

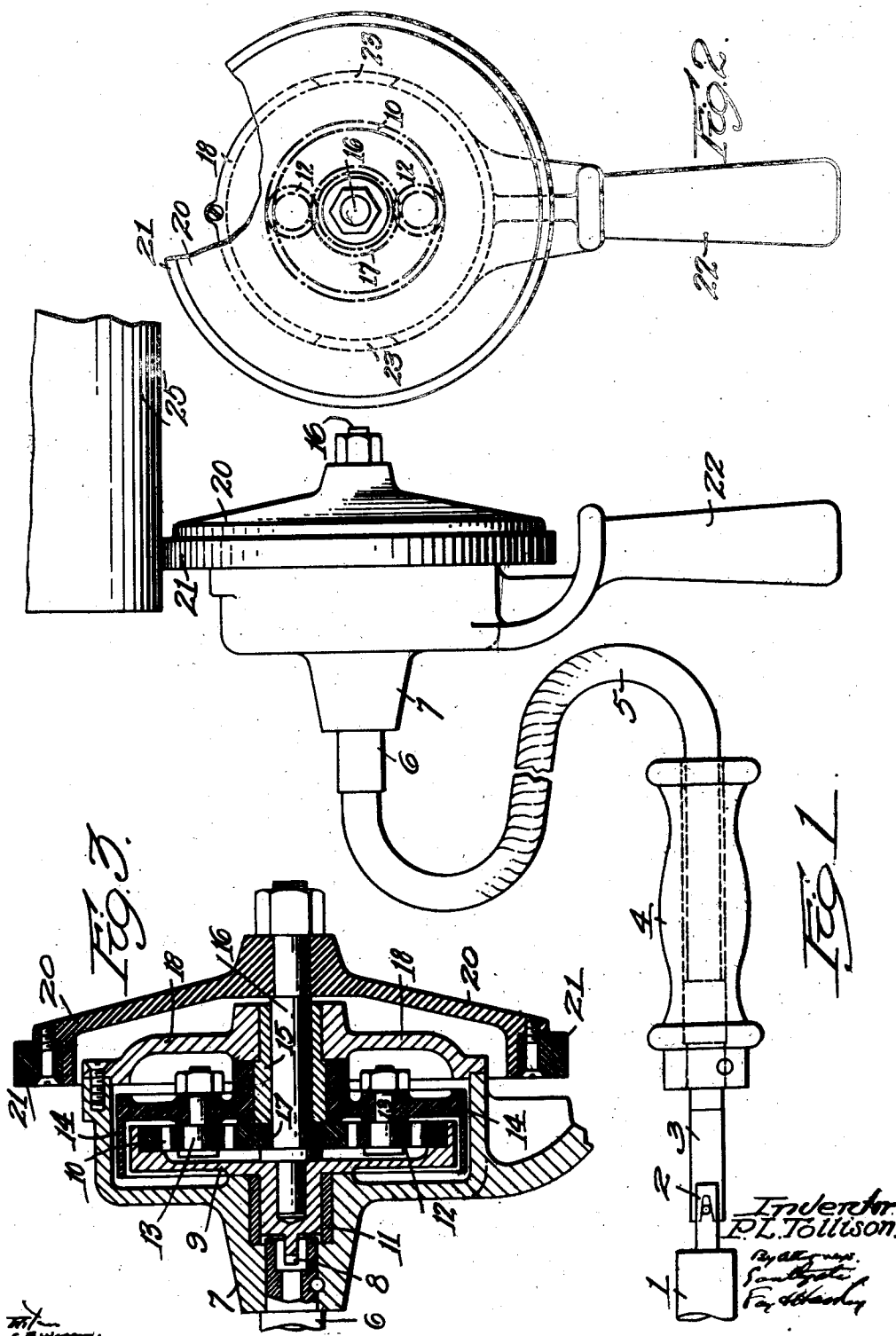
Feb. 22, 1938.

