

Aug. 9, 1938.

B. A. MALKIN

2,126,486

PAPER MACHINE

Filed Sept. 30, 1936

3 Sheets-Sheet 1

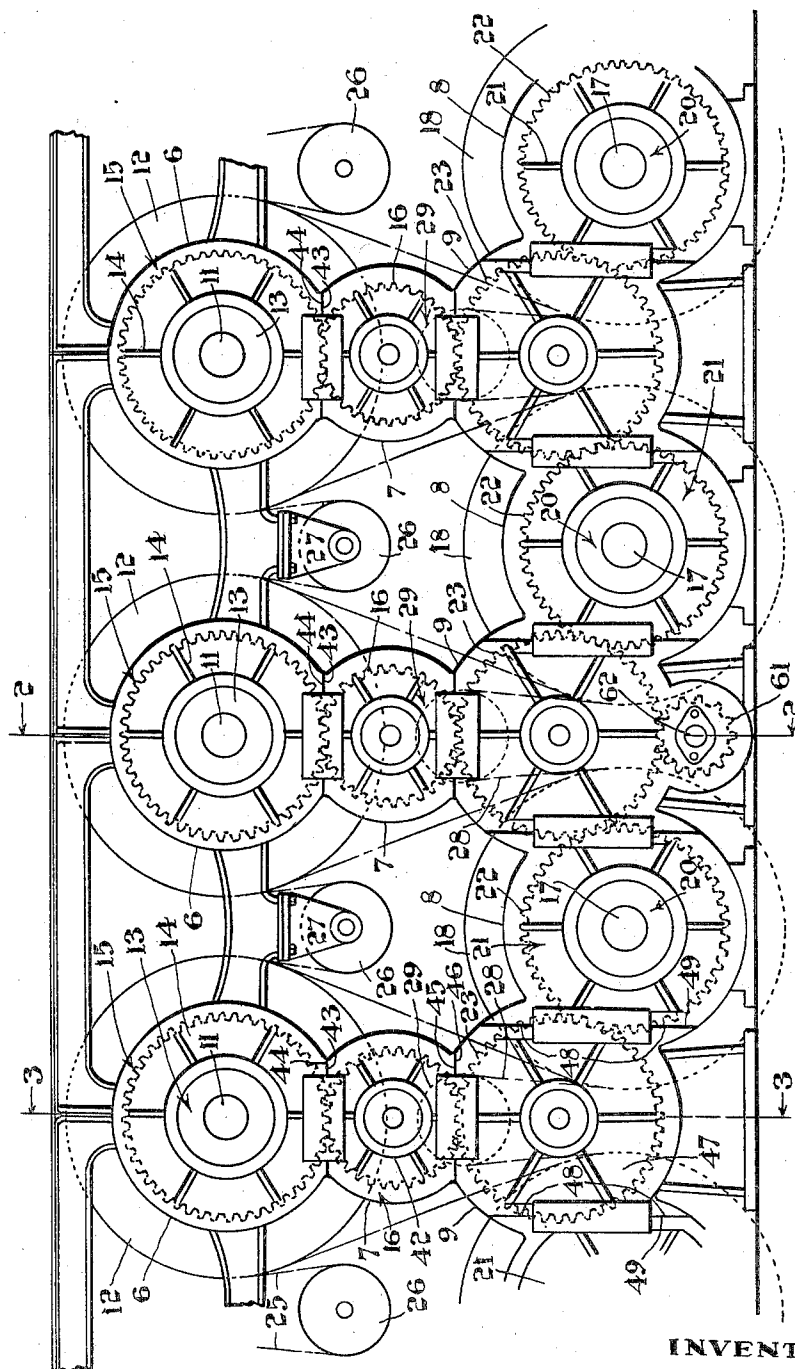


FIG. 1

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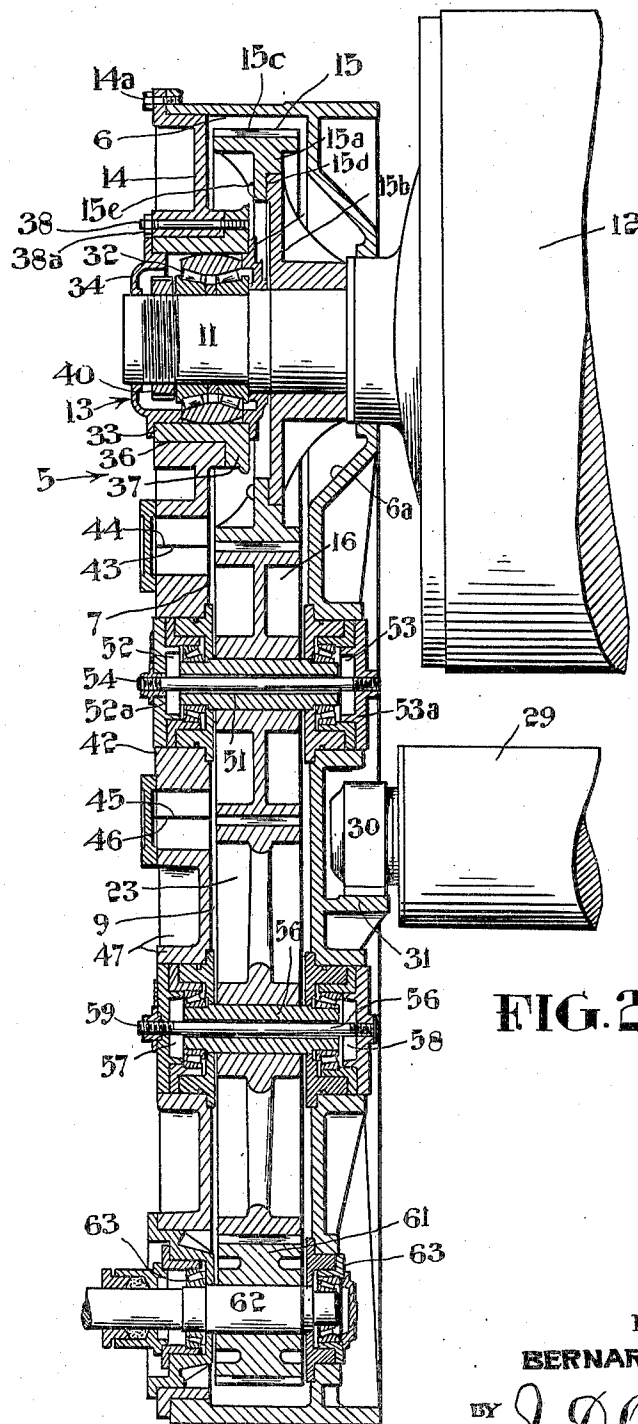
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

