Oct. 23, 1956 P. DIETRICH ET AL 2,767,652

IMPRESSION CYLINDER DRIVE

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Fig. 1

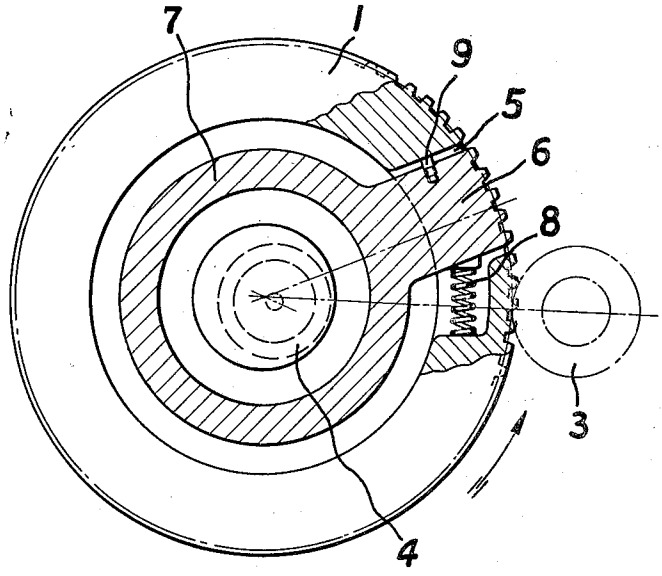



Fig. 2

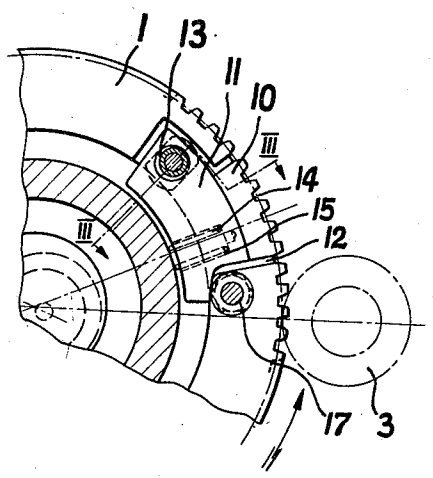
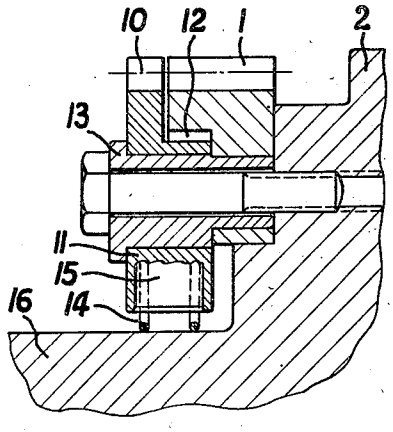



Fig. 3




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Fig. 4

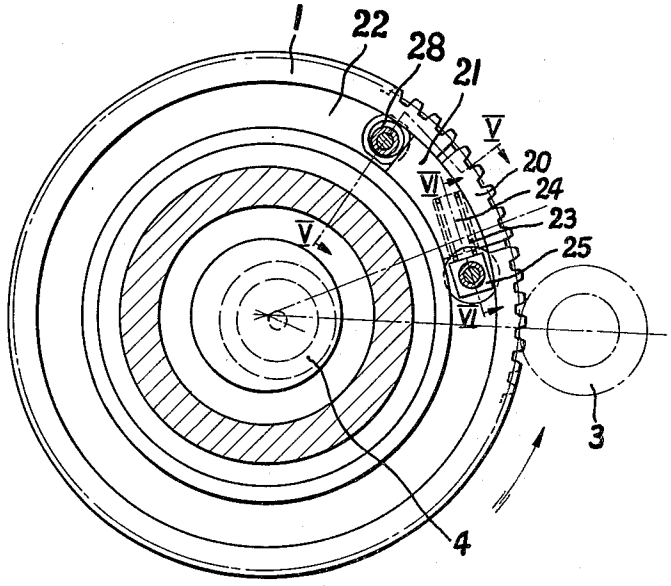



Fig. 5

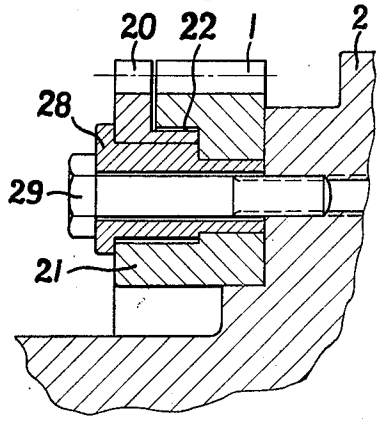
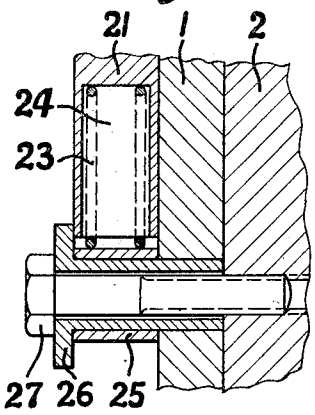



