

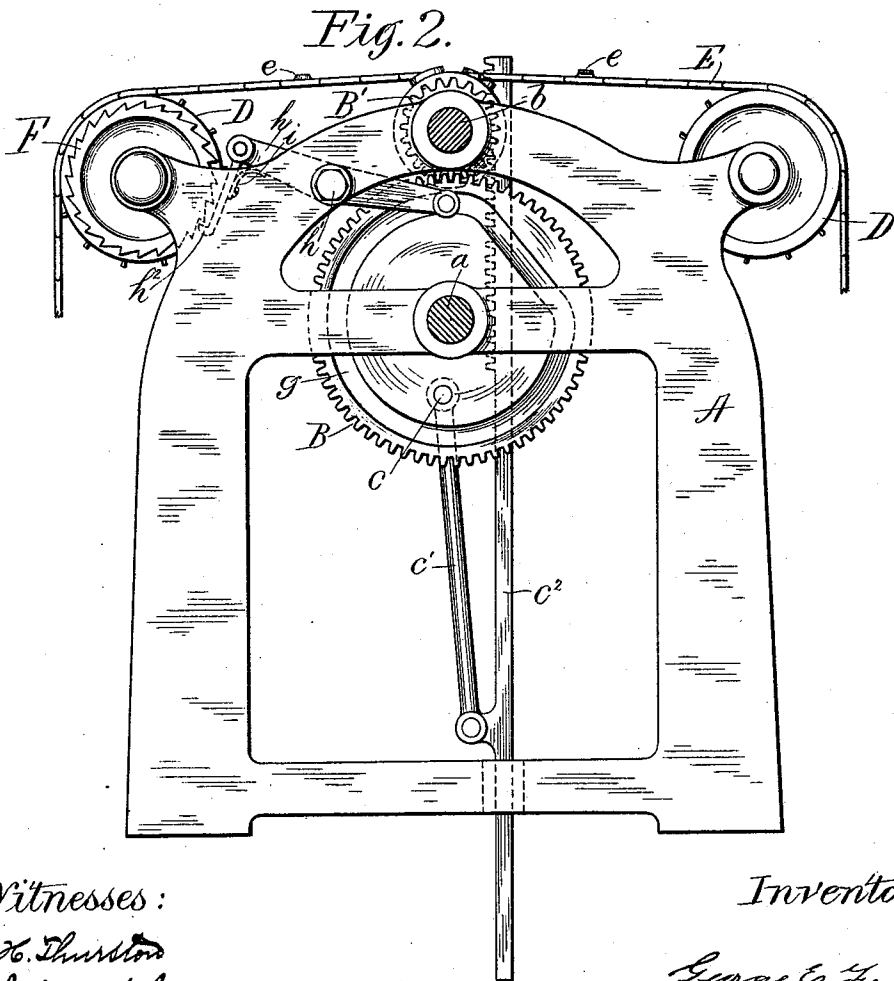
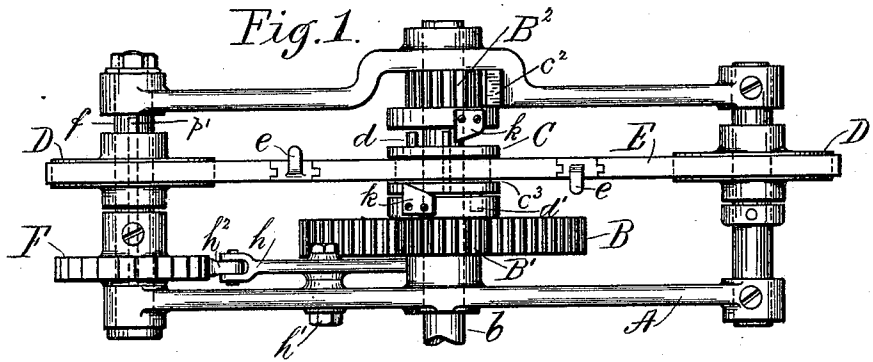
(No Model.)

2 Sheets—Sheet 1.

G. E. FRINK.
MECHANICAL MOVEMENT.

No. 497,316.

Patented May 16, 1893.



Witnesses:
H. H. Thurston
S. J. Murphy.

