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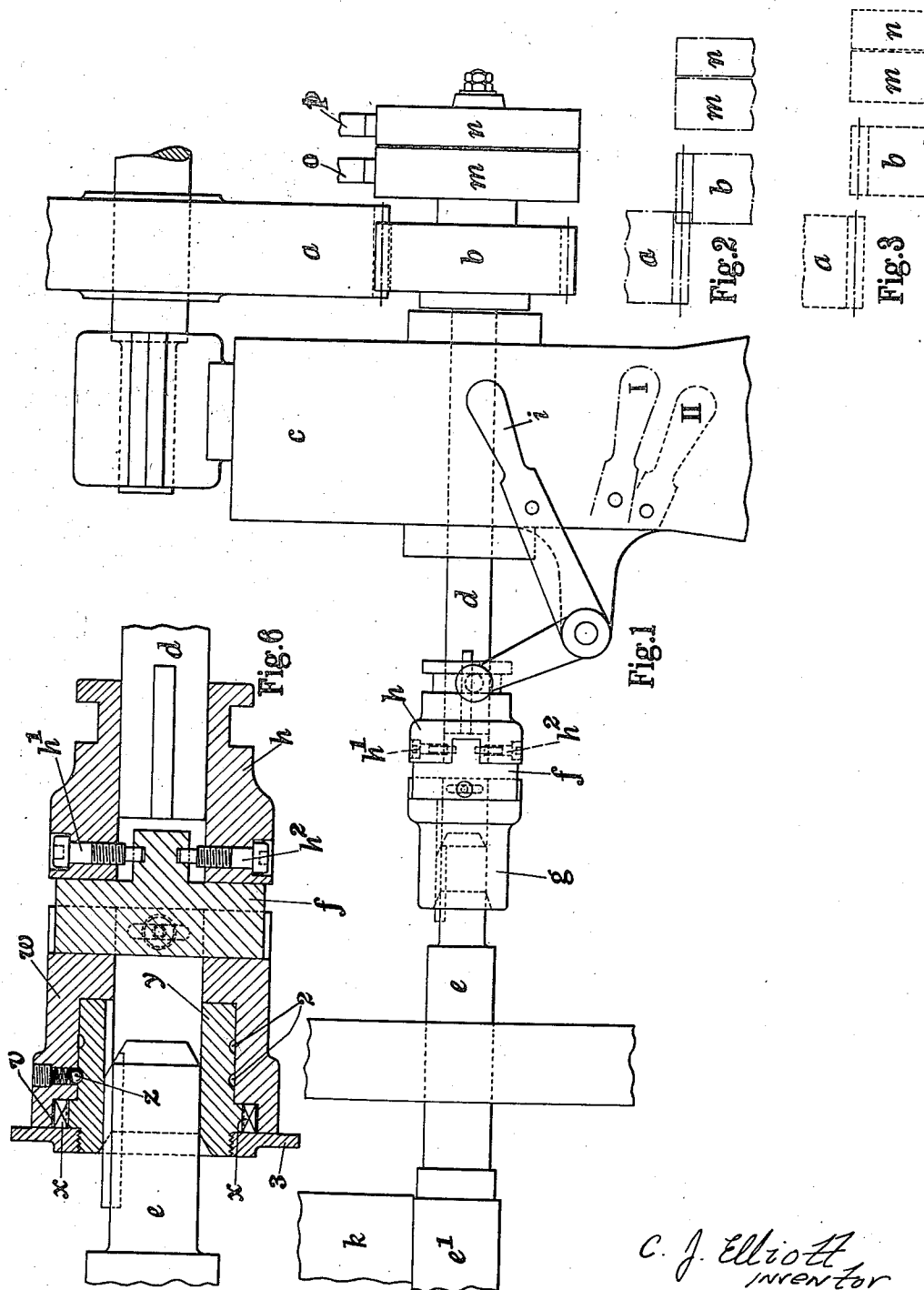
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2,098,946

