J. H. WALLACE.

PAPER MAKING MACHINE DRIVE.

APPLICATION FILED JAN. 26, 1907.

904,582.

Patented Nov. 24, 1908.

4 SHEETS—SHEET 1.

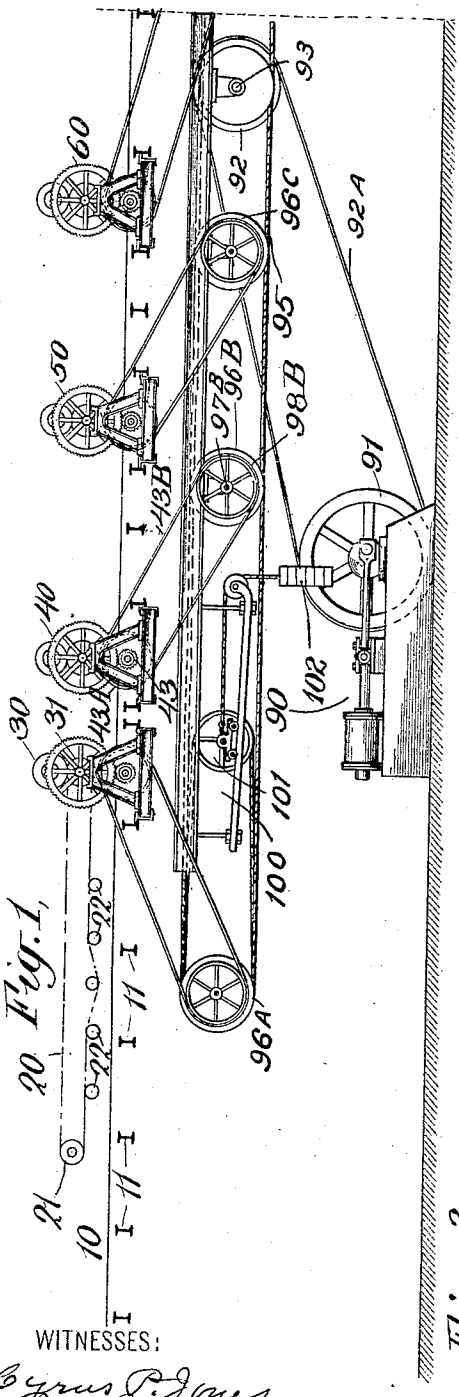

Fig. 1.