Inventor:
George C. Trunk

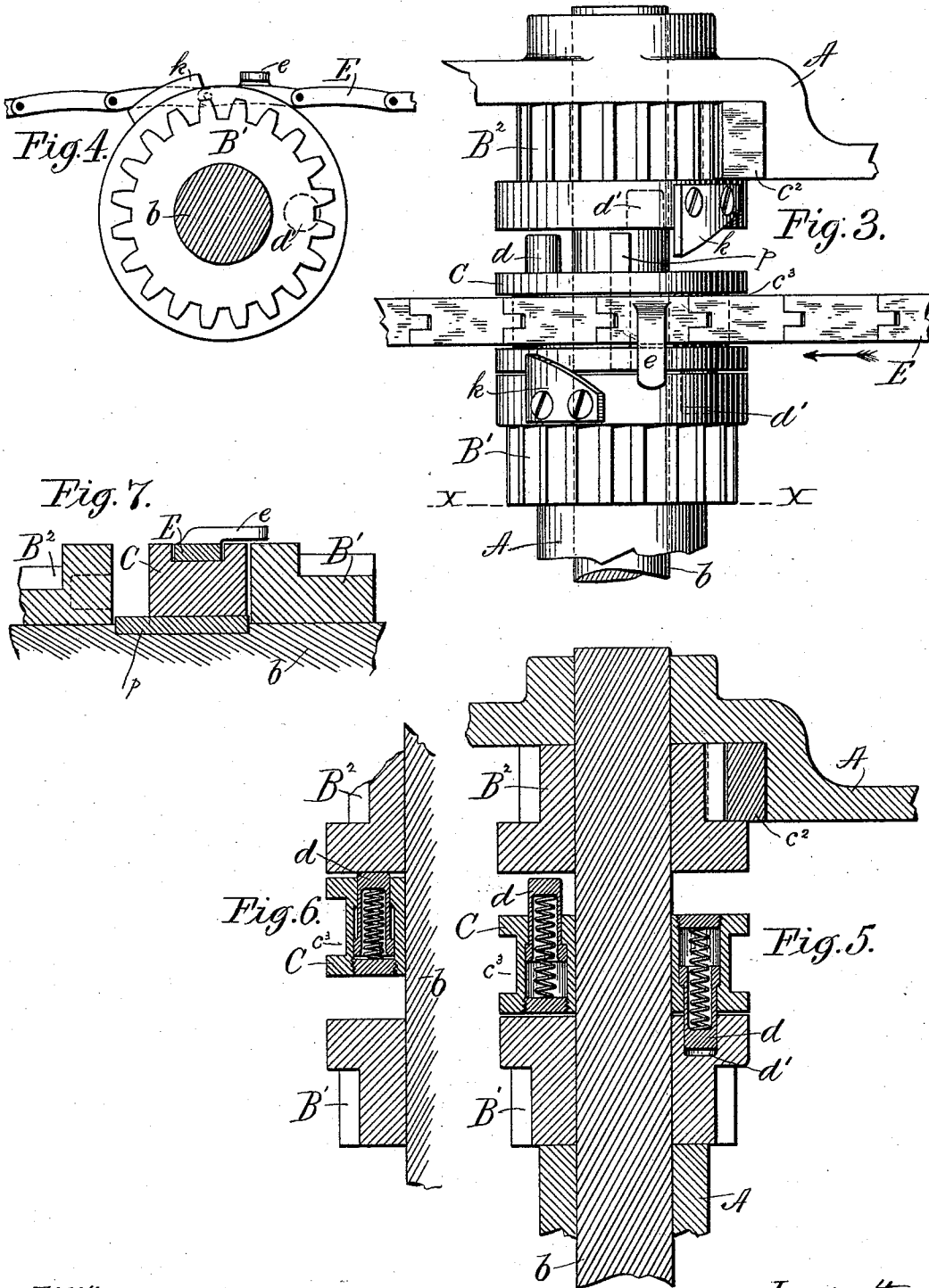
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UNITED STATES PATENT OFFICE.

GEORGE E. FRINK, OF PAWTUCKET, RHODE ISLAND, ASSIGNOR TO THE
E. JENCKES MANUFACTURING COMPANY, OF SAME PLACE.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 497,316, dated May 16, 1893.

