidably mounted on the trunnions **31** and **33** of the form and impression cylinders **10** and **11** of the couple D, and these gears are held against rotary motion relative to their trunnions by suitable keys or splines **47**. These gears are limited in their outward sliding motion by rings or washers **48** secured to the outer terminals of the trunnions **31** and **33**, and their inward sliding motion is limited by the bearing **15** in the frame **16**. When it is desired to change the direction of rotation of the printing couple D, the gears **30** and **32** are slid towards the frame **16** where the gear **30** meshes with the idler **42**. The idler **44** is moved inwardly on its supporting sleeve **38** and meshes with the gear **22**. The gears are locked in position by any suitable means, such as set screws **50**, and in this position power is imparted through the shaft **18**, bevel gears **19** and **21** and gears **22**, **24** and **27** to impart rotation in a given direction to the printing couple E, as indicated by the arrows, and the printing couple D is driven in opposed direction through the gears **22**, idlers **44** and **42**, gears **30** and **32**.

With this arrangement, the web W^2 is first led through the unit A where it is perfected, and then over guide rollers **35** to a slitter **52**, and then through the unit B, where two additional colors are printing on one side of the web, thus producing a web having one color printed on one side thereof, and three colors on the opposed side. In order to insure registration as the additional colors are superposed, the ribbons from the slit web W^2 are guided over spaced guide rolls **35'**, thus compensating for the stagger of the form plates.

Thus it is manifest from the foregoing, that in perfecting units where reversal of direction of its components is not desired, the interposed idlers are not provided, but in units where reversal of direction of one of its couples is desired, the interposed idlers are provided and may be operably associated with the other components of the gear train without changing the components.

In the form of the invention disclosed in Figures 5 and 7, a printing machine is disclosed which includes the usual supporting frame or structure **54** supporting the unit frames **55** and the folder framing **56**. Each printing unit is provided with two printing couples D and E, and each couple comprises a form or plate cylinder **10** and impression cylinder **11**. The cylinders **10** and **11** are mounted in suitable bearings **57** supported in the unit frames **55**, and suitable gears **58** and **59** are secured to the trunnions **60** of the cylinders **10** and **11**, thereby tying these cylinders together to insure that they operate in synchronism. Each gear **58** has a bevel gear **62** formed integral therewith or suitably secured thereto, as indicated at **63** in Figure 7, and these gears are

adapted to mesh with suitable drives to be hereinafter disclosed.

In the construction disclosed, two superposed lines of units are provided, and drive shafts **65** and **66** are operably supported in the machine framing. These shafts may be driven from any suitable source of power, usually an electric motor or motors, and the lower shaft **65** is operably connected to the upper shaft through the intermediation of vertical shafts **67** and suitable bevel gears **68** and **69**. Each of the shafts **65** and **66** drive a plurality of units in line, and for each unit there is provided four bevel gears **70**, **71**, **72** and **73** arranged to be moved to and from operable engagement with the gears **62**. The gears **70**, **71**, **72** and **73** are slidably mounted on the shafts **65** and **66**, and held against rotation relative thereto by means of suitable keys or splines **75**. By this arrangement, these gears may be moved to and from mesh relation with the bevel gear **62**, and any suitable means, not shown, may be employed to secure the gears to the shafts in the selected positions.

When it is desired to run a unit of this type as an ordinary perfecting unit, the gears **70** and **73** are moved from engagement with the gears **62**, and the gears **71** and **72** moved in mesh therewith, and, when so driven, the web W^3 is led through the unit F, as indicated, and guided to the folder **74** by suitable guide rollers **75** and over the former **76**, former rollers **77** and nipping rollers **78**. When the web is thus run, it is perfected or printed on both sides, and, if another type of run is desired, this may be readily produced by merely changing the drive gears **70**, **71**, **72** and **73** to produce the drive arrangement desired.

In this arrangement another web W^4 is led over suitable guide rollers **75** down between the printing couple D of the printing unit G, and up through the printing couple E of the same unit, and then upwardly through couple E of unit H, and down through couple D of this unit, and then down through the couple E of unit I, and upwardly through its couple D, and finally to the folder **74**. By this flexible arrangement, any desired color combination can be produced, and in the present run, four colors are printed on one side of the web and two colors on the other. In the arrangement depicted in unit G, the gears **70** and **72** are in mesh with the gears **62**, and the gears **71** and **73** moved from operable engagement therewith. In the unit H, gears **71** and **73** are meshing with the gears **62**, and the gears **70** and **72** moved away from meshing relationship, and in unit I the gears **70** and **72** are moved into operable relationship with the gears **62**, and the gears **71** and **73** moved from operable engagement.