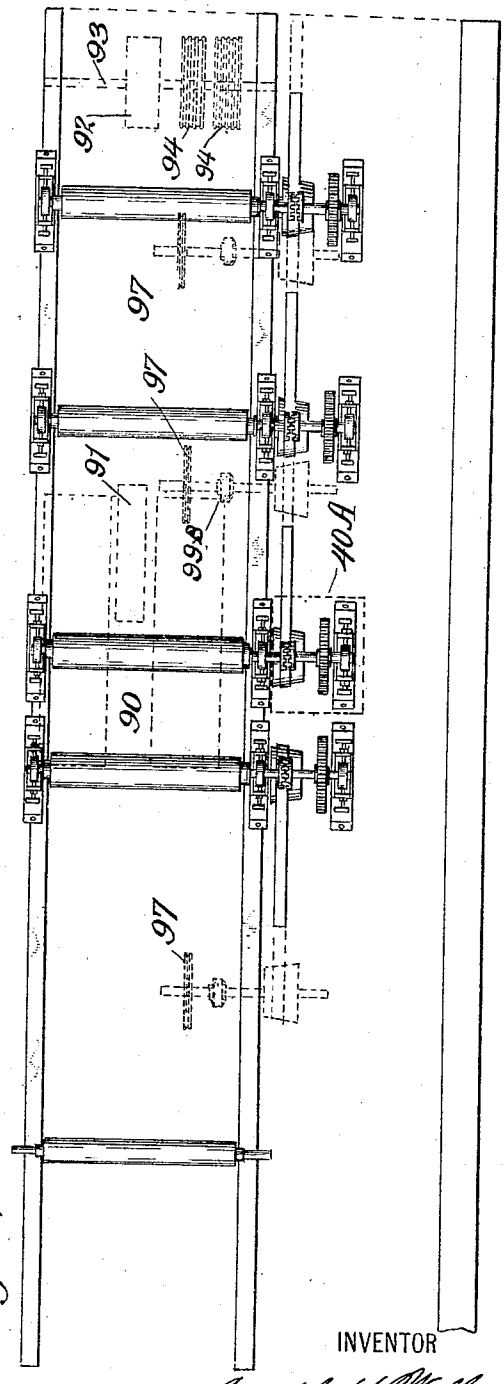

Fig. 3

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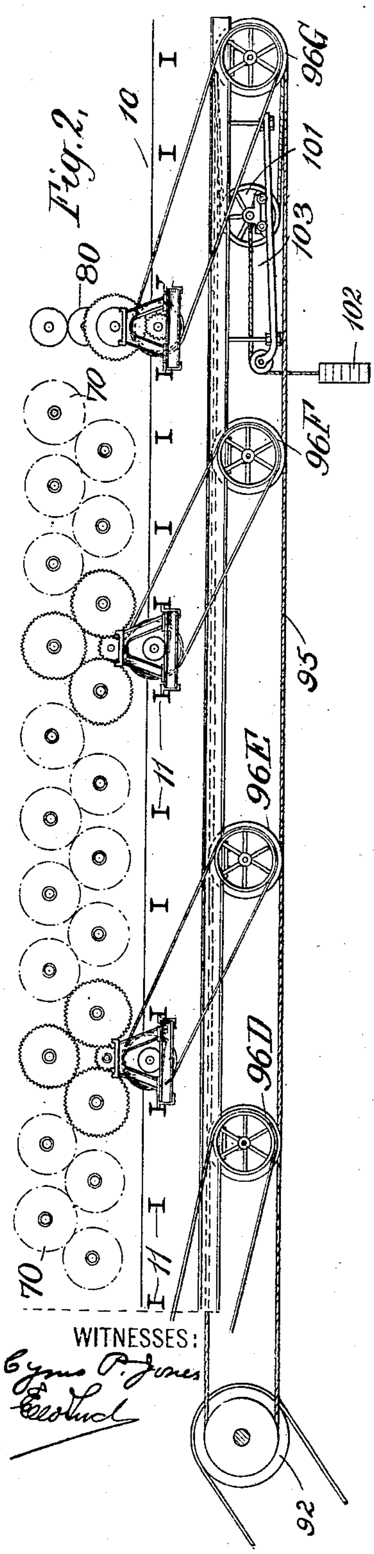

