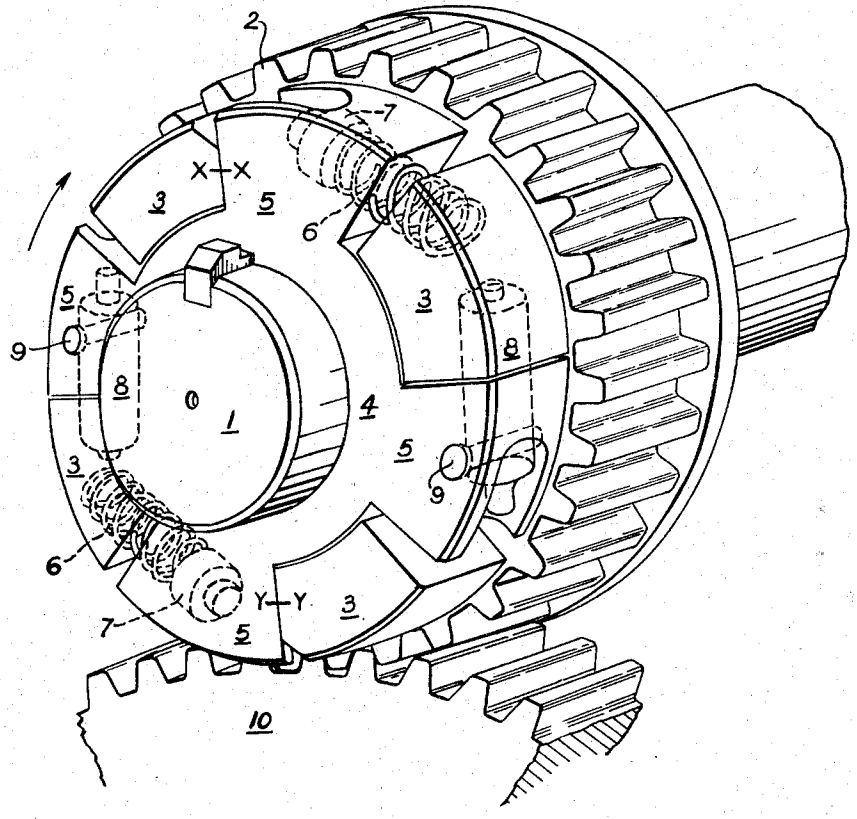
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ROTARY PRINTING PRESSES

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ROTARY PRINTING PRESSES

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This invention relates to rotary printing presses.

In the production of certain printed articles, e.g. security documents, it is usually necessary to print on both sides of a sheet, one impression being made on the obverse side during a first printing operation and the other being made on the reverse side during a second printing operation. High pressures are used in such printing operations and when the cylinders are gear driven the paper may be subjected to a distortion or "slur" with the result that it becomes most difficult to obtain a correct register of the design printed on the reverse side in the second printing operation.

One object of this invention is to provide in such a press means which will prevent sheets of paper fed between the impression and plate cylinders thereof from being subjected to distortion which may arise from compression of the "make-ready" on the impression cylinder or as the result of the gear-tooth characteristics of the gears driving the cylinders.

According to this invention a rotary printing press comprises a rotary impression cylinder, a first gear for said impression cylinder freely mounted on the impression cylinder shaft and having its pitch circle radius equal to the radius of said impression cylinder, spaced driving dogs integral with said first gear wheel, an equal number of driven dogs spaced between said driving dogs and fast with the shaft of the impression cylinder, whereby at least one driving dog may drive one driven dog, a plate cylinder carrying printing plates on part of its circumference and a second gear wheel for said plate cylinder adapted to drive said first gear wheel and to be driven by a prime mover and having a pitch circle radius slightly less than the overall radius of the plate cylinder whereby, during each printing operation, the impression cylinder is frictionally driven at the same surface speed as the plate cylinder.

Preferably at least one pair of coil springs is provided between two opposite pairs of driven and driving dogs in such a way that the spring is compressed during the period that the impression cylinder is frictionally driven by the plate cylinder.

Preferably also shock absorbing mechanisms are provided between other pairs of driven and driving dogs in order to control the return of the driven dogs with the action of the coil spring when the impression cylinder is driven by the plate cylinder gear.

The invention is illustrated in the drawing accompanying the provisional specification which is a perspective view of the driving mechanisms of the impression cylinder and plate cylinder of a rotary printing machine.