In the form of the invention disclosed in Figures 6 and 8, an idler **80** is rotatably mounted on a stud or shaft **81**, secured to the unit frame **55**, and this gear is movable longitudinally on the shaft to and from operable engagement with the gears **59** of the impression cylinders **11**. In this arrangement, only two drive gears are provided for each unit, and these gears **84** and **85** may be operably positioned on the shafts **65** and **66** at the outside of the gears **62** of each unit, as indicated in units K and L of Figure 6, or, if preferred, similar gears **84'** and **85'** may be positioned intermediate the gears **62**, as shown in units J and M of Figure 6.

If it is desired to run the unit to perfect a newspaper web, the gear **80** is moved from mesh relation with the gears **59**, and slid along its shaft **81** until it engages the frame **55**, where it may be held by any suitable instrumentalities, not shown, in inoperative position, and the gears **84'** and **85'** are then moved into operable engagement with the gears **62**, as shown in unit J of Figure 6. The web W^5 is then led through the unit J, where it is perfected, and finally led to the folder **74**. Another web W^6 is led through the units K, L, and M and to the folder **74**, and in passing through these units four colors may be printed on one side and two on the other. In the arrangement depicted in unit K, the gear **84** is moved into mesh relation with a gear **62**, and the idler **80** is moved into operable engagement with the gears **59** of the impression cylinders **11**, and the gear **85** moved from engagement with its cooperating gear **62**. In the arrangement depicted in unit L, the gear **85** is moved into mesh with its cooperating gear **62** and the gear **84** is moved away from operable engagement with its gear **62**, as indicated, the idler **80** remaining in operable position. In the run indicated in unit M, the gear **85'** is moved into engagement with its cooperating gear **62**, and the gear **84'** moved away from operable engagement with its gear **62**, as shown.

From the foregoing, it is manifest that applicant has produced a novel drive arrangement in which all of the synchronizing gears and drive gears are positioned at one side of the machine and directly intermeshing without the intervention of transversely extending drive shafts, and, at the same time, provides unusual flexibility permitting any desired web run with maximum convenience.

Having thus described my invention, what I claim as new and useful in the art, is:—

1. In a web printing unit including a plurality of printing couples, each couple comprising a form cylinder and an impression cylinder, intermeshing synchronizing gears for operably synchronizing the cylinders of each printing couple, a rotatable member including a drive gear and a synchronizing gear, the synchronizing gear of the rotatable member meshing directly with a synchronizing gear of each printing couple to operably synchronize all the cylinders of the printing unit, and a drive gear meshing directly with the drive gear of the rotatable member, the drive and synchronizing gears being located at one side of the printing unit.

2. In a web printing machine including a plurality of printing units, each unit comprising a plurality of printing couples and each printing couple having a form cylinder and an impression cylinder, intermeshing synchronizing gears for operably synchronizing the cylinders of each printing couple, a rotatable member for each printing unit and having a drive gear and a synchronizing gear, the synchronizing gear of each rotatable member meshing directly with a synchronizing gear of each printing couple to operably synchronize all the cylinders of each printing unit, and a drive gear for each printing unit meshing directly with the drive gear of each rotatable member, the drive and synchronizing gears of all the units being located at one side of the printing machine.

3. In a web printing unit including a plurality of printing couples, each couple comprising a form cylinder and an impression cylinder, intermeshing synchronizing gears for operably synchronizing the cylinders of each printing couple, a rotatable member having a drive gear and a

synchronizing gear, the synchronizing gear of the rotatable member meshing directly with a synchronizing gear of each printing couple when the couples are driven in certain directions to operably synchronize all the cylinders of the printing unit, a drive gear meshing directly with the drive gear of the rotatable member, idler gears, certain of the idler gears and synchronizing gears being movably mounted for meshing engagement to thereby change the direction of rotation of a selected printing couple, the drive and synchronizing gears being located at one side of the unit.

4. In a web printing machine including a plurality of printing units, each unit comprising a plurality of printing couples and each couple including a form cylinder and an impression cylinder, intermeshing synchronizing gears for operably synchronizing the cylinders of each printing couple, a rotatable member for each printing unit and having a drive gear and a synchronizing gear, the synchronizing gear of each rotatable member meshing directly with a synchronizing gear of each printing couple of a printing unit when the couples are driven in certain directions to operably synchronize all the cylinders of each printing unit, a drive gear for each printing unit meshing directly with the drive gear of each rotatable member, idler gears, certain of the idler gears and synchronizing gears being movably mounted for meshing engagement to thereby change the direction of rotation of selected printing couples, all the drive and synchronizing gears being located at one side of the machine.

