

A. E. RHOADES.
TAKE-UP MECHANISM FOR LOOMS.
APPLICATION FILED APR. 23, 1909.

Patented Dec. 28, 1909.
2 SHEETS—SHEET 1.

944,579.

Fig. 1.

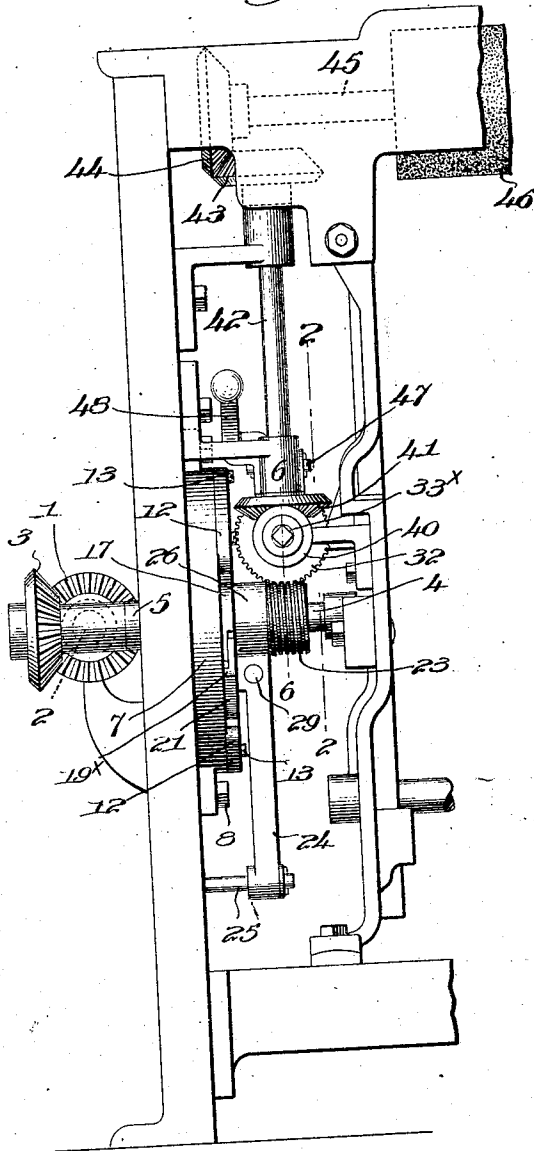
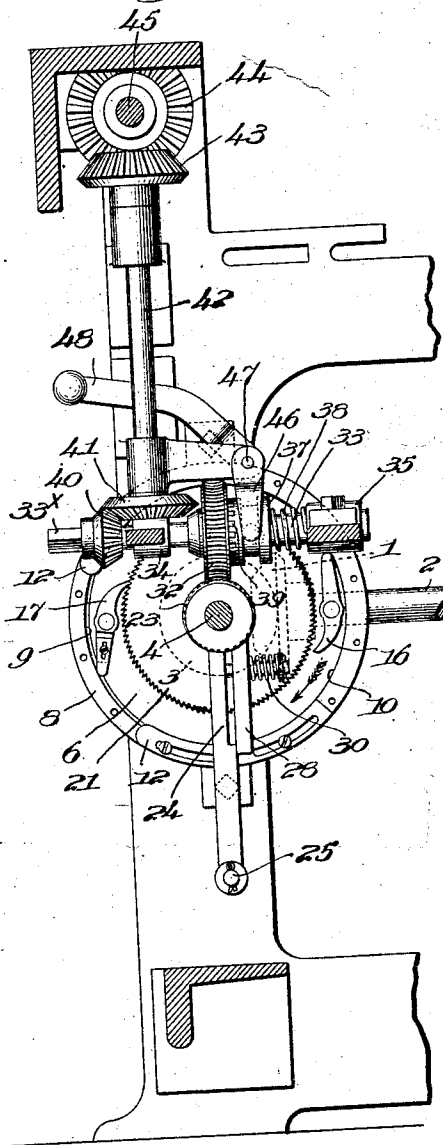


Fig. 2.