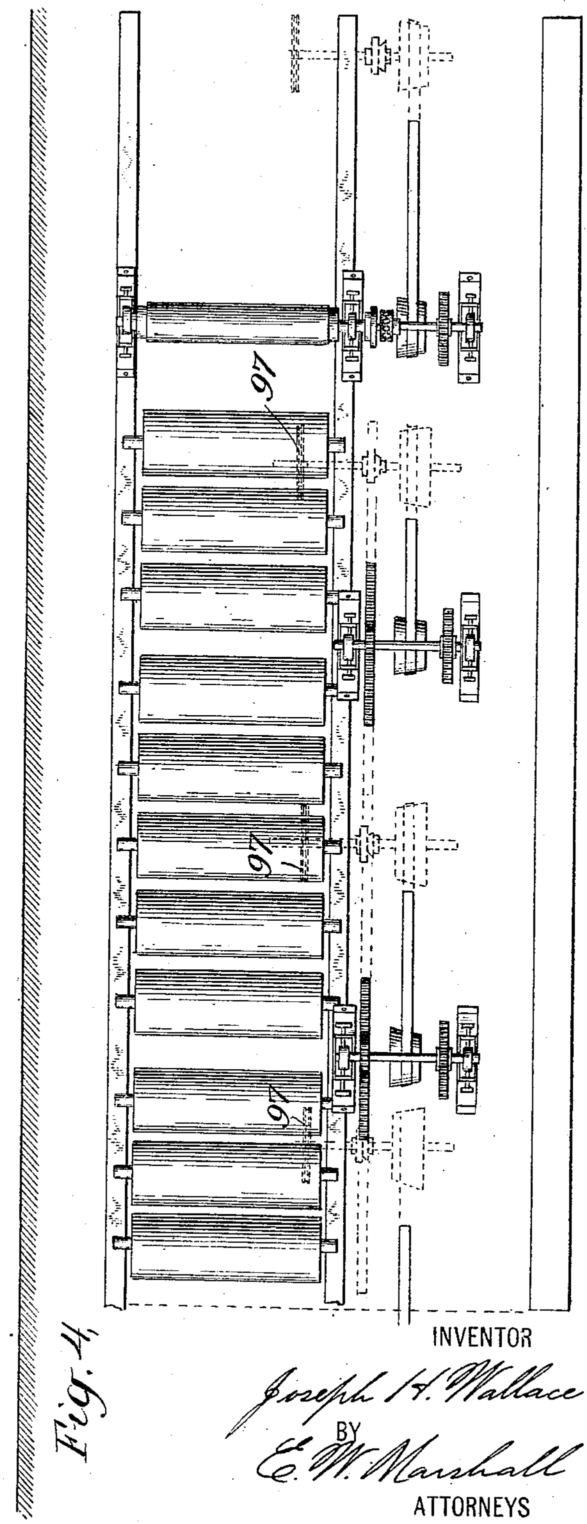

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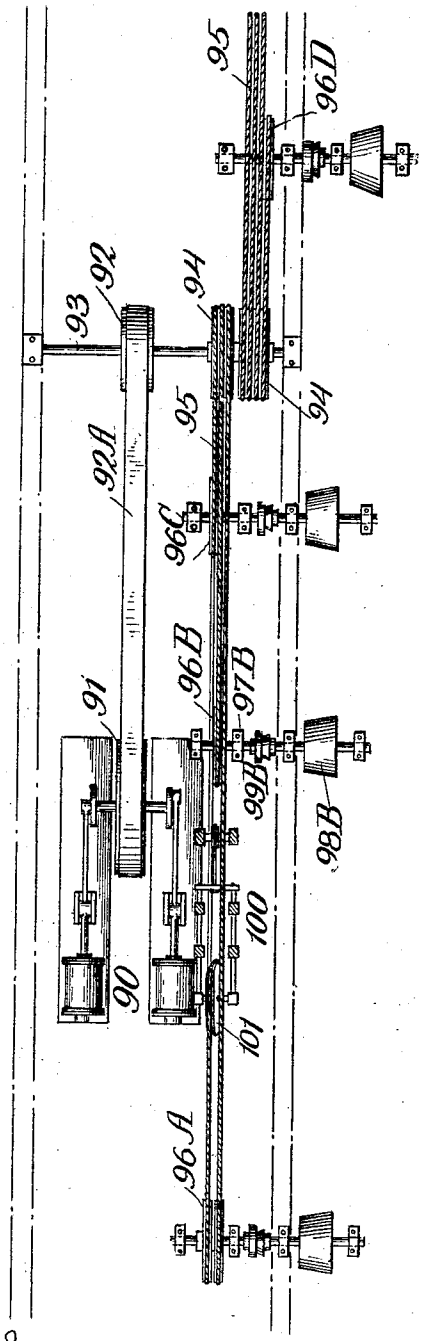

Fig. 5.

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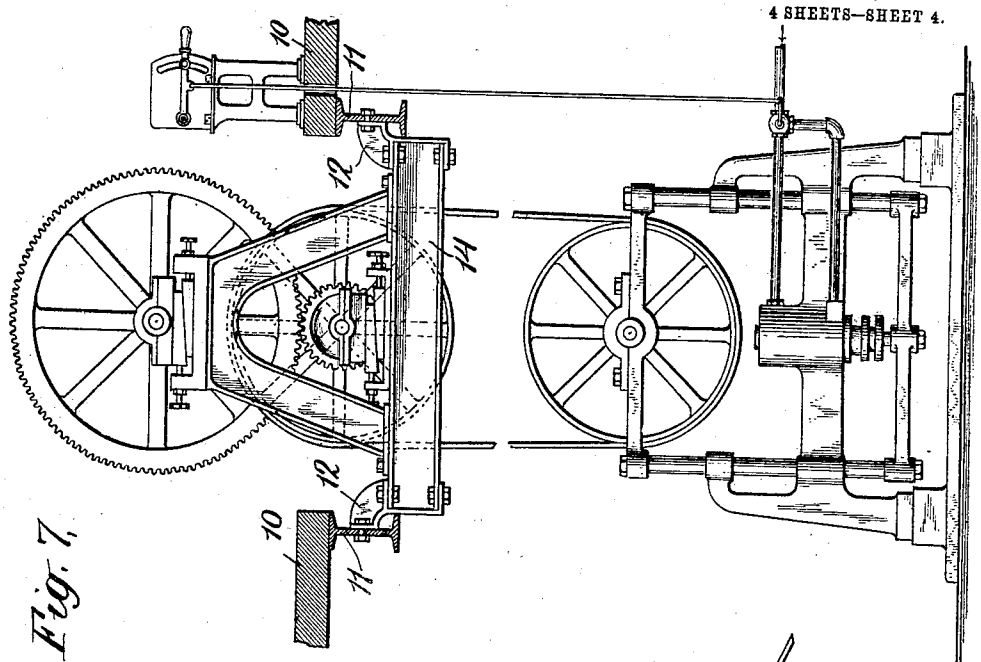

Fig. 7.

