

Nov. 24, 1931.

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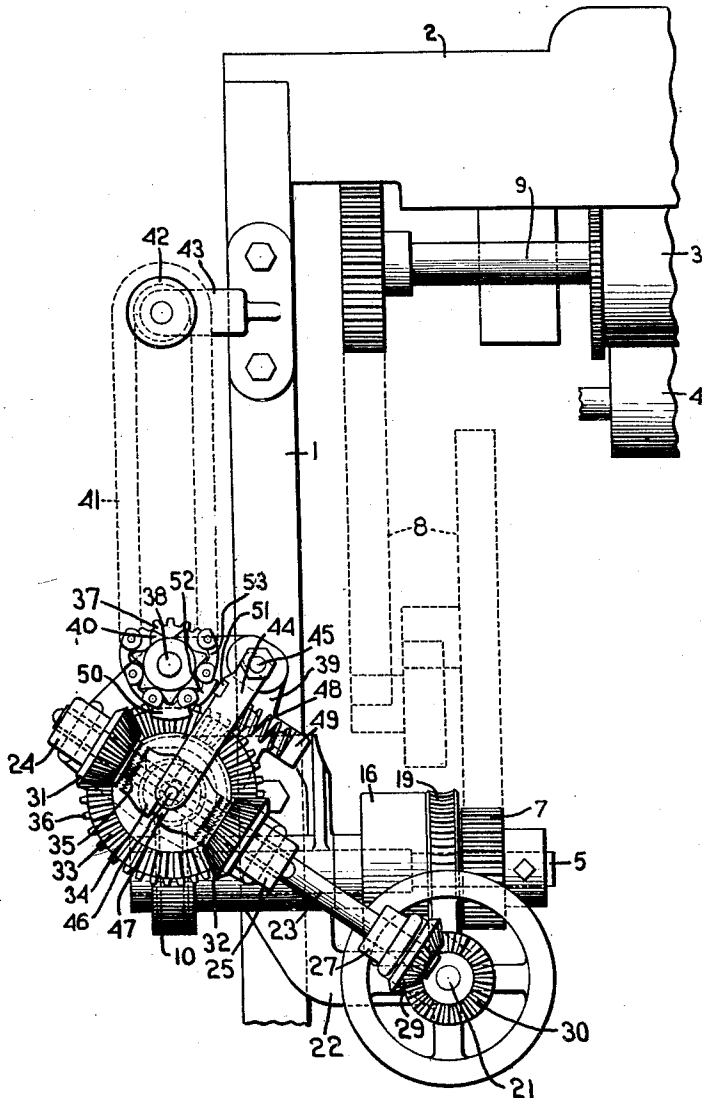
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LOOM FOR WEAVING THICK AND THIN STRIPED FABRIC

Filed Feb. 26, 1931

2 Sheets-Sheet 1

Fig. 1.