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2,109,362

SYNCHRONIZATION INDICATING DEVICE

Original Filed Jan. 27, 1932



UNITED STATES PATENT OFFICE

2,109,362

SYNCHRONIZATION INDICATING DEVICE

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Application January 27, 1932, Serial No. 589,233
Renewed November 4, 1935

3 Claims. (Cl. 235—103.5)

This invention relates particularly to the splicing of a new roll of paper to a running web roll in the printing art but it is applicable to other industries where it is necessary to synchronize two running members.

The principal objects of the invention are to provide means for accurately comparing the relative speeds of the surface of a rotating roll and a running web; to provide means whereby the fact that one of these members is moving faster than the other can be observed so that one of them can be adjusted until they are running in synchronism and that fact can be observed easily, simply and accurately and to provide a simple hand-operated mechanism for accomplishing the above results.

Other objects and advantages of the invention will appear hereinafter.

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

Fig. 1 is a side view of a preferred embodiment of this invention shown in operation;

Fig. 2 is an end view of the casing and contact ring for the rotating roll, and

Fig. 3 is a diametrical sectional view of the mechanism.

In the modern type of device used in splicing a new roll of paper to the web running from an expiring roll into a printing press, the new or incoming roll is brought to the same surface speed as that of the web prior to the making of a paster. Owing to the variable diameters of the rolls used, it is necessary to drive them with some type of friction means which introduces an element of doubt as to their speed at the moment of splicing. As stated above, this invention has for its purpose the provision of means for finding out accurately and positively when the web and the surface of the new roll are running at the same speed so that whenever they are not running at the same speed, the speed of rotation of the new roll can be changed to bring them into synchronism.

This invention involves easily observed means for showing positively when they are in synchronism.

These objects are accomplished by means of a differential mechanism, one member of which is connected directly to a press driven shaft and another member is in running contact with the new roll of paper, preferably on the surface thereof. The differential mechanism involves a third or central member placed between the other two. Means is provided by which the central member can be observed. This differential

member is arranged so that, when the two speeds are synchronized, the central member remains stationary. When running at different speeds, one of the two running members moves faster than the other. Then, of course, the central member will rotate slowly backward or forward. Then the speed of the new roll can be varied to bring its surface to a linear speed exactly the same as that of the running web.

In the drawing, the shaft 1 represents a shaft of the press, or at least a shaft that is rotated by the press in direct and positive proportion to the speed of the printing couple. It carries a double pointed projection 2 over which a shaft extension 3 is adapted to be slipped. This shaft extension is provided with a handle 4 rotatably mounted on it by which it can be manipulated so that this extension 3 may be applied to the projection 2 and the extension 3, which runs through the handle, will then rotate at the same speed, of course, as the shaft 1. This connection is positive.

The shaft extension 3 preferably has a flexible portion 5 provided with a free bushing 6 which is pinned to a casing 7. The casing and bushing are practically stationary, the shaft extending through the bushing and having a slotted end 8. This casing is concentric with this shaft which, of course, is a permanent part of it.

The slotted end 8 receives a projection on a wheel 9 to lock them together. This wheel is provided with internal teeth 10 mounted on a ring which is fixed to the wheel 9. The gear is mounted in an anti-friction bearing 11 in the casing 7. Meshing with this internal gear are two planetary pinions 12 mounted on studs 13 parallel with the axis of the casing and the shaft and carried on a drum 14 which has a cylindrical surface projecting over the internal gear and housing it within the drum.

This drum is rotatably mounted on a sleeve 15 which is carried on a shaft 16 not connected with the shaft 1 directly but mounted in the casing coaxially with respect to that shaft. On the shaft 16 is a central gear 17 meshing with the two planetary gears 12 so as to constitute a differential.