Fig. 6




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# IMPRESSION CYLINDER DRIVE

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Application May 2, 1952, Serial No. 285,744

Claims priority, application Germany May 16, 1951

7 Claims. (Cl. 101—286)

This invention relates to certain improvements in the drive of impression cylinders of cylinder presses, more particularly, two revolution printing presses, of the type in which the impression cylinder is periodically raised and lowered during operation of the machine.

Since in these machines the printing takes place only during motion of the reciprocating type bed in one direction, the impression cylinder is lifted from the type bed during the return stroke thereof. The raising of the impression cylinder takes place either by means of movably arranged cylinder bearings or by a rotation of the eccentrically arranged journal or shaft end of the cylinder.

The last mentioned method of raising and lowering the impression cylinder besides many advantages has the drawback that the impression cylinder owing to the forward and rearward turning of the eccentric pins is imparted an additional acceleration and retardation in a peripheral direction. Owing to the additional acceleration and retardation, pendulum motions of the impression cylinder about its axis may occur within the limits defined by the play of the gear teeth, which motions would have the effect that the impression cylinder would not have the correct position in the moment of the transfer of the sheet.

It is an object of the present invention to provide means for avoiding this disadvantage.

With this object in view, we insert in the toothed rim of the impression cylinder a toothed segment which is movable in a peripheral or radial direction in relation to the stationary toothed rim. This movable toothed segment is in mesh with the driving gear during the transfer of the sheet to the impression cylinder. Since it is under spring action, it is ensured that the flanks of the teeth of the movable toothed segment will not disengage the flanks of the teeth of the driving wheel during the additional acceleration of the impression cylinder. It follows that swinging of the impression cylinder about its axis and displacement of the sheet during the transfer are avoided. In order to ensure continuous engagement of the tooth flanks of the driving wheel with the tooth flanks of the toothed segment, according to a further feature of the invention the module of the teeth of the movable segment is made somewhat smaller than that of the teeth of the driving wheel. Thus the normal play from tooth to tooth is reduced in the region of the movable toothed segment and accurate meshing of the teeth without any play is ensured during the transfer of the sheet to the impression cylinder.

Other and further objects, features and advantages of the invention will be pointed out hereinafter and appear in the appended claims forming part of the application.

In the accompanying drawings several now preferred embodiments of the invention are shown by way of illustration and not by way of limitation.

Fig. 1 is a fragmentary cross section through the driving gear of the cylinder in the region of the movable toothed segment,

Fig. 2 is a side view, partly in section, of the driving gear of the cylinder in the region of the movable toothed segment, showing a modified form,

Fig. 3 is a fragmentary section on line III—III of Fig. 2, drawn on a larger scale,

Fig. 4 is an elevation of a driving gear of the cylinder with a movable toothed segment, showing a further modification,

Fig. 5 is a fragmentary section on line V—V of Fig. 4, drawn on a larger scale, and

Fig. 6 is a fragmentary section on line VI—VI of Fig. 4, also on a larger scale than Fig. 4.

Similar reference numerals denote similar parts in the different views.

Referring now to the drawings in greater detail, it will be seen that the driving gear wheel **1** is fixedly secured to one end face of the impression cylinder **2** (Fig. 3) and driven by gear **3** (Fig. 1). In per se known manner eccentric stubs or journals **4**, indicated in dotted lines only, serve to impart the raising and lowering motion to the impression cylinder. A certain length of the circumference of the driving gear **1** is recessed, as shown at **5**, for reception of a toothed segment **6** which is guided in an annular groove at the end face of the cylinder by means of a hub **7**. The toothed segment **6** is acted upon by a compression spring **8** by which the tooth flanks of the segment during the meshing engagement are always urged against the tooth flanks of the driving gear **3** so that the teeth of the driven wheel cannot be lifted from the teeth of the driving wheel. A pin **9** serves as a stop for the toothed segment **6**.

