

Dec. 8, 1925.

1,564,767

C. EGGART

VARIABLE SPEED GEARING

Filed Oct. 7, 1922

2 Sheets-Sheet 1

Fig. 1.

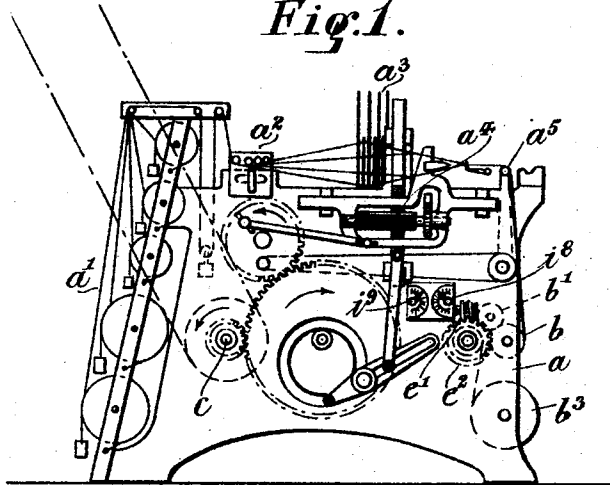
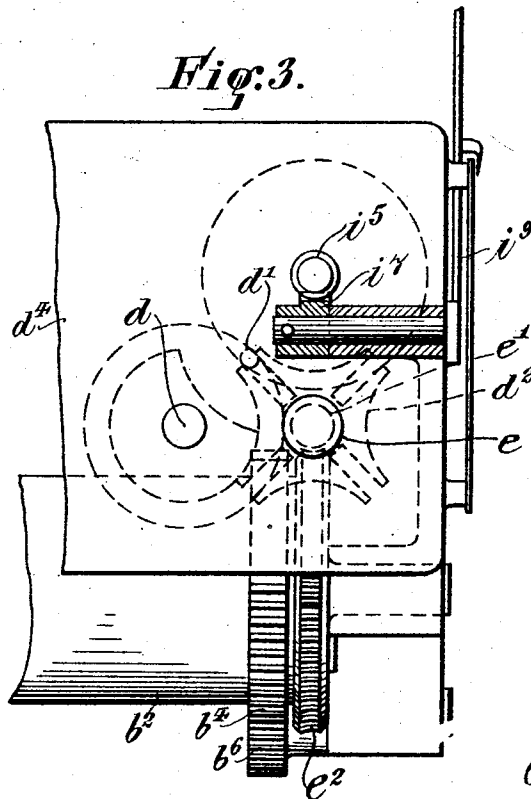


Fig. 3.



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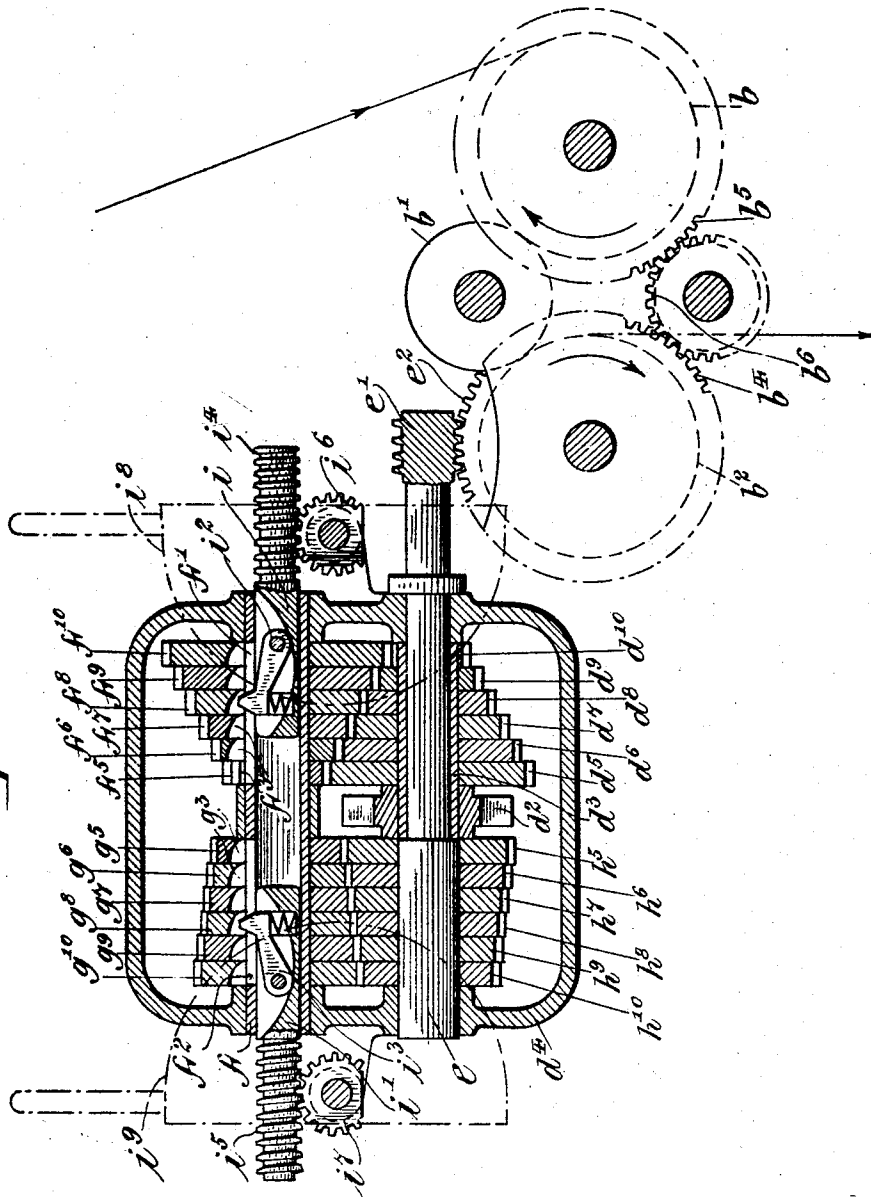
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Fig. 2.