FABRIC PRINTING MACHINE

Filed April 15, 1936

2 Sheets-Sheet 1



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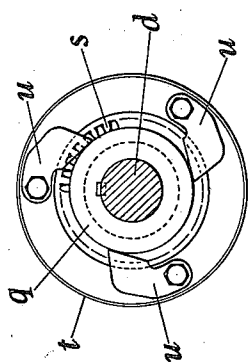
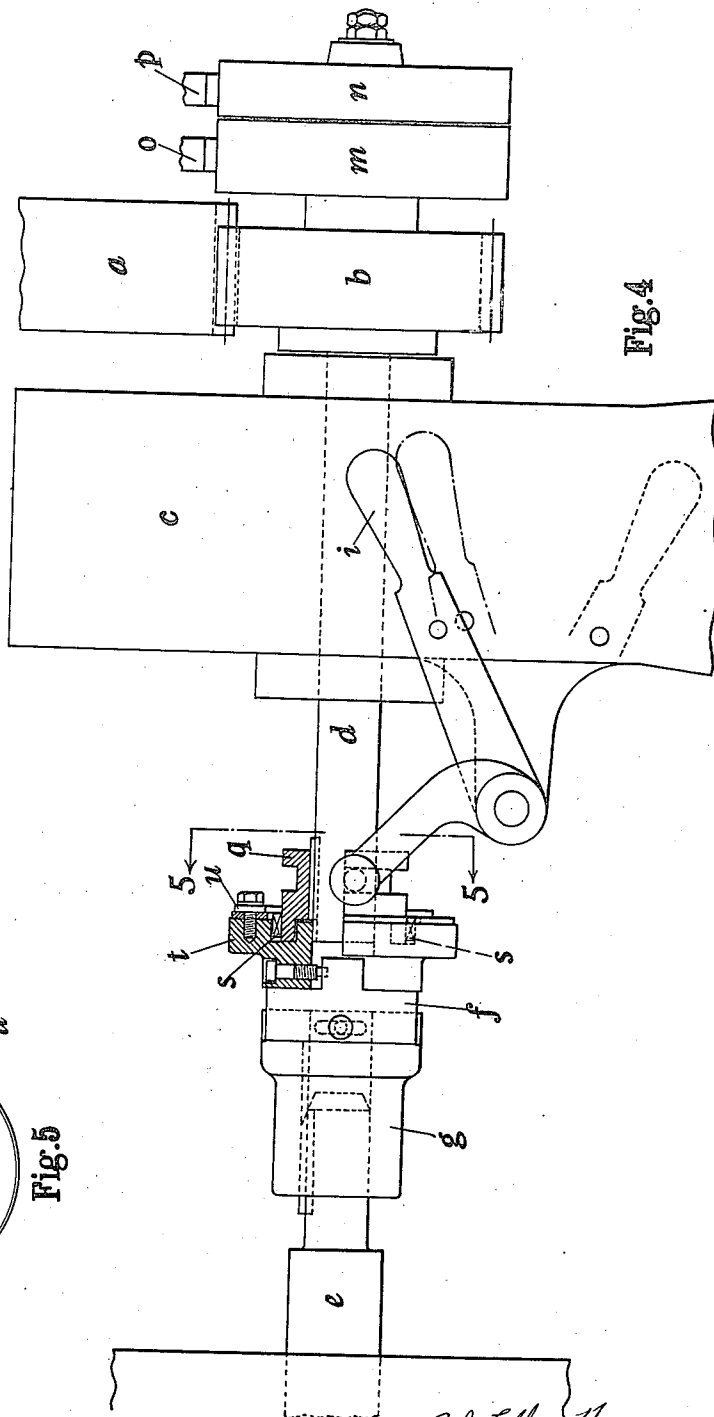
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UNITED STATES PATENT OFFICE

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FABRIC PRINTING MACHINE

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 pany

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 In Great Britain April 23, 1935

14 Claims. (Cl. 101—178)

In the driving of colour rollers of multi-colour fabric printing machines, it is usual to employ a gear wheel, known as the crown wheel which is mounted at one side of the machine and which drives the various colour rollers through gear wheels, known as box wheels. The usual arrangement or disposition of the said driving mechanism has several disadvantages in practice. For example, the teeth of the various gear wheels have to be made unduly long and inefficient in contour due to the necessity of allowing for adjustment of the distance between the wheel axes to suit, for example, variations in the diameter of the printing machine drum or cylinder caused by variations in the thickness of the soft wrappings wrapped therearound in the usual way, or to suit variations in colour roller diameter. As the gear wheels may not gear together on their correct pitch circles, the teeth wear excessively and bad or erratic running results. When the length of gear teeth is not sufficient to deal with the variations in colour roller diameter, different sizes of box wheels have to be provided. In addition, to change colour rollers, the box wheels have to draw off the roller mandrels and are liable to damage. Their settings are also disturbed.

The object of the present invention is to provide an improved driving arrangement which obviates the aforesaid disadvantages of the present arrangement and which gives certain advantages as hereinafter referred to.