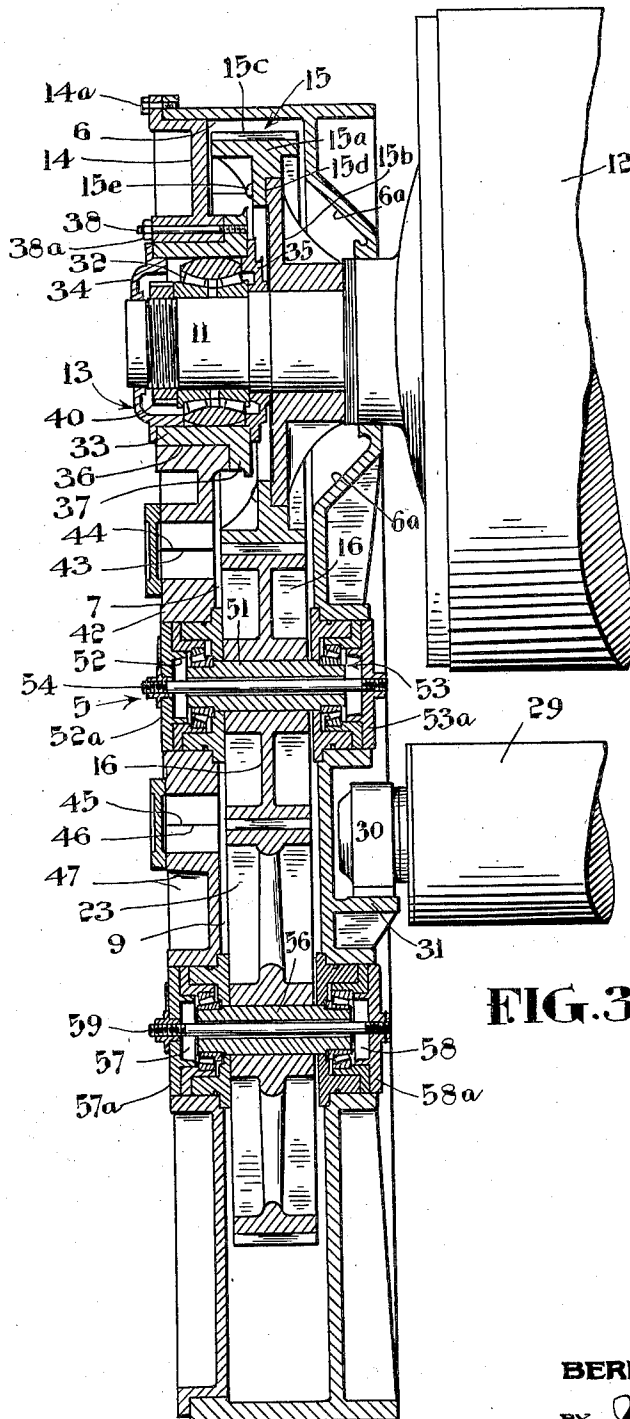


FIG. 3

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PAPER MACHINE

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6 Claims. (Cl. 74-421)

This invention relates to improvements in paper machine dryers of the kind disclosed in my prior Patent No. 1,730,082, granted Oct. 1, 1929.