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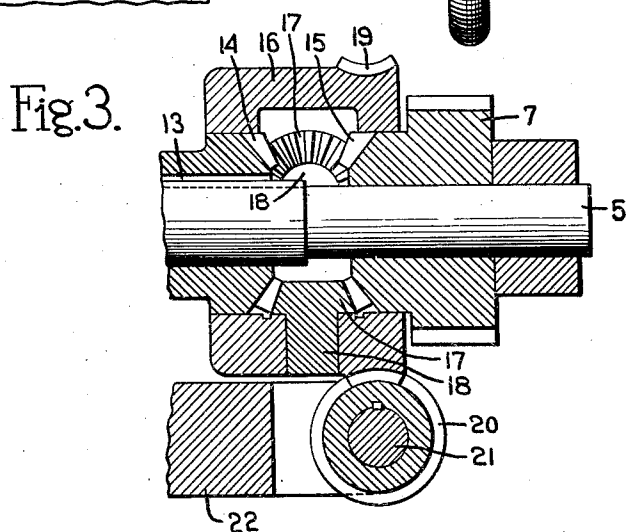
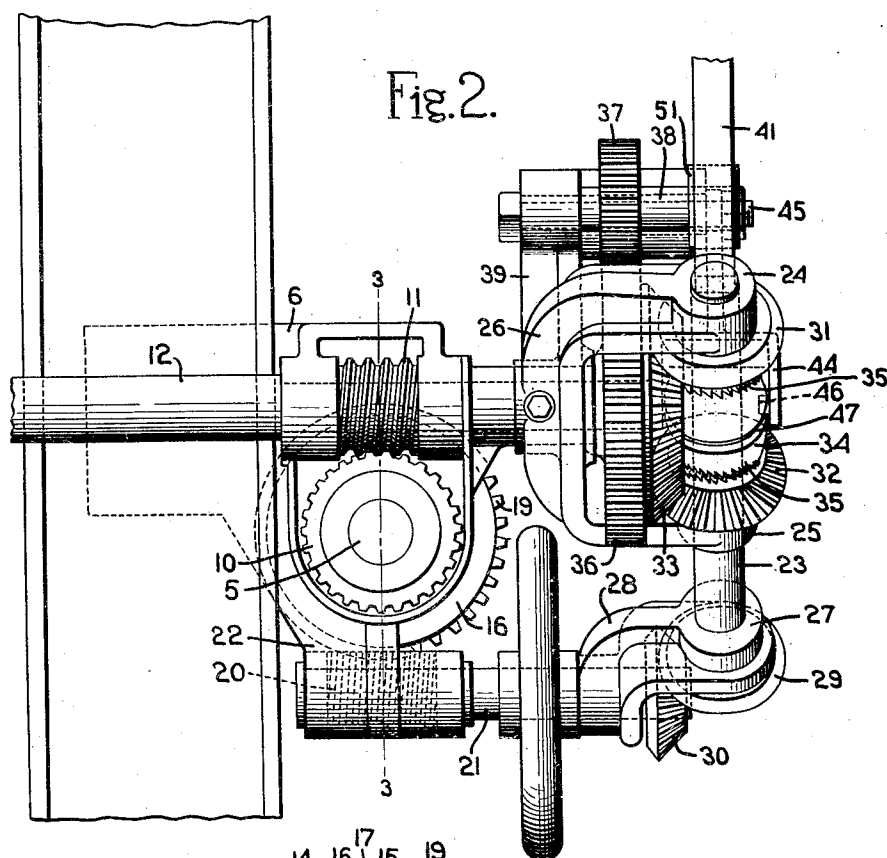
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UNITED STATES PATENT OFFICE

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LOOM FOR WEAVING THICK AND THIN STRIPED FABRIC

Application filed February 26, 1931. Serial No. 518,342.

This invention relates to a loom operating to vary the condensation of the filling in the cloth as it is woven so as to produce thick and thin places transversely of the cloth and thereby give a transverse striped effect.

A co-pending application of Clare H. Draper, Serial No. 518,317, filed Feb. 26, 1931, discloses a mechanism for producing this effect and the present invention is subsidiary thereto and has for its object to provide means for producing either a decrease or an increase in the condensation of the filling at regular or irregular intervals and to predetermined extents all as may be required to produce an endless variety of striped effects.

The object of the invention is further to provide means for effecting a rotary shift of the take-up roll with respect to the driving mechanism in either direction at any interval required and to any extent required to produce any desired decrease or increase in the condensation of the filling.

The object of the invention is further to provide pattern-controlled means for producing the desired effect and also to provide such pattern-controlled means which acts while at all times maintaining a positive driving connection from the driving means to the take-up roll.

These and other objects and features of the invention will appear more fully from the accompanying description and drawings and will be particularly pointed out in the claims.

As the invention is applicable to various types of looms and as the general construction and operation of such looms is well known and familiar to those skilled in the art, it is only necessary here to illustrate and describe those features of an ordinary type of loom with which a preferred embodiment of the present invention is concerned. The embodiment illustrated makes

use of much of the mechanism disclosed in the pending application of Clare H. Draper, Serial No. 429,408, filed February 18, 1930, and is subsidiary to the invention disclosed in the pending application of the said Draper, Serial No. 518,317, filed February 26, 1931.

In the drawings:

Fig. 1 is a front elevation partially broken away of a portion of a loom with the preferred form of the invention embodied therein.

Fig. 2 is a view in elevation of a portion of the construction shown in Fig. 1 looking toward the left of that figure and on a larger scale.

Fig. 3 is a detail chiefly in vertical cross section taken on the line 3—3 of Fig. 2.