In accordance with my invention, the drive between the crown and box wheels is arranged as a separate permanent unit so that the drive can be designed to function with maximum mechanical efficiency notwithstanding any want of alignment between the box wheel shafts and colour roller mandrels, and the drives from the box wheels to the colour rollers are each effected by means which allow of adjustment both of the angular relationship of the colour roller to its box wheel, and of the longitudinal relationship of the colour roller mandrel to the box wheel shaft. In addition, such means allow of the changing of a colour roller without breaking the driving connection between the crown wheel and box wheel, whilst allowing of the breaking of such connection when necessary.

Referring to the accompanying explanatory drawings:—

Figure 1 is an elevation showing one form of my improved drive to a colour printing roller mandrel.

Figures 2 and 3 are diagrams showing the posi-

tions of axial displacement of the box wheel shown in Figure 1 for definite positions of the control handle in that figure.

Figure 4 shows a modified construction of the driving gear.

Figure 5 is a sectional end view on the line 5—5 of Figure 4.

Figure 6 shows a further modification of the drive.

The crown wheel *a* and the box wheels, one only of which is shown at *b*, are mounted in bearings in or on a suitable frame *c*, the axial relationship of the wheels being fixed. It will be understood that the number of box wheels driven from the crown wheel at any printing operation, depends upon the number of colour rollers required to produce the desired pattern. Each box wheel shaft *d* drives its colour roller mandrel *e* through a double universal coupling *f* which may for example be a double universal joint of known type, such as an Oldham coupling, which takes care of any lack of alignment of the box wheel shaft and colour roller mandrel. The part *g* of the coupling on the colour roller mandrel *e* may be splined or feather keyed thereon to allow of variation in longitudinal position of the mandrel relative to the coupling. The part *h* of the coupling is secured upon the box wheel shaft whilst the part *g* is feather keyed upon the colour roller mandrel. When the colour roller is to be withdrawn from the machine or turned angularly with relation to the box wheel shaft, the complete coupling is moved to the right along with the shaft *d* so that the part *g* is withdrawn from the mandrel *e*. The box wheel shaft *d* when so moved axially with its coupling piece can remain in engagement with the crown wheel so that the adjustment setting of the box wheel need not be disturbed. There is a control handle *i* for moving the coupling together with the box wheel shaft *d* and the box wheel *b*. When the handle *i* is in the dotted line position I, the box wheel is in the position shown in dotted lines in Figure 2 and it will be seen that the box wheel is still in engagement with the crown wheel *a*.

It will be seen that there is a possibility of endwise adjustment of the mandrel *e* and corresponding sidewise movement of the printing roller *e*¹ thereon without disturbing the drive thereto or lowering its mechanical efficiency. If it is desired to put a colour or printing roller *e*¹ out of action whilst retaining it in the machine, the handle *i* is moved to the dotted line position II, Figure 1, when the box wheel is in the dotted line position

shown in Figure 3, and is not driven by the crown wheel.

The double universal joint at *f* allows of variations in the axial alignment of the shafts *d* and *e* to compensate for varying thicknesses of the wrapping upon the impression cylinder *k* around which the fabric being printed passes.

The two wheels *m* and *n* upon the box wheel shaft *d* and the brakes *o* and *p* for application to such wheels serve for the fine adjustment of the angular relation of the box wheel shaft *d* to its box wheel *b* for ensuring the correct fit of the pattern upon the printing roller *e*¹ with the patterns printed by the other rollers, not shown.

This fine adjustment mechanism may be as described in specification No. 7649/35.

It will be seen that the crown wheel *a* and the box wheels *b* driven thereby form a driving unit which need not be disturbed to break the driving connection except when a printing roller is to be allowed to remain idle without being removed from the machine. Efficiency of driving and freedom from damage to the gears is thereby ensured.

In the arrangement shown in Figures 4 and 5, the part *q* which is secured upon the shaft *d* and is moved by the control handle *i* does not itself form part of the double universal coupling, but has teeth thereon which can mesh with internal teeth *s* on the part *t* of the coupling. In this case, the drive to the colour or printing roller mandrel *e* can be disconnected by withdrawing the part *q* from the part *t*, without disturbing the double universal coupling. This is of great advantage as it permits of ready or coarse angular setting or pitching of the colour roller relatively to the box wheel shaft, the fine setting or fitting being then made by the use of the brakes *o*, *p* as previously referred to. Pivoted catches *u* upon the coupling member *t* come behind the teeth on the part *q* when such teeth are engaged with the teeth *s* in order to prevent the drive being accidentally disconnected. When it is desired to break the drive, the catches are moved clear, whilst the handle *i* is operated.