5. In a web printing unit including two printing couples, each couple comprising a form cylinder and an impression cylinder, intermeshing synchronizing gears operably secured to the cylinders at one side of the unit for operably synchronizing the cylinders of each printing couple, a rotatable member having a drive gear and a synchronizing gear, the synchronizing gear of the rotatable member meshing directly with a synchronizing gear of each printing couple when the couples are driven in certain directions to operably synchronize all the cylinders of the printing unit, a drive shaft located at one side of the unit adjacent the synchronizing gears, a drive gear secured to the shaft and meshing directly with the drive gear of the rotatable member, idler gears, certain of the idler gears and synchronizing gears being movably mounted for meshing engagement to thereby change the direction of rotation of the selected printing couple.

6. In a web printing machine including a plurality of printing units, each printing unit including two printing couples and each printing couple including a form cylinder and an impression cylinder, intermeshing synchronizing gears operably secured to the cylinders at one side of the machine for operably synchronizing the cylinders of each printing couple, a rotatable member for each printing unit and having a drive gear and a synchronizing gear, the synchronizing gear of each rotatable member meshing directly with a synchronizing gear of each printing couple when the couples are driven in certain directions to operably synchronize all the cylinders of each printing unit, a drive shaft located at the side of the machine adjacent the synchronizing gears, drive gears secured to the shaft and each drive gear meshing directly with the drive gear of each rotatable member, idler gears, certain of the idler gears and synchronizing gears being movably mounted for meshing engagement to thereby change the direction of rotation of the selected printing couples.

7. In a web printing unit including a plurality of printing couples, each printing couple comprising a form cylinder and an impression cylinder, intermeshing synchronizing gears carried by the cylinders to synchronize the rotation of the cylinders of each printing couple, a rotatable member having a drive gear and a synchronizing gear, the synchronizing gear of the rotatable member meshing directly with a synchronizing gear of each printing couple when the couples are driven in certain directions to operably synchronize all the cylinders of the printing unit, a drive gear meshing with the drive gear of the rotatable member, an idler gear operably mounted in fixed axial position, an idler gear operably mounted for axial movement and rotatable with the fixed idler gear, and means for operably mounting certain of the synchronizing gears for axial movement, the idler gears and certain of the synchronizing gears intermeshing to change the direction of rotation of a selected couple.

8. In a web printing unit including separate printing couples, each couple comprising a form cylinder and an impression cylinder, intermeshing gears carried by the cylinders at one side of the unit to synchronize the rotation of the cylinders, a common gear adapted to mesh with a gear of each printing couple to rotate the cylinders in given directions, idler gears mounted for rotation and movable from an idler position to a position where they are operably interposed between the common gear and a gear of one of the printing couples to reverse the direction of rotation of this couple.

9. In a web printing unit including separate printing couples, each couple comprising a form cylinder and an impression cylinder, intermeshing gears, supported by the cylinders at one side of the unit to synchronize the rotation of the cylinders, a common gear adapted to mesh with a gear of each printing couple to rotate the cylinders in given directions, idler gears operably supported at the side of the unit adjacent the synchronizing gears, one of the idler gears and the synchronizing gears of a printing couple being moveable on their supports to operably interpose the idlers between the common gear and said couple to reverse the direction of rotation of the couple.

10. In a web printing machine including separate printing units, each unit comprising separate printing couples and each couple including a form cylinder and an impression cylinder, intermeshing gears carried by the cylinders at one side of each unit to synchronize the rotation of the cylinders, a common gear adapted to mesh with a gear of each printing couple to rotate the cylinders in given directions, idler gears mounted for rotation and movable from an idler position to a position where they are operably interposed between the common gear and the gear of one of the printing couples of a printing unit to reverse the direction of rotation of the said couple to permit a common web to be led through more than one printing unit.

11. In a web printing machine including separate printing units, each unit comprising separate printing couples and each couple including a form cylinder and an impression cylinder, intermeshing gears supported by the cylinders at one side of the machine to synchronize the rotation of the cylinders, a common gear adapted to mesh with a gear of each couple of each printing

unit to rotate the cylinders in given directions, idler gears operably supported at the side of selected units and adjacent the synchronizing gears, one of the idler gears and the synchronizing gears of a selected printing couple being moveable on their supports to operably interpose the idlers between the common gear and said couple to reverse the direction of rotation of this couple to permit a common web to be led through more than one unit to print additional colors on one side thereof.