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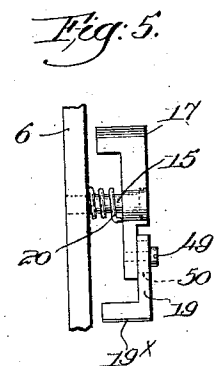
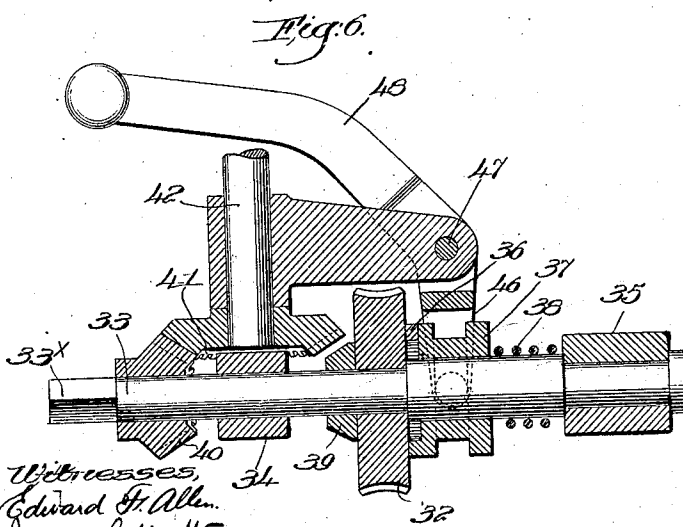
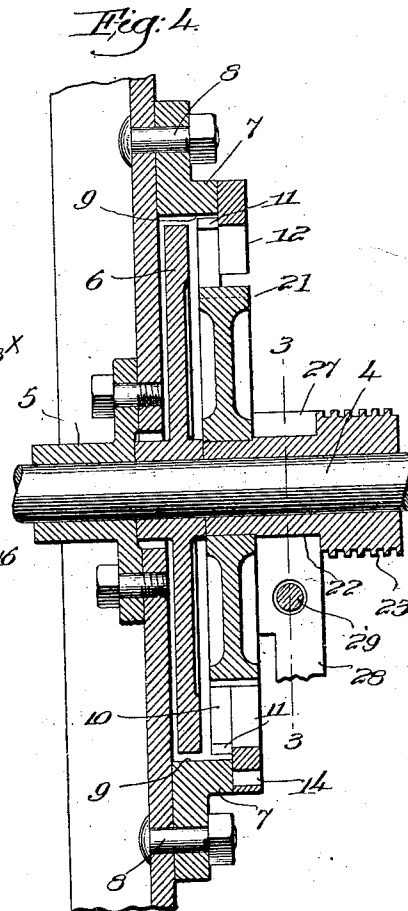
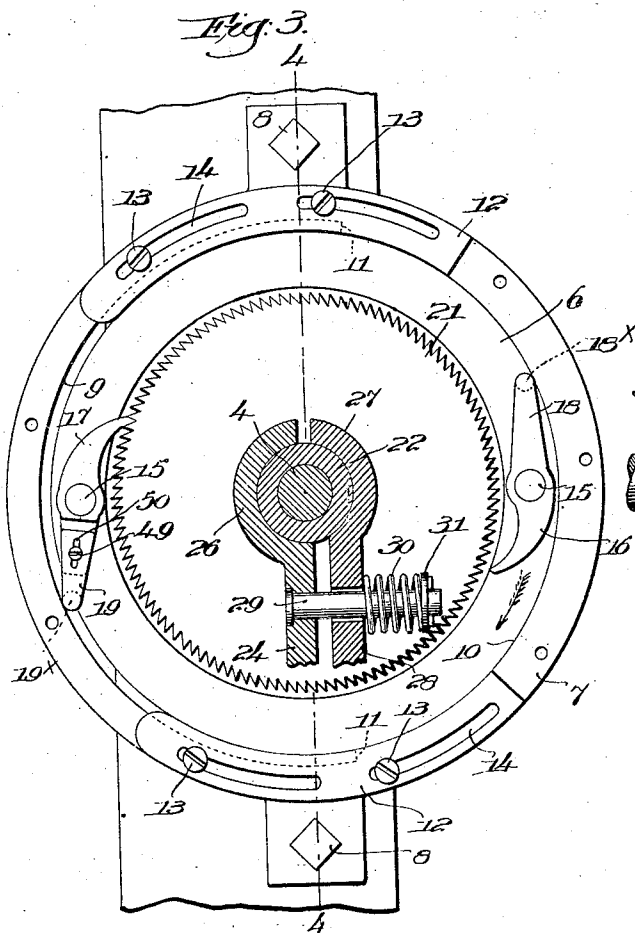
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UNITED STATES PATENT OFFICE.