In Figure 6, the drive to the colour or printing roller mandrel *e* can be broken by moving the sleeve *y* and plate 3 to the left along the feather key on the mandrel *e* until the internal teeth at *v* on the member *w* of the coupling clear the teeth *x* on the sleeve *y*. There are spring pressed balls *z* in the member *w* which can engage one or other of two grooves 2 in the sleeve *y*. This arrangement allows of circular motion of the mandrel *e* whilst the box wheel shaft *d* and crown and box wheels are stationary, if the teeth *x* and *v* are disengaged. After sufficient circular motion has been given to the mandrel *e*, the sleeve is pushed back into position with the teeth *x* and *v* in mesh. When the driving mechanism is to be completely uncoupled from the mandrel *e*, the whole of the parts including the sleeve *y* and plate 3 are moved to the right in Figure 6.

I may vary the details of my improved drive to the colour roller mandrels from the crown and box wheels to suit any particular requirements.

What I Claim is:—

1. A drive for the printing rollers of fabric printing machines, comprising a crown wheel, a plurality of box wheels in mesh with said crown wheel and having their axes fixed relatively to the axis of said crown wheel, a shaft for each said box wheel, a printing roller mandrel for each of said box wheels and a double universal coupling

between each box wheel shaft and the associated printing roller mandrel.

2. A drive as claimed in claim 1 in which there is a member slidably but non-rotatably mounted upon the box wheel shaft and in which the double universal coupling is freely mounted upon said shaft, means being provided to bring said member into and out of driving engagement with said coupling.

3. A drive as claimed in claim 1 in which there is a member slidably but non-rotatably mounted upon the box wheel shaft and in which the double universal coupling is freely mounted upon said shaft, means being provided to bring said member into and out of driving engagement with said coupling together with releasable means to restrain sliding movements.

4. A drive as claimed in claim 1 in which the double universal coupling is splined upon both the box wheel shaft and the printing roller mandrel.

5. A drive as claimed in claim 1 in which the double universal coupling is secured to the box wheel shaft and in which there is a member slidably and non-rotatably mounted upon the printing roller mandrel, teeth solid with said member and co-operating teeth upon said coupling, sliding movement of said member engaging and disengaging the drive from said coupling to said printing roller mandrel.

6. A drive as claimed in claim 1 in which the double universal coupling is secured to the box wheel shaft and in which there is a member slidably and non-rotatably mounted upon the printing roller mandrel, teeth solid with said member and co-operating teeth upon said coupling, sliding movement of said member engaging and disengaging the drive from said coupling to said printing roller mandrel a spring-loaded ball catch being provided to hold said sliding member against accidental sliding movements.

7. A drive as claimed in claim 1 in which the double universal coupling is secured to the box wheel shaft and in which there is a member slidably and non-rotatably mounted upon the printing roller mandrel, teeth solid with said member and co-operating teeth upon said coupling, sliding movement of said member engaging and disengaging the drive from said coupling to said printing roller mandrel, the said sliding member comprising a sleeve which forms a bearing for one member of the double universal coupling.

8. A drive as claimed in claim 1 in which there are adjustment means interposed between each box wheel and its shaft to effect relative angular adjustment therebetween.

9. A drive as claimed in claim 1 in which there are means to move each box wheel shaft axially to a position in which the box wheel no longer meshes with the crown wheel.

10. A drive as claimed in claim 1 in which there are means to impart axial movement to each box wheel shaft together with said box wheel and said double universal coupling, and in which the double universal coupling is slidably but non-rotatably connected to the printing roller mandrel and is disconnected therefrom on axial movement away from said mandrel.

11. A drive as claimed in claim 1 in which there are means to impart axial movement to each box wheel shaft together with said box wheel and said double universal coupling, and in which the double universal coupling is slidably but non-rotatably connected to the printing roller mandrel and is disconnected therefrom on axial

movement away from said mandrel to an extent insufficient to withdraw said box wheel from mesh with said crown wheel.

12. A drive for the printing roller of a fabric
5 printing machine comprising a shaft mounted for rotation about a fixed axis, a printing roller mandrel mounted in bearings movable towards and away from the axis of the shaft and a double universal coupling connecting said shaft and
10 said mandrel.

13. A drive as claimed in claim 12 in which one of the members of the double universal coupling is in sliding, non-rotatable engagement with the shaft or mandrel to which it is con-

nected, and in which there are means to adjust the printing roller mandrel axially in position.

14. A drive for the printing roller of a fabric printing machine comprising a shaft mounted for rotation about a fixed axis, a printing roller
5 mandrel mounted in bearings movable towards and away from the axis of the shaft and a double universal coupling connecting said shaft and said mandrel, together with a crown wheel, a box wheel in mesh with said crown wheel and an
10 angularly adjustable drive from said box wheel to said shaft.

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