The loom comprises the usual side frames of which a portion of the left-hand frame 1 is shown with the breast beam 2 extending therefrom to the opposite side frame, a usual form of take-up roll 3 is journaled in the side frames under the breast beam and usually presents a roughened surface to grip the cloth which is wound on the cloth roll 4 by frictional engagement with the take-up roll. A shaft 5 is journaled in a bearing bracket 6 supported on the bottom of the frame and this shaft has journaled thereon a gear 7. A train of gearing which may be of any suitable arrangement and indicated generally at 8 extends from the gear 7 to the shaft 9 of the take-up roll so that any rotation imparted in either direction to the gear 7 will in turn be positively and definitely imparted to the take-up roll. But it will be understood that the particular driving connections between the element 7 and the shaft 9 of the take-up roll may be of any suitable construction so long as they act to impart positively, directly, and accurately the rotation of the take-up roll in either direction according to the direction of rotation of the element 7.

The shaft 5 has keyed thereto a worm wheel 10 and this worm wheel meshes with and is

driven by a worm 11 keyed to a shaft 12 jour-
nalled in the bearing bracket 6 and extending
rearwardly in the loom frame and positively
driven from one of the usual loom shafts.
The shaft 5 has also keyed thereto at 13 a
bevelled gear 14. The shaft 5 with this gear
14 constitutes a positively driven element
which in this case is the driving element for
the take-up roll. But the means by which
the final driving element, or in this case the
bevelled gear 14, is given a positive rotation
may be of any suitable form and construction
and specifically considered forms no part
of the present invention.

A driven element in the form of a bevelled
gear 15 is journaled in axial alignment with
the driving element or bevelled gear 14 and
is preferably for that purpose journaled on
the shaft 5. This driven element 15 imparts
a direct driving connection to the take-up
roll and for that purpose is preferably
formed rigid or integral with the gear 7 and
thus acts through the train of gearing 8 to
drive the take-up roll.

A differential system of gearing is illus-
trated including the bevelled gears 14 and
15 and comprises a cylindrical housing 16
rotatable coaxially of the shaft 5 and pro-
vided with one or more intermediate bevelled
gears 17 herein shown as three in number
having their shafts 18 journaled radially in
the housing and so arranged that the bevelled
gears 17 mesh with both of the bevelled gears
14 and 15.

The outer cylindrical surface of the hous-
ing 16 is formed to present a worm wheel 19
and this worm wheel 19 meshes with a worm
20 secured to an auxiliary or transverse shaft
21 journaled in portions 22 of the bearing
bracket 6.

This type of gearing connection between
the housing and the auxiliary shaft is desir-
able because it acts to hold the housing
against rotation except when the worm 20
is turned in the one direction or the other.
Consequently unless the worm is thus turned,
the ratio of speed between the take-up roll
and the driving means will remain constant.

A transmitting shaft 23 extends diagonal-
ly with its axis intersecting the axes of the
shaft 12 and the auxiliary shaft 21 and is
journaled in suitable bearings formed in
brackets supported from the loom frame.
Such bearings are shown at 24 and 25 formed
on a bracket section 26 secured to that por-
tion of the bracket 6 in which the shaft 12
is journaled, while a third bearing 27 is
shown on a bracket section 28 supported free-
ly on the shaft 21. At its lower end the trans-
mitting shaft 23 is provided with a bevelled
gear 29 meshing with a bevelled gear 30 se-
cured to the forward end of the auxiliary
shaft 21. Near its upper end the transmit-
ting shaft 23 is provided with a pair of op-
positely disposed bevelled gears 31 and 32

freely rotatable thereon between the bear-
ings 24 and 25. These bevelled gears 31 and
32 mesh at diametrically opposite points
with a large bevelled gear 33 secured to the
end of the shaft 12. A clutch sleeve 34 is
keyed to the transmitting shaft 23 and is pro-
vided at its ends with clutch surfaces such
as the teeth 35 adapted to engage with corre-
sponding clutch surfaces on the bevelled
gears 31 and 32. Consequently if the clutch
sleeve 34 be moved into clutching engage-
ment with the bevelled gear 31 and out of
clutching engagement with the bevelled gear
32, the shaft 23 will be rotated in one direc-
tion and will rotate the auxiliary shaft 21
and the housing 16, which is the intermediate
element of the differential gear mechanism,
in one direction. Consequently also if the
clutch sleeve 34 be moved into clutching en-
gagement with the bevelled gear 32 and out
of clutching engagement with the bevelled
gear 31, a rotation of the housing 16 in the
opposite direction will take place. If the
clutch sleeve 34 be left in its intermediate
position shown in Fig. 1, that is, out of clutch-
ing engagement with both bevelled gears 31
and 32, then the housing 16 will be held sta-
tionary locked against rotation by the en-
gagement of the worm 20 with the worm
wheel 19.