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UNITED STATES PATENT OFFICE.

CARL EGGART, OF ARBON, SWITZERLAND, ASSIGNOR TO SOCIETE ANONYME ADOLPHE SAURER, OF ARBON, SWITZERLAND, A CORPORATION OF SWITZERLAND.

VARIABLE-SPEED GEARING.

Application filed October 7, 1922. Serial No. 592,950.

To all whom it may concern:

Be it known that I, CARL EGGART, a citizen of the Republic of Switzerland, residing in Arbon, Switzerland, have invented certain new and useful Improvements in Variable-Speed Gearing, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

Various devices have been produced heretofore for regulating the number of picks per inch in the fabric. Some of such devices do not operate under positive mechanical control and therefore fail sometimes to function properly when the loom is operated at a relatively high speed. Other devices operate under positive mechanical control but necessitate a substitution of gears for every change in the number of picks. The object of this invention is to produce positively operating means whereby the desired change in the rate at which the completed fabric is drawn through the loom can be regulated and the number of picks per inch of the fabric thereby also regulated, which means shall be complete in itself and can be adjusted readily at the will of the weaver without requiring any substitution of gears. The invention will be more fully explained hereinafter with reference to the accompanying drawings in which it is illustrated as embodied in suitable form and in which—

Figure 1 is a view in side elevation, showing so much of a loom as is necessary to enable the application of the invention to be understood.

Figure 2 is a view partly in elevation and partly in longitudinal section of the mechanism with which the invention is particularly concerned.

Figure 3 is a detail view as seen from the left hand in Figure 2 and partly in section.

In the embodiment of the invention represented in the drawings the frame a supports in usual manner the warp beams a' , the yarn guides a^2 , the heddles a^3 the shuttle mechanism a^4 and the cloth guide a^5 . From the cloth guide a^5 the completed fabric passes about a cloth roller b (hereinafter called a driven member), over a roller b' and between the same and a roller b^2 , and thence to the cloth beam b^3 on which the fabric is rolled up as the weaving progresses. The rollers b and b^2 are provided with gears b^4 and b^5 , both of which are engaged by an in-

termediate gear b^6 , so that the rollers b and b^2 shall be driven at the same speed and in the proper relative directions. The roller b' need not be driven positively but may rest by its own weight upon the rollers b and b^2 . The number of picks per inch of the fabric depends upon the speed at which the cloth rollers, by which the fabric and the warps are drawn through the loom, are driven in relation to the speed of the loom, that is, of the mechanism by which the shed is formed and the shuttle is driven. If the cloth rollers are driven at a higher speed the number of picks per inch will be smaller, while if the cloth rollers are driven at a slower speed the number of picks will be greater. The present invention is concerned particularly with the variable speed mechanism through which the cloth rollers are driven from the main shaft c of the loom in timed relation with the shuttle mechanism indicated at a^4 and the shedding mechanism, represented by the heddles a^3 . This variable speed mechanism, in the form illustrated in the drawing, will now be described.