12. In a web printing unit including two printing couples located immediately adjacent each other, each couple comprising a rotatable form cylinder and a rotatable impression cylinder, intermeshing synchronizing gears secured to the cylinders at one side of the unit to synchronize the rotation of the cylinders of each couple, a composite rotatable member for each couple including a drive gear and one of the synchronizing gears, a drive shaft at the side of the unit adjacent the synchronizing gears, opposed movable drive gears for each couple operably supported by the shaft, said gears being selectively movable to and from operable engagement with the drive gears of the composite rotatable members of the couples to control the direction of rotation of the cylinders of the couples.

13. In a web printing machine including separate printing units, each unit comprising two printing couples located immediately adjacent each other and each couple having a rotatable form cylinder and a rotatable impression cylinder, intermeshing synchronizing gears carried by the cylinders at one side of the machine to synchronize the rotation of the cylinders of each couple, a drive shaft common to the separate units and positioned at the side of the machine adjacent the synchronizing gears, a composite rotatable member for each couple including a drive gear and one of the synchronizing gears, opposed movable drive gears for each couple of each unit operably supported by the shaft, said gears being selectively movable to and from operable engagement with the drive gears of the composite rotatable members to control the direction of rotation of the cylinders of the couples.

14. In a web printing unit including two couples located immediately adjacent each other, each couple comprising a rotatable form cylinder and a rotatable impression cylinder, intermeshing synchronizing gears carried by the cylinders at one side of the unit to synchronize the rotation of the cylinders of the couples, an idler synchronizing gear operably supported at the side of the unit and meshing with a synchronizing gear of each couple to synchronize the rotation of the cylinders of the unit, a composite rotatable member for each couple including a drive gear and one of the synchronizing gears, a drive shaft at the side of the unit adjacent the synchronizing gears, opposed movable drive gears for each unit operably supported by the shaft, said gears being selectively movable to and from operable engagement with the drive gears of the composite rotatable members to control the direction of rotation of the cylinders of the unit.

15. In a web printing machine including separate printing units, each unit comprising two printing couples and each couple including a rotatable form cylinder and a rotatable impression cylinder, intermeshing synchronizing gears carried by the cylinders at one side of the machine to synchronize the rotation of the cylinders of the couples, a composite rotatable member for each couple including a drive gear and one of the synchronizing gears, a drive shaft common to the separate units and positioned at the side of the machine adjacent the synchronizing gears, opposed drive gears for each unit operably supported by the shaft, said gears being selectively movable to and from operable engagement with the drive gears of the composite rotatable members to drive the printing couples, an idler synchronizing gear operably supported at the side of each unit adjacent the said synchronizing gears, each idler gear being movable to and from meshing engagement with a synchronizing gear of each couple of a unit to control the direction of rotation of one couple of the unit when one of its drive shaft gears is moved from engagement with the drive gear of a selected movable member.

16. A web printing unit including a plurality of printing couples, each couple comprising a rotatable form cylinder and a rotatable impression cylinder, intermeshing synchronizing gears for operably synchronizing the rotation of the cylinders of the printing couples, a composite rotatable member including a drive gear and one of the synchronizing gears, a drive shaft, a drive gear carried by the drive shaft and meshing directly with the drive gear of the rotatable member, the drive shaft, drive gears and synchronizing gears being located at one side of the printing unit.

17. In a web printing unit including two couples located immediately adjacent each other, each couple comprising a rotatable form cylinder and a rotatable impression cylinder, intermeshing synchronizing gears carried by the cylinders at one side of the unit to synchronize the rotation of the cylinders of each couple, a composite rotatable member for each couple including a drive gear and one of the synchronizing gears, a drive shaft at the side of the unit adjacent the synchronizing gears, a drive gear meshing with a drive gear of a rotatable member of each couple and operably supported by the shaft to control the direction of rotation of the rotatable member of each couple and rotate the rotatable members of both couples in synchronism.

18. In a web printing unit including two printing couples located immediately adjacent each other, each couple comprising a rotatable form cylinder and a rotatable impression cylinder, synchronizing gears secured to the cylinders at one side of the unit and intermeshing to synchronize the rotation of the cylinders of each couple, a composite rotatable member for each couple including a drive gear and one of the synchronizing gears, a drive shaft at the side of the unit adjacent the synchronizing gears, a movable drive gear for each couple operably supported by the shaft, said gears being selectively movable to and from meshing engagement with the drive gear of the selected rotatable member to drive the couples, a movable idler synchronizing gear operably supported at the side of the machine adjacent the said synchronizing gears, the idler gear being movable from inoperative position to meshing engagement with a synchronizing gear of each couple to control the direction of rotation of one of the couples when one of the shaft drive gears is moved for meshing engagement with the drive gear of a selected movable member.

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