The casing 7 is provided with a cover 18 which encloses this mechanism and is fixed to the casing. It has a bearing for the sleeve 15 and supports one end of the shaft 16. On the shaft 16 beyond the cover is fixed a disc wheel 20 which in turn is provided with a ring 21, preferably a ring or annulus of fiber or other preferably non-metallic material. The casing 7 is provided with

a handle 22 for manipulating the casing. This is really a hand tool.

It will be seen that if the disc 20 and the shaft 5 are rotating in the same direction, there is a differential action in the gearing mentioned furnishing no obstruction to their rotation but, if the two members are rotating at different speeds, the drum will rotate slowly in one direction or the other in accordance with the difference in speeds. If, however, they are rotating at the same speed the drum will be stationary.

For the purpose of observing the drum the casing 7 is provided with openings 23 therein. These are located in a convenient position so that the operator, holding the handle 22, can look into the casing and see whether the drum 14 is rotating or not and also see in which direction it is rotating.

The method of use, of course, is to hold the casing in the hand by means of the handle 22 and by means of the handle 4 connect the shaft extension 3 to the shaft 1. Then by manipulating the handle 22 he brings the ring 21 into contact with the cylindrical surface of the paper roll 25. Thus this annulus serves as a roller.

It will be remembered that the shaft 1 is rotating in given proportion to the press speed while the new web roll 25 is rotated by any usual means to bring it up to a speed approximate to the speed of the web drawn into the printing press by the printing couple. These two speeds should be the same before the pasting is commenced and this tool furnishes the means for finding out when they are the same. The operator observes through the openings 23 whether the drum 14 is rotating or not. If it is rotating in one direction he reduces the speed of the roll 25 by suitable means not shown herein. If it is rotating in the other direction he increases this speed. When the drum 14 is stationary he knows positively and accurately that the speed of the surface of the drum in feet per minute is the same as the speed of the web of paper running with the press. Then he does whatever is necessary to make the paster at that time. In other words, he sets mechanism into operation for the joining of the running web to the surface of the rotating roll. When this observation is made this tool is no longer used and it is taken away.

This device is particularly applicable to the measuring of the relative speeds of the web and the paper roll which is being speeded up prior to splicing and securing accurate knowledge of the fact that they are in synchronism whenever they come into that condition. It is capable of use, however, in any other form of machine

where it is necessary to synchronize two moving members, one of which is accessible for the application of the ring 21 as a roller on its circular surface.

Although I have illustrated and described only one form of the invention I am aware of the fact that other modifications can 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 in this respect, otherwise than as set forth in the claims, but what I claim is:—

1. In a device for indicating synchronous rotation, the combination of a shaft connected to be driven by one of the two elements to be tested and an annulus adapted to be rotated by surface contact with the other of the two elements which are to be tested, a portable casing outside of which the annulus is located, said shaft entering said casing axially, a second shaft in the casing in axial alignment with the first shaft and to which the annulus is fixed, a differential mechanism in the casing connecting the two shafts, a drum carrying part of the differential and means whereby the casing can be moved to bring the annulus into contact with the exterior convex surface of one rotating element to be tested.

2. In a device for indicating synchronous rotation, the combination of a flexible shaft adapted to be rotated by one of the elements to be tested and an annulus adapted to be rotated by the other of the two elements which are to be tested, with a freely portable casing, said shaft entering said casing axially, a second shaft in the casing in axial alignment with the first shaft and to which the annulus is fixed, a differential mechanism in the casing connecting the two shafts and a drum carrying one side of the differential and located in the casing.

3. In a device for indicating synchronous rotation, the combination of a flexible shaft adapted to be rotated by one of the elements to be tested and an annulus adapted to be rotated by the other of the two elements which are to be tested, with a freely portable casing, said shaft entering said casing axially, a differential mechanism in the casing connecting the shaft and the annulus, a cover for the casing having spaced openings, and a drum carrying one side of the differential and located in the casing but observable through said openings to indicate whether the two elements to be observed are rotating at the same speed.

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