Mounted upon a shaft d , supported in suitable bearings in the frame of the loom and driven by any convenient means from the main driving shaft c , is one member d' of a Geneva gear, the other member d^2 of which is fixed upon a sleeve d^3 which is rotatably mounted on a shaft e , supported in suitable bearings carried by a housing d^4 . Fixed upon the sleeve d^3 , so as to be rotated therewith with an intermittent or step by step rotation, through the Geneva gear d' , d^2 , or any other suitable mechanism for producing a step by step rotation, are variable speed driving gears d^5 , d^6 , d^7 , d^8 , d^9 , and d^{10} , the pitch diameters of these gears varying by gradations corresponding to the varying number of picks per inch in the completed fabric for which it is desired to provide. Meshing with the several gears d^5 , d^6 , etc., are corresponding gears f^5 , f^6 , etc., which are mounted loosely upon a hollow shaft f , rotatably mounted in bearings supported by the housing d^4 . The hollow shaft f is slotted longitudinally, as at f' , and also as at f^2 . Likewise mounted loosely on the left hand portion of the hollow shaft f are gears g^5 , g^6 , g^7 , etc., likewise of different pitch diameters, the difference between the pitch diameters of successive gears being preferably small as compared with the difference between pitch

diameters of successive gears of the series f^5, f^6 , etc. The gears g^5, g^6 , etc., mesh with corresponding gears h^5, h^6 , etc., which are fixed on the shaft e .

5 Means are provided whereby, under control of the weaver, any one of the gears f^5, f^6 , etc., and any one of the gears g^5, g^6 , etc., can be connected to the hollow shaft f to rotate therewith, the combination of any one
10 of the gears g^5, g^6 , etc., with any one of the gears f^5, f^6 , etc., making possible a very great number of speed variations of the driven shaft e and a correspondingly great number of variations in the number of picks per inch
15 in the completed fabric between the predetermined limits.

As a convenient means for effecting engagement at will of one or another of the gears f^5, f^6 and of the gears g^5, g^6 with the
20 hollow shaft, f , there are provided within the hollow shaft f longitudinally movable carriers i and i' , carrying respectively pivoted, spring pressed dogs i^2 and i'^2 adapted to engage notches f^3, g^3 in the respective wheels
25 of the two series, the tooth of each dog being cammed for co-operation with the notches so that each dog shall be held in yielding engagement with a single wheel and prevented from engagement with two wheels at the
30 same time. For convenience in operation the carriers i and i' , which are cylindrical, may be formed with peripheral gear teeth as at i^4 and i'^4 for engagement by gears i^6 and i'^6 connected with indicating and setting handles i^8 and i'^8 , shown in Figure 1.

35 Movement is transmitted from the shaft e to one of the cloth rollers, as b^2 , by any convenient means, as by a worm e' , meshing with a worm gear e^2 fixed to the roller b^2 .

40 It will be seen that by the provision of a unitary speed changing gear, complete in itself, between the driving gear which operates in timed relation with the shuttle mechanism and shedding mechanism of the loom,
45 and the driven member or cloth roller, the speed at which the completed fabric is drawn through the loom and therefore the number

of picks in a unit of length can be regulated readily at the will of the weaver without necessitating the substitution of gears while
50 at the same time the driven member or cloth roller is at all times driven by positive mechanical means so that there can be no failure of the mechanism to function properly at any speed.

55 It will be understood that various changes in details of construction and arrangement can be made to suit different conditions of use, the convenience of the manufacturer, etc., and that the invention, except as pointed out in the claim, is not limited to the details of construction and arrangement shown and described herein.

I claim as my invention:

The combination of a shaft operatively
60 connected with mechanism to be driven, a sleeve mounted to rotate freely on said shaft, means for rotating said sleeve, a series of differential gears fast on said sleeve, a hollow shaft parallel with the first mentioned
70 shaft, a second series of differential gears loosely mounted on said hollow shaft, each in mesh with a gear of the first series of differential gears, means for operatively connecting one or another of said gears to the hollow shaft, a third series of differential gears
75 loosely mounted on the hollow shaft, means for operatively connecting one or another of said third series of differential gears with the hollow shaft, and a fourth series of differential
80 gears fast on the first mentioned shaft each in mesh with a gear of said third series of differential gears, the means for operatively connecting gears of the second series with the hollow shaft being independent of the
85 means for operatively connecting gears of the second series with said hollow shaft, and an enclosing housing having bearings for said shafts adapted to hold the several sets of differential gears against endwise move-
90 ment.

This specification signed this 30th day of August A. D. 1922.

CARL EGGART.