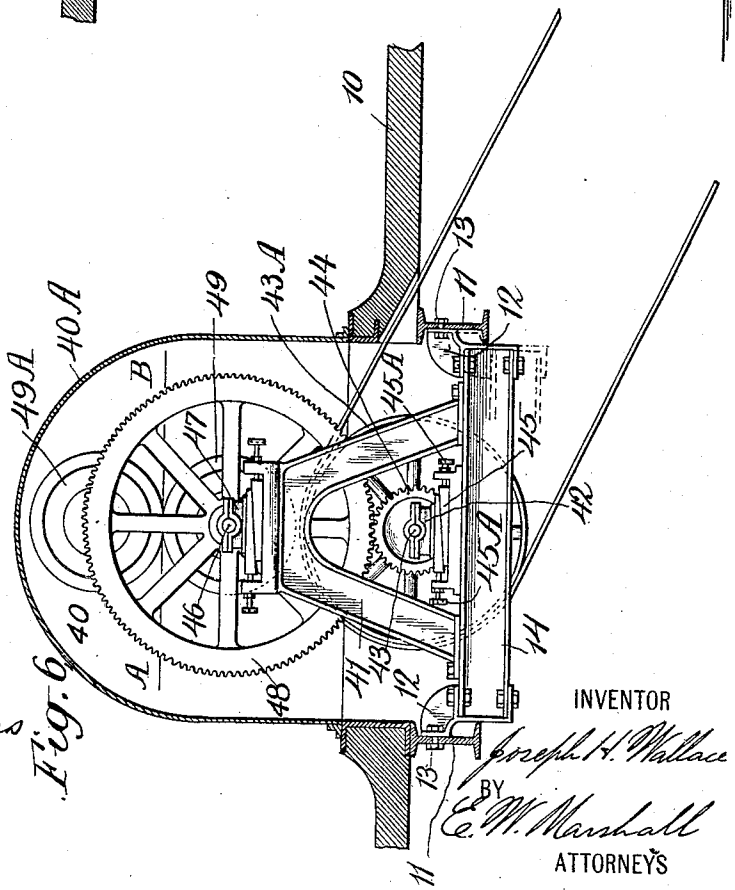

Fig. 6

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UNITED STATES PATENT OFFICE.

JOSEPH H. WALLACE, OF NEW YORK, N. Y.

PAPER-MAKING-MACHINE DRIVE.

No. 904,582. Specification of Letters Patent. Patented Nov. 24, 1908.

Application filed January 26, 1907. Serial No. 354,231.

To all whom it may concern:

Be it known that I, JOSEPH H. WALLACE, a citizen of the United States, and a resident of the city of New York, in the county of New York and State of New York, United States of America, have invented certain new and useful Improvements in Paper-Making-Machine Drives, of which the following is a specification.

My invention relates to an improved driving mechanism for paper making machines and consists in the novel construction and arrangement of parts herein shown and described, the novel features of which are particularly pointed out in claims.

Referring to the drawings, Figures 1 and 2 are a diagrammatic elevation of certain parts of a paper making machine showing my invention applied thereto. Figs. 3 and 4 are a top plan view of the parts shown in Figs. 1 and 2. Figs. 2 and 4 are continuations of the same machine, parts of which are shown in Figs. 1 and 3, so that these figures are designed to be taken together. Fig. 5 is a top plan view taken under the foundation floor of the machine proper and shows the engine and a system of rope-drive connecting the engine to a series of countershafts. Fig. 6 is a sectional side elevation of a press, one of the units in a paper making machine, showing certain parts of its driving mechanism. Fig. 7 shows a modification of one part of my invention. In this figure a gas, air, steam or other fluid pressure device is shown for throwing the driving gear into and out of operative relation with the units of the paper making machine.

Like characters of reference designate corresponding parts in all of the figures.

10 designates the operating floor of a paper making machine which is arranged to support the various units of the machine in a manner which I will more fully describe hereinafter.

