May 22, 1928. 1,670,832

J. W. VEDDER

DRIER DRIVING MEANS

Filed Jan. 13, 1928 2 Sheets-Sheet 1

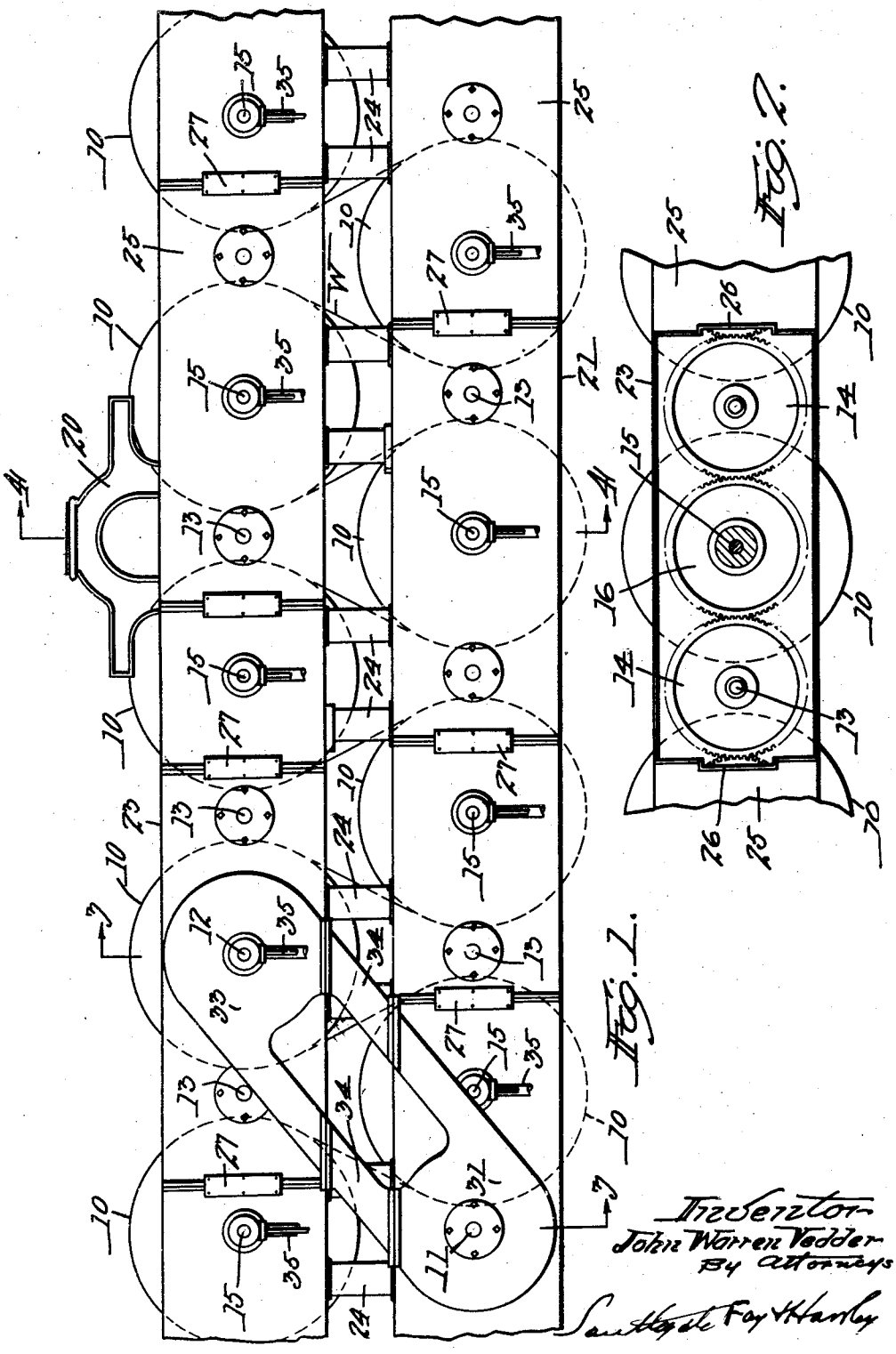


Fig. 1.