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TAKE-UP MECHANISM FOR LOOMS.

944,579.

Specification of Letters Patent.

Patented Dec. 28, 1909.

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To all whom it may concern:

Be it known that I, ALONZO E. RHOADES, a citizen of the United States, and resident of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Take-Up Mechanism for Looms, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

In the weaving of cloth on a loom the take-up mechanism must be adjusted or set according to the character and requirements of the particular cloth being made, as in some cases there must be more cloth taken up on each pick than in other cases. Such adjustment of the take-up is effected by change-gears, usually, arranged at some convenient point in the train of gearing between the actuating member of the take-up mechanism and the take-up roll.

My present invention has for its object the production of novel take-up mechanism, so constructed and arranged that it can be set or adjusted to suit the character and requirements of the particular cloth being woven without the use of change-gears, and in a very ready manner.

The take-up mechanism is actuated by a driving member which is continuously and positively rotated while the loom is in operation, but this driving member is arranged to act intermittently and effect the actual taking-up of the cloth on each pick, the duration of each period of activity of the driving member determining the amount of take-up. I have provided manually operated means to vary the duration of such active periods of the driving member, as will be explained hereinafter.

Certain features of my invention closely resemble the so-called continuously-acting take-up devices, while in other respects it is similar to the pawl and ratchet type, but in its entirety my novel take-up mechanism differs essentially from either of the specified types and obviates certain objectionable features inherent in each.

The various novel features of my invention will be fully described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is a front elevation of a portion of a loom with take-up mechanism embodying one form of my present invention ap-

plied thereto; Fig. 2 is a transverse sectional view taken on the line 2—2, Fig. 1, looking toward the left; Fig. 3 is an enlarged detail of the continuously rotating driving member, the driven member, and the means for effecting intermittent coöperation of said members, the view being taken on the line 3—3, Fig. 4, looking toward the left; Fig. 4 is a vertical sectional view of the same parts, taken on the line 4—4, Fig. 3; Fig. 5 is an edge view of one of the pawls through which motion is communicated from the driving to the driven member, showing the adjustable construction of the pawl; Fig. 6 is an enlarged sectional detail on the line 6—6, Fig. 1, of a device to throw the take-up roll out of operation when desired.

Referring to Fig. 1, a bevel-gear 1 fast on a shaft 2 at the left-hand side of the loom-frame meshes with a like gear 3 fast on a shaft 4 having a bearing 5, Fig. 4, on the loom side, the shaft 2 being driven continuously while the loom is in operation, the shaft 2 in practice being driven from the usual cam-shaft of the loom, (not shown) as in Patent No. 648,903 granted May 1, 1900 to Emery. The shaft 4 is arranged to rotate at the speed of the cam-shaft, and hence at one half the speed of the usual crank-shaft, said shaft 4 having fast upon it a driving member shown as a disk 6, Figs. 2, 3 and 4, inclosed within an annular housing 7 bolted at 8 to the inner face of the loom side.

As most clearly shown in Fig. 3 the longer arc 9 of the inner face of the housing is of greater diameter than the shorter arc 10, for a purpose to be described, the longer arc being formed by cutting out the housing between the shoulders 11, and by means of cam-plates 12, adjustably held on the top of the housing by clamping screws 13 passing through slots 14, the effective length of the arc 10 can be varied, the inner edges of said cam-plates being circular arcs having the same radius.