The dryer cylinders disclosed in the above patent are driven by a train of spur gears enclosed by casings formed integral with the gear side of the dryer frame. The gears attached directly to the spindles of the dryer cylinders are located outside the bearings in which the spindles are journaled, said bearings being attached to and supported by the inner portion of the gear side of the dryer frame.

The object of the present invention is to provide an improved arrangement whereby the spindle gears and bearings may be housed in the gear side of the dryer frame in such manner that the bearings may be inspected or removed without disturbing the gears or vice versa. To this end the invention consists in arranging the spindle gears and bearings in the gear side of the dryer frame so that the bearings lie outside the gears and may be readily removed from the spindle without disturbing the gears. The gears are made in sections comprising a ring section carrying the gear teeth and a spider or hub section by means of which the ring sections are mounted on the spindle. The ring sections of the gears are provided with central openings of sufficient diameter to permit these sections to be drawn outwardly over the spindle bearings without disturbing the latter.

Proceeding now to a more detailed description reference will be had to the accompanying drawings, in which

Fig. 1 is a view, in side elevation, of a portion of the gear side of a dryer constructed in accordance with this invention.

Fig. 2 is a sectional view along the line 2-2 of Fig. 1.

Fig. 3 is a sectional view along the line 3-3 of Fig. 1.

As shown in these drawings, the gear side 5 of the dryer frame is of hollow construction designed to provide a plurality of interconnected casings including upper casings 6, intermediate casings 7, and lower casings 8 and 9. The spindles 11 of the upper dryer cylinders 12 are journaled in anti-friction bearings 13 which are mounted in the covers 14 of the upper casings 6. These spindles carry gears 15 meshing with idler gears 16 contained in the intermediate casings 7.

The spindles 17 of the lower dryer cylinders 18 (see Fig. 1) are journaled in bearings 20 which are mounted in the covers 21 of the lower casings 9. The spindles 17 also carry gears 22 meshing

with idler gears 23 contained in the lower casings 9. The idler gears 23 mesh with the previously mentioned idler gears 16 to complete the drive connection between the spindle gears of the upper and lower dryer cylinders.

The upper dryer felt 25 passes over the upper dryer cylinders 12 and under the idler rolls 26 which are journaled in bearing brackets 27 fastened to the frame structure 5. The lower dryer felt 28 passes under the lower dryer cylinders 18 and over the lower idler rolls 29. The lower idler rolls 29 are journaled in bearings 30 mounted on supporting shelves 31 formed integral with the frame structure 5 as shown to advantage in Figs. 2 and 3.

The bearings 20 and gears 22 associated with the spindles 17 of the lower dryer cylinders are not shown in detail since they are constructed and mounted in exactly the same manner as the bearings 13 and gears 15 associated with the spindles 11 of the upper dryer cylinders 12.

As shown more particularly in Figs. 2 and 3 the gears 15 are made in two sections comprising a ring section 15a and a spider or hub section 15b. The ring section 15a carries the gear teeth 15c and is spigoted onto the spider 15b as indicated at 15d, being secured in place by the bolts 15e. The spider or hub section 15b is fixed to the spindle 11 between the bearing 13 and the rear wall 6a of the casing 6. The bearing 13 associated with each spindle 11 comprises suitable anti-friction bearing members 32 arranged within a cylindrical housing 33 provided with end closures 34 and 35 which are centrally apertured for the passage of the spindle therethrough. The cylindrical housing 33 is fitted in an opening 36 formed in the cover 14 and is provided with a flange 37 which is bolted to the inner side of the cover as indicated at 38. The diameter of the flange 37 is slightly less than the diameter of the central opening of the ring section 15a of the spindle gear 15.

When it is desired to remove one of the bearings 13 the end closure 34 of the bearing housing 33 is removed to permit removal of the clamping nut 40 by which the anti-friction members 32 are secured in place on the spindle 11. The remaining elements of the spindle bearings may then be removed, as a unit with the cover 14, by removing the cover fastening bolts 14a. It will thus be seen that the bearing 13 associated with each spindle 11 may be conveniently removed without disturbing the adjacent spindle gear 15. Obviously the removal of the bearing 13 and the cover 14 leaves the entire front side of the casing

6 open so that the whole of the gear 15 is accessible for inspection or removal.