Fig. 2.

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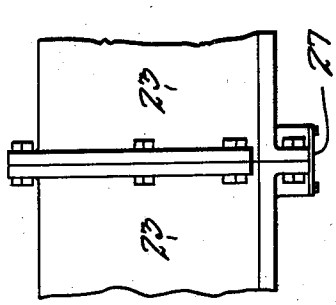


Fig. 5.

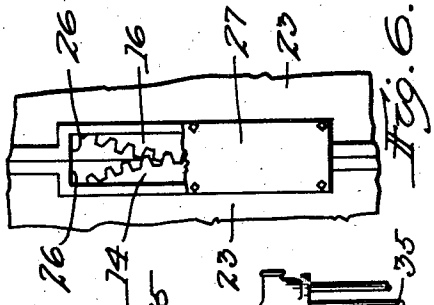


Fig. 6.

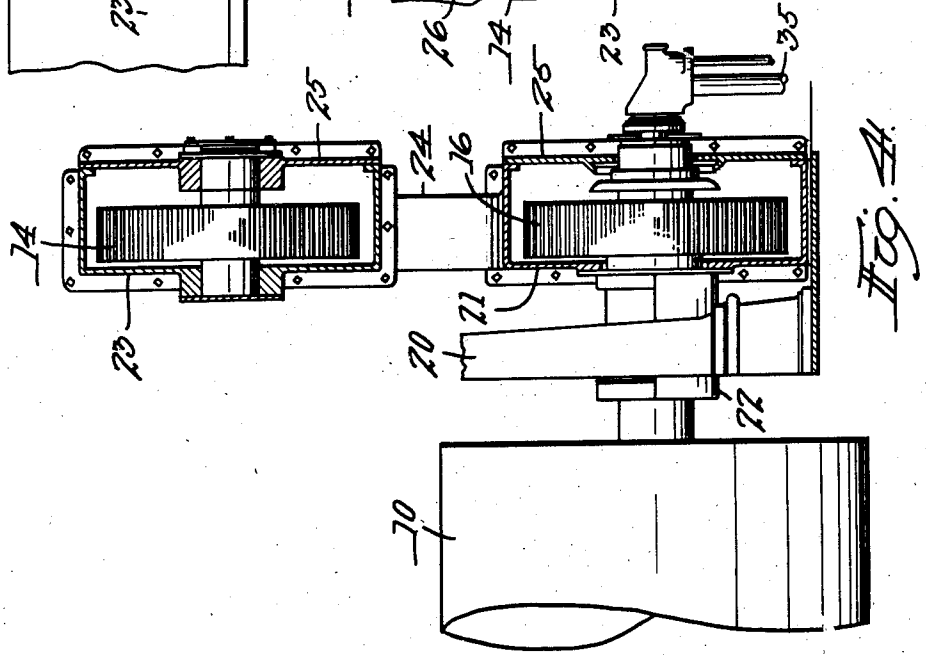


Fig. 4.