20 designates the Fourdrinier wire commonly used in a paper making machine, one portion of which passes over a breast-roll 21 and the other end of which passes over a roll 31 of the couch 30. The under portion of this wire is carried over a series of small rolls 22, 22 in the ordinary manner.

40, 50 and 60 designate three presses of the machine.

70 designates the drier and 80 the calender. The other units of the machine, that is, the reels, slitter and winder, are not shown in these drawings as it is not thought necessary for the purpose of illustrating the present invention.

11, 11 designates a plurality of I-beams which are arranged to support the floor 10, and also support the various parts of the driving mechanism for the paper making machine itself in a peculiar manner which I have invented.

In Fig. 6 I have shown one of the presses 40 on a somewhat enlarged scale. This press is of ordinary construction but is supported and driven in a novel manner which I have invented. 12, 12 designate brackets which are arranged to be supported by the I-beams 11 by means of bolts 13 which pass through holes which may be drilled through the webs of the I-beams at the desired points. These brackets 12, 12 are arranged to be attached to and to support horizontal beams 14 to which the frames or pedestals 41 of the press are attached. A bearing 42, which is arranged to support the shaft 43 of a pinion 44, is also supported by these horizontal beams 14 and is arranged to be vertically adjustable by means of the wedge-shaped blocks 45 and their adjusting screws 45^{A}. 46 designates the main shaft of the press 40 which is supported in a bearing 47, which bearing is mounted upon the frame or pedestal 41 and which is arranged to be vertically adjustable by wedge-shaped blocks and adjusting screws similar to those just described. 48 designates a spur-gear which is mounted upon and keyed to the shaft 46 and which is arranged to be in mesh with the pinion 44. 49 designates the lower roll of the press 40 and this roll is also rigidly attached to the shaft 46 and arranged to be driven thereby. 49^{A} designates the upper roll of the press 40. The centers of the different units in machines of this character are at different heights above the operating floor. It has heretofore been necessary to construct the supporting parts of these mechanisms in such a manner as to provide these differences in height.

By using the construction which I have above described it is possible to use frames or pedestals, such as 41, of the same size for all of the units and to obtain the required differences in height by attaching the brackets 12 to different portions of the webs of the I-beams 11. In Fig. 6 the brackets 12 are shown attached to the upper portion of these webs and the dotted lines in this fig-

ure designate the brackets in their lowest position on these webs. In Fig. 7 an intermediate position of the brackets 12 on the webs of the I-beams 11 is shown. In this manner the various units may be supported at the required heights, and any finer adjustment which may be necessary may be obtained by means of the wedge-shaped supporting blocks and their adjusting screws.

90 designates a steam engine which supplies motive power to this machine. This engine may be variable in speed or it may be replaced by speed changing device driven by any desired motive power. 91 is its fly-wheel. This fly-wheel is connected by a belt 92^A to a pulley 92 which is rigidly mounted upon a countershaft 93.

94, 94 designate rope-drive sheaves which are rigidly mounted upon the countershaft 93 and which are arranged to be driven by the engine 90.

95, 95 designate a plurality of driving ropes which coöperate with the rope-drive sheaves 94, 94 and a plurality of other rope-drive sheaves 96^A, 96^B, 96^C, 96^D, 96^E, 96^F and 96^G, each of which is mounted upon one of a series of countershafts such, for example, as the countershaft 97^B. A cone pulley such as 98^B is attached to one end of each of these countershafts, and between the rope-drive sheaves and the cone pulleys a friction clutch such as 99^B is interposed.

100 designates a tension device for the driving ropes which comprise a traveling sheave 101 in a loop of the driving rope 95 and the weight 102 which is arranged to move the traveling sheave 101 and take up any slack in the driving rope 95. At 103 a similar tension device is shown in another portion of the driving rope.

The cone pulley 43^A is attached to the shaft 43 of the press 40, and a similar cone pulley is attached to a similar shaft or shafts of the other units. This cone pulley 43^A is connected with the cone pulley 96^B by a belt 43^B, and any of the well-known belt-shifting devices commonly used in mechanisms of this type may be provided for shifting the position of this belt for the purpose of regulating the speed of the press. The other units may be similarly provided with connecting belts and belt-shifting devices.