In the embodiment as per Figs. 2 and 3 the toothed segment **10** is connected with an annular member **11** which is arranged in a recess **12** of the gear **1**. The annular member **11** is rotatably mounted on an eccentric sleeve **13**. The spring **14** is inserted in a radial bore **15** of the annular member **11** and bears on the cylindrical part **16** of the impression cylinder **2**, thus tending to cause an outward swinging motion of the toothed segment **10** about the axis of the eccentric sleeve **13**. The deeper engagement of the teeth of the toothed segment **10** in the gaps between the teeth of the driving wheel **3** also acts to completely avoid play between the teeth during engagement of the toothed segment **10** in the gear **3**. By rotation of the eccentric sleeve **13** the axis of the swinging motion of the toothed segment **10** can be displaced and thus an accurate adjustment between the toothed segment and the driving wheel can be effected. A screw **17** serves as a stop member for the annular part **11** of the toothed segment **10**.

Figs. 4–6 show a further embodiment of a movable toothed segment according to the invention. The toothed segment **20** in this case is connected with an annular member **21** acting as a sliding block and being guided in an annular groove **22** in the toothed wheel **1**. The spring **23** is arranged in an approximately tangentially directed bore **24** and bears against the outer surface of a sleeve **25** which is connected with the gear **1** and the impression cylinder **2** by means of a flanged sleeve **26** and a screw **27**. The adjustable stop for the ring member **21** consists of an eccentric sleeve **28** which is secured to the gear **1** by means of a screw **29**. The flanges of the sleeves **26** and **28** prevent displacement of the annular member **21** and so of the toothed segment **20** in an axial direction.

While the invention has been described in detail with respect to certain now preferred examples and embodiments of the invention it will be understood by those

skilled in the art after understanding the invention that various changes and modifications may be made without departing from the spirit and scope of the invention and it is intended, therefore, to cover all such changes and modifications in the appended claims.

What we claim is:

1. In a gear drive for a rotary printing press impression cylinder the axis of which is adapted to be arcuately displaced periodically from one position to another with resultant variation in the meshing engagement of gears in said drive, the combination which comprises a driven gear for rotating said cylinder, means for mounting said driven gear for movement with said cylinder axis during said displacements thereof, a toothed segment at the rim of said driven gear having teeth laterally offset from the teeth of said driven gear, means for mounting said toothed segment for movement with respect to the rim of said driven gear, a driving gear, means for mounting said driving gear for firm meshing engagement with the teeth of said driven gear when said cylinder axis is in one of said positions, the meshing engagement of said driving and driven gears being substantially less firm when said cylinder axis is in the other said position and said toothed segment being positioned on said driven gear for meshing engagement with the teeth of said driving gear when said cylinder axis is in said other position, and means for yieldably urging the teeth of said toothed segment out of alignment with said adjacent teeth of said driven gear reducing play between said driven and driving gears during said less firm meshing engagement thereof.

2. In a gear drive for a rotary printing press impression cylinder the axis of which is adapted to be arcuately displaced periodically from one position to another with resultant variation in the meshing engagement of gears in said drive, the combination which comprises a driven gear for rotating said cylinder, means for mounting said driven gear for movement with said cylinder axis during said displacements thereof, an annular recess in the rim of said driven gear, a toothed segment in said recess, means for mounting said toothed segment for limited circumferential movement with respect to the rim of said driven gear, a driving gear, means for mounting said driving gear for firm meshing engagement with the teeth of said driven gear when said cylinder axis is in one of said positions, the meshing engagement of said driving and driven gears being substantially less firm when said cylinder axis is in the other said position and said toothed segment being positioned on said driven gear for meshing engagement with the teeth of said driving gear when said cylinder axis is in said other position, and means for yieldably urging the teeth of said toothed segment out of alignment with said adjacent teeth of said driven gear reducing play between said driven and driving gears during said less firm meshing engagement thereof.

3. In a gear drive for a rotary printing press impression cylinder the axis of which is adapted to be arcuately displaced periodically from one position to another with resultant variation in the meshing engagement of gears in said drive, the combination which comprises a driven gear for rotating said cylinder, means for mounting said driven gear for movement with said cylinder axis during said displacements thereof, a toothed segment at the rim of said driven gear having teeth laterally offset from the teeth of said driven gear, means for mounting said toothed segment for movement with respect to the rim of said driven gear, a driving gear, means for mounting said driving gear for firm meshing engagement with the teeth of said driven gear when said cylinder axis is in one of said positions, the meshing engagement of said driving and driven gears being substantially less firm when said cylinder axis is in the other said position and said toothed segment being positioned on said driven gear for meshing engagement with the teeth of said driving gear when said cylinder axis is in said other position, means for urging the teeth of said toothed segment annularly out of alignment with adjacent teeth of said driven gear reducing play between said driven and driving gears during said less firm meshing engagement thereof, and a stop member for limiting said misalignment of said toothed segment and said driven gear.