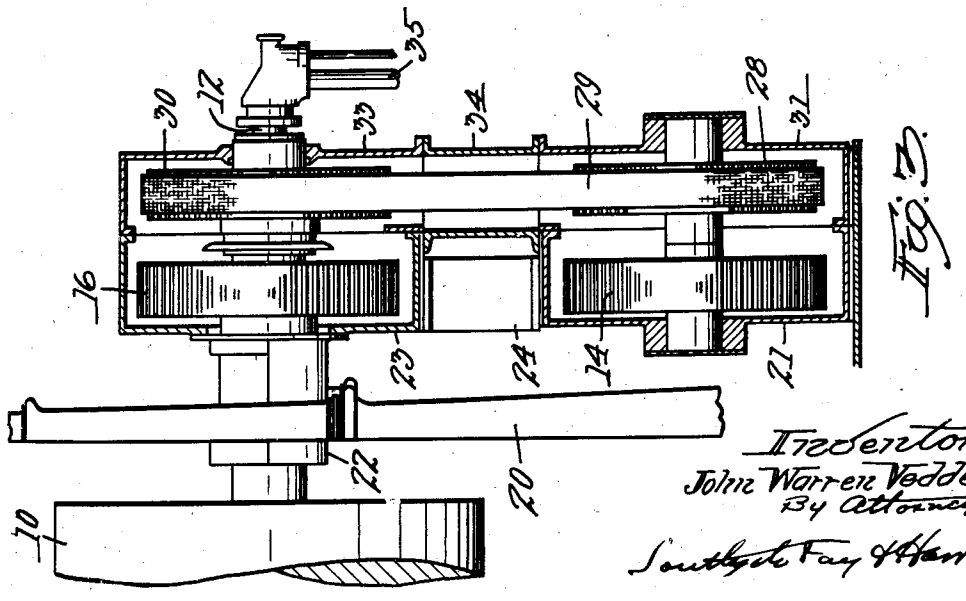


Fig. 3.

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UNITED STATES PATENT OFFICE.

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DRIER DRIVING MEANS.

Application filed January 13, 1928. Serial No. 246,604.

This invention relates to an arrangement of gearing for driving a drier part of a paper making machine.

The principal objects of the invention are to provide a gear drive which will enable the attendants to get at the parts on the driving side for lubrication, also for spearing the paper, inspection, repairs, etc., and will distribute the strain on the gears and shafting; and to provide a casing for the gearing with the cover made up in parts and so constructed as to be readily removable from each other, and permit a section of gears to be removed without dismantling a large part of the machine.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings, in which

Fig. 1 is a side view of a drier part constructed in accordance with this invention showing only a portion thereof near the means for transmitting power from the driving shaft to the upper set of cylinders;

Fig. 2 is a view of one of the sections of gears on the same scale as Fig. 1, showing one of the plates of the gear casing removed to illustrate how the gears can be taken out;

Fig. 3 is a sectional view on the line 3—3 of Fig. 1;

Fig. 4 is a sectional view on the line 4—4 of Fig. 1;

Fig. 5 is a plan of a joint between two sections of the casing for the gearing, and

Fig. 6 is a side view at the same point showing how the casing is cut out to permit the gears to be removed.

I have shown the invention as applied to a drier part adapted to receive the web W of paper and comprising a series of steam heated cylinders 10 located in two sets above and below. It has been customary heretofore to place these cylinders in such relation to each other that a gear can be mounted on the end of each and said gears mesh directly with each other in accordance with the travel of the web. By this I mean that the first cylinder shaft at the left in Fig. 1 will have a gear upon it meshing with a gear on the cylinder shaft below and to the right of it, and the latter will have a gear meshing with the gear on the next cylinder above and to the right of it, and so on throughout the series. In this way, although the gear ratios were kept correct and a comparatively small number of gears was required, the back-lash was transmitted all the way across the machine directly from one cylinder to the next, thus causing trouble in some cases, and the strain on the gearing was unbalanced as the power was applied to a gear in the bottom section at a point near the bottom and transmitted from that gear at another point near the top.

In the ordinary construction the gears, which are on the rear ends of the drier journals or trunnions which carry the drying cylinders, are of larger size than the cylinders themselves in order to make the web travel at desired uniform speed. These are located on the rear side and it is practically impossible to get in behind them to oil the bearings, to perform any slight repairs, keep the parts clean, or to spear the paper. One of the objects of this invention is to provide a form of gearing for driving the drier cylinders which will be of such a nature that it will be very easy to get in behind them and perform the above mentioned operations at any time.

I separate the top set of cylinders entirely from the bottom set and drive each one by a single line of gearing extending from the power shafts 11 and 12. For this purpose I have provided additional shafts 13 on which are located gears 14, and on the journals 15 on which the cylinders 10 are located I have provided gears 16 meshing with the gears 14. The gears 14 and 16 thus alternate with each other and they are all of the same size on the form shown. They transmit power to the cylinders in the same direction as heretofore, but the transmission of the power to the cylinders along toward the end of the machine at the bottom may be said to be independent of the transmission of the power to the corresponding cylinders at the top. This makes more gearing, but none of the gears have to be so large and it will be seen that each gear receives power on one side of its shaft and transmits power from a diametrically opposite point around the circumference. The small gears do not prevent access to the bearings for lubrication and repairs.