The toothed or ring section 15a of the gear 15 may also be removed from each of the spindles 11 without disturbing the bearing 13. To accomplish this the cover fastening bolts 14a and the nuts 38a on the bolts 38 are removed to permit removal of the cover 14 without disturbing the bearing 13. The bolts 15e, fastening the ring section 15a to the spider or hub section 15b are then removed and the ring section 15a drawn outwardly over the flange 37 of the bearing housing 33.

The bearings 20 and gears 22, associated with the spindles of the lower drying cylinders 18, being constructed in the same manner as the gears and bearings associated with the upper drying cylinders 12, may be independently removed in exactly the same manner.

The front walls of the idler gear casings 7 are formed by removable covers 42 having their upper edges 43 butted against the lower edges 44 of the previously mentioned covers 14. The lower edges 45 of the covers 42 are similarly butted against the upper edges 46 of adjacent covers 47 forming the outer side of the idler gear casings 9. The side edges 48 of the covers 47 are butted against the side edges 49 of the adjacent covers 21 forming the outer sides of the casings 8 in which the spindle bearings and gears of the lower dryer cylinders are housed.

Each idler gear 16 is fixed to a shaft 51 having one end journaled in a suitable anti-friction bearing 52 mounted in the cover 42 and the other end journaled in a similar bearing 53 mounted in the rear wall of the casing 9. The outer members 52a and 53a of the bearings 52 and 53 are fastened together by a bolt 54 passing centrally through the shaft 51.

Each idler gear 23 is fixed to a shaft 56 having its ends journaled in suitable anti-friction bearings 57 and 58, the bearing 57 being mounted in the cover 47 and the bearing 58 being mounted in the rear wall of the casing 9. A bolt 59 passing through the shaft 56 is fastened at its ends to the outer members 57a and 58a of the two bearings 57 and 58.

Removal of the bolts 54 and 59 permits disassembly and removal of the component parts of the bearings supporting the shafts of the idler gears 16 and 23. One of the idler gears 23, preferably the central gear shown in Fig. 1, is driven by a drive pinion 61 fixed to a drive shaft 62 journaled in suitable bearings 63.

Having thus described by invention, what I claim is:—

1. Spindle driving mechanism of the character described comprising a hollow frame structure, spindle bearings housed in said structure, spindles journaled in said bearings and gears fixed to said spindles so that said gears are housed in the hollow frame structure between the bearings and the inner side of said structure, each of said gears comprising detachably connected sections including a hub section fixed to one of said spindles and a toothed ring section detachably carried by the hub section, said ring section being removable through an opening in the outer side of said hollow structure when detached from the hub section and being provided with a central

opening large enough to permit it to be drawn outwardly over the adjacent bearing without disturbing the latter.

2. Spindle driving mechanism of the character described comprising a hollow frame structure designed to provide a plurality of integrally connected gear casings, spindle bearings housed in certain of said gear casings, spindles journaled in said bearings, gears fixed to the spindles between the spindle bearings and the inner side of the hollow frame structure, each gear being housed in the gear casing containing the bearing of the spindle to which said gear is attached and additional gears housed in the remaining gear casings of the hollow frame structure to form a driving connection between the various spindle gears, said hollow structure being provided at its outer side with openings through which the bearing and gear associated with each spindle may be removed.

3. Spindle driving mechanism of the character described comprising a hollow frame structure designed to provide a plurality of integrally connected gear casings, spindle bearings housed in certain of said gear casings, spindles journaled in said bearings, gears fixed to the spindles between the spindle bearings and the inner side of the hollow structure, each gear being housed in the gear casing containing the bearing of the spindle to which said gear is attached and additional gears housed in the remaining gear casings to form a drive connection between the various spindle gears, each of the gear casings containing the spindle bearing being provided, at the outer side, with removable covers in which said bearings are mounted so as to be removable without disturbing the spindle gears, said covers being detachable from said bearing so as to be capable of independent removal.

4. A machine as set forth in claim 3 characterized in that each spindle gear comprises a hub section fixed to the spindle and a toothed ring section detachably fastened to the hub section, said ring section being removable through the outer side of its enclosing casing when the cover of said casing is detached and removed.

5. A spindle driving mechanism comprising a hollow frame member designed to provide a plurality of gear casings, spindle bearings housed in certain of said gear casings, spindles journaled in said bearings, a gear fixed to each spindle between the spindle bearing and the inner side of the casing containing said bearing, each of said gear casings being provided, at the outer side of the hollow frame structure, with a removable cover provided with a central opening in which the bearing associated with said casing is removably secured so that the cover may be removed with the bearing or independently thereof.

6. A spindle driving mechanism as set forth in claim 5 in which each spindle gear comprises a hub section fixed to the spindle and a toothed ring section detachably fastened to the hub section, the inside and outside diameter of the ring section being such as to permit removal of said section by drawing it outwardly over the adjacent spindle bearing when the cover of the casing is detached from the bearing and removed.