Upon diametrically opposite studs 15 on the driving member 6 are pivotally mounted two pawls 16, 17 the former having a fixed tail 18 and the latter an adjustable tail 19, shown separately in Fig. 5, having an in-turned lug 19*, while the tail 18 is provided with a similar lug 18*, indicated by dotted lines in Fig. 3. A spring 20, Fig. 5, sur-

rounding each stud 15 is arranged to act upon the adjacent pawl and throw the point thereof inward toward the shaft 4 while at the same time the tail of the pawl is thrown outward toward the housing 7. As the driving disk 6, which is thus a revolving pawl-carrier, is rotated the two pawls travel with it, and so long as the inturned lug on a pawl tail engages the part 10 of the housing or the inner edge of either cam-plate 12 said pawl will be held inoperative, but while passing from one cam-plate to the other along the arc 9 the greater diameter of such arc permits the spring 20 to swing the pawl inward into operative position.

The exposed or active portion of the arc 9, determined by the adjustment of the cam-plates, regulates the taking up of the cloth, as will be described, and the longer such exposed part of the arc 9 the longer will the pawl then controlled thereby remain operative, and the greater will be the amount of cloth taken up. A ratchet 21, fast on the hub 22 of a worm 23 loosely mounted on the shaft 4, is located between the two pawls, see Figs. 2 and 3, so that either pawl may engage the ratchet and effect its rotation in unison with the disk 6, such rotative movement continuing while a pawl is in such engagement, the ratchet constituting a driven member. Herein I have shown pawl 16 as inoperative and pawl 17 as operative, the point of the latter pawl engaging the ratchet teeth as clearly shown in Fig. 3, and such engagement will continue until the upper cam-plate 12 acts upon the lug 19* and throws the pawl 17 out.

To prevent overrunning of the ratchet when a pawl is disengaged therefrom the hub 22 of the worm 23 is embraced by a friction detent one member of which is an arm 24 pivotally mounted on a stud 25 and having a curved shoe 26 partly surrounding the hub 22, an opposed shoe 27 on a shorter arm 28 also partly surrounding said hub, as shown in Fig. 3. A headed pin 29 on the arm 24 passes loosely through a hole in the arm 28, and a coiled spring 30 is interposed between said arm 28 and a washer 31 on the pin, the spring thereby acting to press the two shoes toward each other and upon the worm hub, the friction detent thereby acting to stop angular movement of the ratchet as soon as it is disconnected from the disk 6. Said detent also serves to prevent movement of the worm and ratchet longitudinally on the shaft 4.

It will be manifest from the foregoing description that the pawls act in alternation to temporarily connect the driven member or ratchet 21 and the continuously rotating driving member or disk 6, so that said member 21 is intermittently rotated step by step, each step or angular advance being made

operative to take up the cloth. To this end the worm 23 meshes with a worm gear 32 loose on a shaft 33 mounted in fixed bearings 34, 35 above and at right angles to the shaft 4, the shaft 33 being reduced in the bearing 35 to prevent endwise movement, as shown in Fig. 6. Clutch teeth 36 on the worm-gear are adapted to engage similar teeth on a clutch member 37 rotatable with but longitudinally movable on the shaft 33, a spring 38 normally acting to hold the two sets of clutch teeth in engagement to thereby clutch together the gear 32 and shaft 33 to rotate in unison, a collar 39 fast on said shaft serving as a backing for the gear. At its front end the said shaft has fast upon it a bevel pinion 40 meshing with a bevel gear 41 fast on a vertical shaft 42 mounted in suitable bearings and provided at its upper end with a second bevel-gear 43 meshing with a like gear 44 fast on the shaft 45 of the take-up or sand roll 46, Fig. 1. By means of the intervening train of gearing just described the rotative movement of the worm 23 is transmitted to the take up roll, as will be evident, under normal conditions, but by throwing out the clutch the worm-gear 32 will rotate but the shaft will be stopped and there will be no take-up at such time.

Any suitable means may be employed to throw out the clutch, and herein I have shown for the purpose a yoke 46 cooperating with the clutch member 37 and fulcrumed at 47 on a fixed part of the loom frame, the yoke having a lever-like handle 48. By throwing out the clutch the cloth can be pulled back by the weaver, if desired, or it can be taken up by applying a wrench or other suitable tool to the squared end 33* of the shaft 33.