Having described the gearing I will now describe the frame of the machine. There

is of course the usual frame 20 of the drier which supports the cylinders 10 in the usual way. On the floor of the room, or on a suitable solid support, is carried a casing 21 for the gearing. Above the casing 21 is a casing 23 for the upper gears, and this is connected with the frame 20 by bearings 22 which surround each one of the shafts 12 and extend inwardly to the frame 20.

This latter casing is supported from the frame by posts 24 arranged at intervals. The casings 21 and 23 are provided with front plates or covers 25 which are of different sizes as will appear, but they are all rectangular in shape, and certain of them are constructed so as to encompass the length of three gears 14 and 16. The line of division between two of these cover plates 25 has to come at the pitch line of the intermeshing gears. Therefore, the teeth of the gears project half way beyond this line in each case, and when the cover is removed two of the end gears could not be lifted out conveniently to say the least.

For this purpose the covers 25 are cut away to provide notches 26. These notches register with each other and form a rectangular opening which is covered by a plate 27 bolted to the edges of these notches as appears in Fig. 6 especially. Now when one of the covers 25 is removed and the two plates 27 adjacent thereto, which can be taken off with it, a set of three gears is always exposed in such a way that all three of them can be taken out very readily as is clearly indicated in Fig. 2.

It may be stated that the shaft 11 shown in Fig. 1, is the power shaft to which power is delivered from a motor or line of shafting, and this transmits power directly through the lower set of gears 14 and 16. It is also provided with a pulley 28 or sprocket wheel driving a belt or chain 29 which, through a similar pulley or wheel 30, drives the shaft 12, which in this case happens to be one of the shafts on which one of the cylinders 10 is mounted. This shaft 12 becomes the driving shaft for the upper series of gears and cylinders and transmits its power to them directly without any special influence from the train of gearing in the lower set. In this way the strain on the gears is equalized, the loss of surface travel due to back-lash is also equalized in the upper and lower sets and the gears are easily removed. These advantages can be secured without changing the spacing apart of the cylinders.

The elements 28, 29 and 30 are housed in a casing carried by the casings 21 and 23 and made up of several parts 31, 33 and 34. There are two of the latter and they constitute hollow supports similar to the posts but inclined and serve as an oil casing. Steam pipes 35 are shown, as usual, for heating the cylinders.

Although I have illustrated and described only a single form of the invention I am aware of the fact that modifications may be made therein by any person skilled in the art without departing from the scope of the invention as expressed in the claims. Therefore, I do not wish to be limited to the exact form shown, but what I do claim is:—

1. In a paper drying machine, the combination with a series of drying cylinders over which the web is adapted to pass, a shaft midway between each two adjacent cylinder shafts, a series of gears on said shafts meshing with each other in a train along the machine, and a gear casing covering the said gears and a plurality of covers divided along lines tangent to the pitch lines of the gears, said covers being notched at said pitch lines to permit the removal of the gears by straight movement along their shafts, and a cover plate covering the two notches of two adjacent covers.

2. In a paper drying machine, the combination with a series of steam heated drying cylinders over which the web is adapted to pass, said cylinders being arranged on shafts in horizontal alignment, a shaft midway between each two adjacent cylinder shafts, a series of gears of the same size on said shafts meshing with each other in alignment along the machine, and a gear casing covering the said gears and having a plurality of removable covers, said covers being divided along lines tangent to the pitch lines of the gears, and certain of said covers being notched at said pitch lines to permit the removal of the gears, two adjacent covers supporting a cover plate covering the notches.

3. In a paper drier, the combination with a train of gears arranged horizontally for operating the drier, with a casing extending along the train of gears and supported at the bottom, a second train of gears directly above the first train, a casing for the second set of gears surrounding them, and posts supported by the first casing and bearing the weight of the second casing.

In testimony whereof I have hereunto affixed my signature.

JOHN WARREN VEDDER.