In the drawing the shaft of an impression cylinder, not shown, is denoted by the numeral 1. Fitted on the shaft 1, in a free and non-rigid manner, is a gear wheel 2 to which are attached, in an integral manner, four equally spaced driving dogs 3. A spider 4, which includes four equally spaced dogs 5, is keyed to the shaft 1, the dogs 5 being interposed between the dogs 3. Coil springs 6 are fitted between two adjacent pairs of dogs 3 and 5 in

bores therein and screwed caps 7 are provided to enable the springs to be adjusted. When the springs are decompressed, the rear faces of the dogs 5 mate with the forward faces of the driving dogs 3 at XX and YY, whereby the dogs 5 become driven dogs. Each driving dog 3, which carries the coil springs, is bored to carry an oil controlled dash-pot shock absorbing device 8, which fits also into a bore in the next driven dog 5 in the direction of rotation, as indicated by the arrow. The devices 8 are fixed into the dogs 5 by means of pins 9 and, whilst permitting unrestricted compression of the springs 6, serve to control return of the driven dogs 5 on decompression of the springs.

A printing plate cylinder (not shown) carries a gear wheel 10 which is driven by a prime mover (not shown) and drives the gear wheel 2. The ratio of the impression cylinder gear wheel 2 to the plate cylinder gear wheel 10 is designed to be 1:2. The plate cylinder carries one or more printing plates which cover only part of its circumference and thus is arranged to have a slightly larger radius than that of the pitch circle of the plate cylinder gear wheel 10 with the result that the ratio between the impression and plate cylinder surfaces is, e.g. 1:2.01. The plate cylinder gear wheel 10, as stated above, is driven by a prime mover with the result that the plate cylinder makes one revolution for every two revolutions made by the driven gear of the impression cylinder, the impression cylinder itself being driven by driving dogs 3 moving against driven dogs 5 at the interfaces indicated by XX and YY. However, as the part of the circumference of the plate cylinder which carries the printing plate or plates has a radius which is greater than that of the pitch circle of the gear wheel 10, the impression cylinder normally is not driven by the meshing of the gear wheels 2 and 10, but by the friction between the surfaces of the plate and impression cylinders, with the result that the impression cylinder moves at the same surface speed as the plate cylinder. Thus, during the printing operation, when a sheet of paper is fed between the impression and plate cylinders, both cylinders are driven at the same peripheral speed, with the result that the paper is not subjected to any slur or distortion. When the impression cylinder is frictionally driven, the spider 4 and its integral driven dogs 5 move away from the driving dogs 3 and the surfaces XX and YY no longer mate. This results in compression of the coil springs 6 which remain compressed until the cylinders come "off impression," when the printing plate or plates carried by the plate cylinder no longer co-act with the impression cylinder.

What is claimed is:

1. A rotary printing press comprising a rotary impression cylinder, a shaft with which said cylinder can rotate, a first gear wheel for said impression cylinder freely mounted on the said cylinder shaft and having its pitch circle radius equal to the radius of said impression cylinder, spaced driving dogs integral with said first gear wheel, an equal number of driven dogs spaced between said driving dogs and fast with the impression cylinder shaft, whereby at least one driving dog may drive one driven dog, a plate cylinder carrying printing plates on part of its circumference and a second gear wheel for said plate cylinder adapted to drive said first gear wheel and to be driven by a prime mover, said second gear wheel having a pitch circle radius slightly less than the overall radius of the plate cylinder whereby, during each printing operation, the impresison cylinder is frictionally driven at the same surface speed as the plate cylinder.

2. A rotary printing press as claimed in claim 1, in which at least one pair of coil springs is provided between two opposite pairs of driven and driving dogs in

such a way that the spring is compressed during that period that the impression cylinder is frictionally driven by the plate cylinder.

3. A rotary printing press as claimed in claim 2, in which shock absorbing mechanisms are provided between other pairs of driven and driving dogs in order to control the return of the driven dogs with the action of the coil springs when the impression cylinder is driven by the plate cylinder gear.

4. A rotary printing press as claimed in claim 1, in which at least one pair of coil springs is provided between two opposite pairs of driven and driving dogs in such a way that the spring is compressed during that period that the impression cylinder is frictionally driven by the plate cylinder, and means for adjusting the bias of the coil springs.

5. A rotary printing press as claimed in claim 2, in which shock absorbing mechanisms are provided between other pairs of driven and driving dogs in order to control the return of the driven dogs with the action of the coil springs when the impression cylinder is driven by the plate cylinder gear, and means for adjusting the bias of the coil springs.

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