I have pointed out specifically the arrangement of the driving mechanism for but one of the units as all of them are of substantially the same construction and arrangement and it is therefore to be understood that this description applies to the other units as well as the press 40. The operation of this arrangement is obvious. The countershafts under the machine are driven by the rope-drive arrangement which I have described and the various units of the paper making machine are driven directly from these countershafts by the cone pulleys and their connecting belts.

Hitherto paper making machines have been driven by an engine situated beneath the operating floor, the motive power of which is transmitted through long lines of countershafting, and a cumbersome system of gearing which included at least one pair of bevel-gears for each of the units of the machine. The space underneath the floor of the machine was so much encumbered by this mechanism that it was not available for other uses. By my arrangement the countershafts which drive the various units are supported from the floor leaving the floor of the basement free for the most part, or are supported from the roof of the engine-room and the rope-drive transmission may be placed close to this roof. This leaves the floor space clear except for the portion of the floor which is taken up by the driving engine, and in some cases even this space may be left clear by using an electric motor suspended overhead for driving the countershaft 93 and the rope-drive mechanism. Another advantage of this arrangement is that the spur gears and driving cones which I use take up but little space upon the operating floor and these may be entirely inclosed by a waterproof cover placed over them in the position shown at 40^A in Fig. 6 and by the dotted lines in Fig. 3. When such covers are used the entire driving mechanism is so protected that the operating floor and various parts of the paper making machine may be readily cleaned by means of a hose. The floor space saved by this arrangement is so great that in a certain case it has been possible to install a large modern paper making machine in a building constructed for a much smaller machine which could not have been done with any of the devices heretofore known without reconstructing the building.

The various units of a paper making machine must be positively driven at relative speeds to each other.

It is essential in a machine of this character that the various units shall be driven smoothly and with entire freedom from any jerky motion. This arrangement entirely overcomes difficulties of this character which are often disastrous as they break the paper during the process of its manufacture and cause expensive delays. The peculiar arrangement which I have invented for supporting the units upon the floor and the peculiar design of driving mechanism for the various units makes a cheap form of installation. Moreover, as many parts of the construction may be used for each of the units, it makes feasible the carrying of but few repair parts and thereby increases the efficiency of the machine.

What I claim is.—

1. In combination with a paper making machine comprising a plurality of units, a countershaft for each of said units, a motor, a driving shaft, ropes connecting the driving shaft and the countershafts, means for maintaining tension on the ropes, a belt between each of the units and its countershaft, cone pulleys over which the belts are arranged to run, a pair of spur gears between each unit and its driven cone pulley, and a floor structure supporting the paper making machine above it and the driving shaft and ropes below it.

2. In combination with a paper making machine comprising a plurality of units, a countershaft for each of said units, a motor, a common driving shaft, a plurality of ropes connecting the driving shaft and the countershafts, a separate tension mechanism for each of said ropes, a belt between each of the units and its countershaft, cone pulleys over which the belts are arranged to run, a pair of spur gears between each unit and its driven cone pulley, means for connecting and disconnecting each of said units to and from its respective countershaft, and a floor structure supporting the paper making machine above it and the driving shaft and ropes below it.

3. In combination with a paper making machine, comprising a plurality of units, a countershaft for each of said units, a motor, a common driving shaft, a plurality of ropes connecting the driving shaft and the countershafts, a separate tension mechanism for each of said ropes, a belt between each of the units and its countershaft, cone pulleys over which the belts are arranged to run, a pair of spur gears between each unit and its driven cone pulley, means for connecting and disconnecting each of said units to and from its respective countershaft, a floor structure comprising a plurality of transverse I-beams, said structure supporting the paper making machine above it and the driving shaft and ropes below it, and a plurality of connecting brackets of uniform dimensions arranged to be attached to said units and to said transverse beams at different heights.

4. In combination with a paper making machine comprising a plurality of units, a countershaft for each of said units, a motor, a common driving shaft, a plurality of ropes connecting the driving shaft and the countershafts, a separate tension mechanism for each of said ropes, a belt between each of the units and its countershaft, cone pulleys over which the belts are arranged to run, a pair of spur gears between each unit and its driven cone pulley, fluid pressure actuated mechanisms for connecting and disconnecting each of said units to and from its respective countershaft, a floor structure comprising a plurality of transverse I-beams, said structure supporting the paper making machine above it and the driving shaft and ropes below it, and a plurality of connecting brackets of uniform dimensions arranged to be attached to said units and to said transverse beams at different heights.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOSEPH H. WALLACE.

Witnesses:
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CYRUS P. JONES.