If the housing 16 is held stationary, the
only movement imparted to the take-up roll
will be the direct, positive driving action
from the positively driven shaft 5 and bev-
elled gear 14 through the intermediate gears
17 to the bevelled gear 15 and thence through
the train of gearing 7 and 8 to the take-up
roll. If, however, the housing 16 be rotated
in the one direction or the other, a rotary
shift of the take-up roll relatively to the
driving element, that is, the shaft 5 and bev-
elled gear 14, will take place and such rela-
tive rotary shift of the take-up roll will act
to vary the concentration of the filling in the
cloth being woven either decreasing or in-
creasing that concentration in accordance with
the direction in which the relative rotary
shift takes place. Consequently by varying
the times at which this relative rotary shift
of the take-up roll takes place and the direc-
tion in which it takes place, an infinite variety
of transverse striped effects may be produced
in the cloth comprising zones where the fill-
ing is either beaten in in the usual manner
where the filling is beaten in less frequently
to form a thin place and where the filling is
crowded in to form a thick place.

The invention provides in the specific em-
bodiment illustrated, a simple form of pat-
tern mechanism for shifting the clutch sleeve
35 either into engagement with the bevelled
gear 31, into neutral position, or into engage-
ment with the bevelled gear 32, thus enabling
an infinite variety of striped effects to be pro-

duced by varying as desired the concentration of the filling in the cloth being woven. The mechanism illustrated for this purpose is conveniently operated directly from the shaft 12 which is constantly and positively driven. For this purpose the shaft 12 is shown as having secured thereto a gear 36 in the rear of the bevelled gear 33 and this gear 36 meshes with the pinion 37 secured on a short shaft 38 journaled in a bracket section 39 upstanding from the bracket section 26. This shaft 38 has secured thereto at its forward end a sprocket wheel 40 driving a sprocket pattern chain 41 of any required length and extending upwardly over an idler 42 journaled in a bracket 43 secured to the side frame 1. A lever 44 is fulcrumed at 45 on the bracket section 39 and at its lower end is provided with a stud 46 riding in an annular groove 47 in the center of the clutch sleeve 34. This lever is swung and held between and into the three required positions to shift the clutch sleeve 34 either into clutching engagement with the bevelled gear 31, into neutral position, or into clutching engagement with the bevelled gear 32 under the control of the pattern chain 41. For this purpose the lever 44 is normally pressed to move the clutch sleeve 34 into clutching engagement with the bevelled gear 31 by the spring 48 seated against it and against a projection 49 on the bracket section 39. The links of the pattern chain are provided according to the desired pattern to be produced with any desired arrangement and sequence of lugs of three types, first, lugs such as 50 projecting sufficiently so that when they engage the projection 51 on the lever 44 it will slide the clutch sleeve 34 into clutching engagement with the bevelled gear 32, second, lugs such as 52 projecting sufficiently so that when they engage the projection 51 they will slide the clutch sleeve 34 into neutral position, and, third, lugs such as 53 projecting sufficiently so that when they engage the projection 51 the clutch sleeve will be slid by the spring 48 into engagement with the bevelled gear 31.

Thus by varying the position, kind and number of the lugs, any desired degree and arrangement of condensation of the filling may be produced to produce any required transverse striped effect in the cloth.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is:

1. A loom comprising a take-up roll, means for driving the take-up roll in a direction to effect take-up, and pattern-controlled means acting to effect rotary shift of the take-up roll relative to its driving means in either direction at predetermined times and to predetermined extents.

2. A loom comprising a take-up roll, means for driving the take-up roll in a direction to effect take-up, and means acting to effect ro-

tary shift of the take-up roll relative to its driving means in either direction at predetermined regular or irregular intervals and to predetermined extents.

3. A loom comprising a take-up roll, means for driving the take-up roll in a direction to effect take-up, and pattern-controlled means acting without disconnecting the said driving means from the take-up roll to effect rotary shift of the take-up roll relative to its driving means in either direction at predetermined times and to predetermined extents.