As the shaft 4 and the driving member 6 rotate at one-half the speed of the crank-shaft it is necessary to effect angular advance of the driven member 21 twice for each revolution of the member 6 in order to effect take-up on each pick, and hence the two pawls 16 and 17 are provided, each one acting when its tail is traveling opposite the exposed part of the arc 9 of the housing 7. By setting the left hand ends of the cam-plates 12 nearer together, Figs. 2 and 3, the exposed part of such arc will be shortened and hence the angular advance of the ratchet 21 will be shorter, so that a less amount of cloth will be taken up.

If an even number of picks per inch is put into the cloth the pawls could be alike, and each would act precisely like the other, but if an odd number of picks is required a differential action of the pawls is necessary. For that reason I have made the tail 19 of pawl 17 adjustable, to move the lug 19* nearer to or farther from the pivot-stud 15 of the pawl. By moving said lug away

from the stud it will leave one cam plate later and engage the other cam plate earlier, to thereby cause the pawl to be retarded in its engagement with and disengagement from the ratchet, while by moving the lug toward the stud 15 the engagement and disengagement will be effected earlier, in either case differing from the engagement and disengagement of the pawl 16. In either case the difference is slight, but sufficient for the desired purpose, the adjustment of the lug effecting the same result as would be attained by lengthening or shortening the cam plate. The pawl 16 is controlled wholly by the cam-plates 12 while said cam-plates and the adjustment of the tail 19 control the pawl 17. By this differential action of the two pawls the take-up mechanism can be made to take up an odd number of picks per inch, the amount of such differential action depending upon the number of picks and being figured out accordingly.

Adjustment of the cam-plates is readily effected by manipulation of the clamp screws 13, and the pawl tail 19 is adjusted by means of the set screw 49 and slot 50.

Changes in details of construction and arrangement may be made by those skilled in the art without departing from the spirit and scope of my invention as set forth in the annexed claims.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In take-up mechanism for looms, in combination, a positively and continuously rotated driving disk, diametrically opposite pawls thereon, a ratchet, springs to throw the pawls into engagement therewith, an annular housing surrounding the disk and having a portion of its inner face cut away to allow each pawl to engage the ratchet when said pawl is moved past said cut-away portion, adjustable members on the housing at the ends of the latter to determine the time when a pawl shall engage and be disengaged from the ratchet, and a take-up roll intermittently actuated by the ratchet at regularly recurring intervals.

2. In take-up mechanism for looms, a positively and continuously rotated driving member, a rotatable driven member, diametrically opposite devices on the driving member to intermittently engage and effect step-by-step rotation of the driven member, adjustable means to determine when each of said devices shall engage and be disengaged from the driven member at each revolution of the driving member, separate means to effect a differential action

of said devices, and a take-up device for the cloth, actuated by the driven member.

3. In take-up mechanism for looms, a continuously revolving pawl-carrier, oppositely located pawls thereon, a ratchet, a take-up roll operatively connected therewith and actuated thereby, means to cause each pawl to engage and effect a partial revolution of the ratchet on each revolution of the pawl-carrier, and separate means to effect a differential action of said pawls, whereby they engage the ratchet for periods differing in length.

4. In take-up mechanism for looms, a continuously revolving pawl-carrier, oppositely located pawls thereon, a ratchet, a take-up roll operatively connected therewith and actuated thereby, relatively fixed means to cause the pawls successively to engage and effect a partial revolution of the ratchet on each revolution of the pawl-carrier, and means to effect an independent adjustment of one of said pawls and thereby cause a differential action of the pawls upon the ratchet.

5. In a loom, in combination, a take-up roll, a driving member continuously rotated and making one revolution for every two picks, a rotatable driven member, diametrically opposite devices on the driving member to successively engage and advance the driven member twice on each revolution of the driving member, means to cause each of said devices to engage and be disengaged from the driven member as the driving member revolves, separate means to effect a differential action of said devices upon said driven member, and connections between the latter and the take-up roll.

6. In a loom, in combination, a take-up roll, a continuously rotated driving member having one revolution for every two picks, a rotatable driven member operatively connected therewith, separate devices on the driving member to engage intermittently and successively the driven member and advance the same twice on each revolution of the driving member, and means to effect a differential action of said separate devices on the driven member, whereby the successive advances thereof differ in duration.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

ALONZO E. RHOADES.

Witnesses:

ROBERT JAMIESON,
A. C. MUNYON.