4. In a gear drive for a rotary printing press impression cylinder the axis of which is adapted to be arcuately displaced periodically from one position to another with resultant variation in the meshing engagement of gears in said drive, the combination which comprises a driven gear for rotating said cylinder, means for mounting said driven gear for movement with said cylinder axis during said displacements thereof, a toothed segment at the rim of said driven gear having teeth laterally offset from the teeth of said driven gear, means for mounting said toothed segment for movement with respect to the rim of said driven gear, a driving gear, means for mounting said driving gear for firm meshing engagement with the teeth of said driven gear when said cylinder axis is in one of said positions, the meshing engagement of said driving and driven gears being substantially less firm when said cylinder axis is in the other said position and said toothed segment being positioned on said driven gear for meshing engagement with the teeth of said driving gear when said cylinder axis is in said other position, means for yieldably urging the teeth of said toothed segment out of alignment with said adjacent teeth of said driven gear reducing play between said driven and driving gears during said less firm meshing engagement thereof, and an adjustable stop member for limiting said misalignment of said toothed segment and said driven gear.

5. In a gear drive for a rotary printing press impression cylinder the axis of which is adapted to be arcuately displaced periodically from one position to another with resultant variation in the meshing engagement of gears in said drive, the combination which comprises a driven gear for rotating said cylinder, means for mounting said driven gear for movement with said cylinder axis during said displacements thereof, a toothed segment at the rim of said driven gear having teeth laterally offset from the teeth of said driven gear, means for mounting said toothed segment for movement with respect to the rim of said driven gear, a driving gear, means for mounting said driving gear for firm meshing engagement with the teeth of said driven gear when said cylinder axis is in one of said positions, the meshing engagement of said driving and driven gears being substantially less firm when said cylinder axis is in the other said position and said toothed segment being positioned on said driven gear for meshing engagement with the teeth of said driving gear when said cylinder axis is in said other position, and spring means for yieldably urging the teeth of said toothed segment annularly against the teeth of said driving gear reducing play between said driven and driving gears during said less firm meshing engagement thereof.

6. In a gear drive for a rotary printing press impression cylinder the axis of which is adapted to be arcuately displaced periodically from one position to another with resultant variation in the meshing engagement of gears in said drive, the combination which comprises a driven gear for rotating said cylinder, means for mounting said driven gear for movement with said cylinder axis during said displacements thereof, a toothed segment at the rim of said driven gear having teeth laterally offset from the teeth of said driven gear, means for mounting said toothed segment for movement with respect to the rim of said driven gear, a driving gear, means for mounting said driving gear for firm meshing engagement with the teeth of said driven gear when said cylinder axis is in one of said positions, the meshing engagement of said driving and driven gears being substantially less firm when said cylinder axis is in the other said position and said toothed segment being positioned on said driven gear for meshing engagement with the teeth of said driving gear when said cylinder axis is in said other position,

and means for yieldably urging the teeth of said toothed segment out of alignment with said adjacent teeth of said driven gear reducing play between said driven and driving gears during said less firm meshing engagement thereof, the module of said toothed segment being smaller than the module of said driven gear.

7. In a gear drive for a rotary printing press impression cylinder the axis of which is adapted to be arcuately displaced periodically from one position to another with resultant variation in the meshing engagement of gears in said drive, the combination which comprises a driven gear for rotating said cylinder, means for mounting said driven gear for movement with the axis of said cylinder during said periodic arcuate displacements thereof, a driving gear for driving said driven gear and said cylinder, means for mounting said driving gear for firm meshing engagement with said driven gear when said axis of said cylinder is in one of said positions, said driving and driven gears being less firmly engaged when said cylinder axis is in said other position with resulting substantial play between the gear teeth thereof, a toothed segment at the rim of one of said gears and having teeth laterally offset from the teeth of said gear, means for mounting said toothed segment on said gear for movement with respect to the rim thereof, said toothed segment being positioned on said one gear for meshing engagement with said other gear during that portion of the rotation thereof when said cylinder is arcuately displaced resulting in said less firm meshing of said driving and driven gears, and means for yieldably urging the teeth of said toothed segment out of alignment with adjacent teeth of said gear on which it is mounted reducing play between said driven and driving gears during said period of less firm meshing engagement thereof.



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