4. A loom comprising a take-up roll, means for driving the take-up roll in a direction to effect take-up, and means acting without disconnecting the said driving means from the take-up roll to effect rotary shift of the take-up roll relative to its driving means in either direction at predetermined regular or irregular intervals and to predetermined extents.

5. A loom comprising a take-up roll, means for driving the take-up roll in a direction to effect take-up, and pattern-controlled means acting either to maintain a fixed ratio of speed between the take-up roll and its driving means or to effect a rotary shift of the take-up roll in either direction relative to its driving means.

6. A loom comprising a take-up roll, means for driving the take-up roll in a direction to effect take-up, and pattern-controlled means acting either to maintain a fixed ratio of speed between the take-up roll and its driving means or to effect a rotary shift of the take-up roll in either direction relative to its driving means without in either case disconnecting the said driving means from the take-up roll.

7. A take-up mechanism for looms comprising a driving element, a take-up roll, a train of permanent connections between said driving element and take-up roll and pattern-controlled means for moving one of said connections in either of two opposite directions to effect rotary shift of the take-up roll in either direction relative to the driving element thereby to vary the condensation of the filling in the cloth.

8. A loom comprising a take-up roll, driving mechanism, a differential system of gearing between the driving mechanism and the take-up roll for driving the latter from the former to effect take-up, and means acting to rotate bodily in opposite directions the intermediate element of the differential gearing at regular or irregular intervals and to predetermined extents thereby to shift in opposite directions the rotary position of the take-up roll with respect to the driving mechanism and produce variations in the condensation of the filling in the cloth.

9. A loom comprising a take-up roll, driving mechanism, a differential system of gearing between the driving mechanism and the take-up roll for driving the latter from the

former to effect take-up, and pattern-controlled means acting either to maintain the intermediate element of the differential gearing stationary or to rotate the same bodily in either direction at predetermined times and to predetermined extents thereby to produce any desired variation in the condensation of the filling in the cloth.

10. A loom comprising a shaft, means for positively driving the shaft, a driving gear secured to the shaft, a driven gear journaled in axial alignment with the shaft, a take-up roll, a gearing connection between the take-up roll and the driven gear, a housing rotatable coaxially with the shaft, an intermediate gear journaled in the housing and meshing with the driving and driven gears, and pattern-controlled means acting to control the position of the housing and to rotate the housing in opposite directions at predetermined times and to predetermined extents thus to effect a take-up action of the cloth with predetermined variations in the condensation of the filling therein.

11. A loom comprising a shaft, means for positively driving the shaft, a driving gear secured to the shaft, a driven gear journaled in axial alignment with the shaft, a take-up roll, a gearing connection between the take-up roll and the driven gear, a housing rotatable coaxially with the shaft, an intermediate gear journaled in the housing and meshing with the driving and driven gears, an auxiliary shaft, a cooperating worm wheel on the housing and worm on the auxiliary shaft, and pattern-controlled means for rotating the auxiliary shaft in either direction at predetermined times and to predetermined extents thereby to produce any desired variation in the condensation of the filling in the cloth.

12. A loom comprising a shaft, means for positively driving the shaft, a driving gear secured to the shaft, a driven gear journaled in axial alignment with the shaft, a take-up roll, a gearing connection between the take-up roll and the driven gear, a housing rotatable coaxially with the shaft, an intermediate gear journaled in the housing and meshing with the driving and driven gears, an auxiliary shaft, a cooperating worm wheel on the housing and worm on the auxiliary shaft, a transmitting shaft geared to the auxiliary shaft, a gear driven by the said shaft-driving means, gears journaled on the transmitting shaft and in mesh at diametrically opposite points with said latter driven gear, and pattern-controlled means for connecting either of said latter gears to, or disconnecting both from, the transmitting shaft, thereby either to effect rotary shift of the take-up roll relative to its driving means in either direction or to maintain constant the ratio of speed therebetween.

13. A loom comprising the construction de-

fined in claim 12, in which the pattern-controlled means comprises a clutch element rotatable with and movable on the transmitting shaft into clutching engagement with either gear or out of clutching engagement with both gears and a pattern chain driven from the driving means and provided with lugs controlling the movement of said element.

In testimony whereof, I have signed my name to this specification.

HORACE H. BURDETT.