Application filed March 9, 1892. Serial No. 424,343. (No model.)

To all whom it may concern:

Be it known that I, GEORGE E. FRINK, of Pawtucket, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Mechanical Movements; and I do hereby declare the following specification, taken in connection with the accompanying drawings, forming a part of the same, to be a full, clear, and exact description thereof.

The invention relates to means for automatically changing the movement of a shaft from a rotary to an oscillating or reciprocating movement and vice versa, and more particularly to means for automatically disengaging a shifting clutch-member from one of two pinions and engaging it with the other, while both of said pinions are in motion, but at different rates of speed.

In another application of even date herewith, Serial No. 424,342, I have shown and described means for accomplishing this result.

The object of the present invention is to simplify the mechanism, and to that end the invention consists in a reorganization of the same and in the combinations and arrangements of parts hereinafter described.

Referring to the drawings, Figure 1 is a top or plan view of the mechanism to be described. Fig. 2 is a side elevation thereof. Fig. 3 is a top view upon an enlarged scale of the clutch mechanism and the gears to be engaged thereby. Fig. 4 is a transverse section on the line x, x , of Fig. 3. Fig. 5 is a central longitudinal section of the parts shown in Fig. 3. Fig. 6 is a like central longitudinal section of a portion of the same, showing the shifting clutch-member in a different position; and Fig. 7 is also a central longitudinal section of a portion of the same but in a different plane from Figs. 5 and 6, and showing the pattern chain in position in the groove of the shifting clutch-member.

A is a suitable frame for supporting the different parts. Mounted in said frame is a shaft a carrying the gear-wheel B, which said gear-wheel is the driving gear of the connected mechanism. This gear wheel B engages a pinion B' mounted loosely on the shaft b likewise supported in the frame A. Said gear wheel B is provided with a crank-

pin c which by means of the connecting rod c' serves to operate the rack-bar c^2 , the teeth of which rack-bar engage with the teeth of a pinion B² also loose upon the shaft b . By the mechanism described, when the driving wheel B is revolved the pinion B' will be continuously rotated, while the pinion B² will be oscillated or reciprocated first in one direction and then in the other. The pinion B² is shown of smaller diameter than the pinion B', and being driven by the crank c will be moved at a slower rate of speed than said pinion B'.

Connected to the shaft b by a groove and spline connection p , and arranged between the pinions B', B², is a shifting-clutch member C provided with the usual groove c^3 . This movable clutch-member C is provided upon each side with a spring-pressed pin d , as clearly shown in Fig. 5, and each of the pinions B', B² is provided upon its inner face with a hole or recess d' adapted to be engaged by one of the said spring-pressed pins d . Sprocket wheels D, D', are mounted in the frame A for supporting a pattern chain E carrying lugs or lateral projections e . Only a portion of this pattern chain is shown in the drawings, but it will be understood that this pattern chain is an endless chain to be carried around other suitable sprocket wheels or guide pulleys suitably located and mounted upon the frame or brackets projecting therefrom. The sprocket wheel D' is an idler, being loosely mounted upon its shaft, and having also a certain amount of lateral play thereon. The sprocket wheel D is connected to its shaft f by a groove and spline connection p' , to which shaft is also secured a ratchet wheel F by means of which motion is imparted to the sprocket wheel D to feed the pattern chain. Upon the face of the driving wheel B is a cam-groove g , as shown in Fig. 2. Engaging with this cam-groove g is a roller or stud projecting from the lever h , which said lever is pivoted to the frame at h' , and to the opposite end of said lever h is pivoted a pawl h^2 for engaging the teeth of the ratchet wheel F and operating said ratchet wheel. A spring i serves to hold the pawl h^2 in operative engagement with the teeth of said ratchet wheel. The pattern chain E runs directly in the groove c^3 of the shifting clutch C, as shown

in the drawings. The pinions B' , B^2 are each extended radially upon the side adjoining the shifting clutch-member, as shown in Fig. 5. Upon the periphery of this extension of each of said pinions is secured a cam k , said cams extending somewhat over the clutch member C and into the path of the lugs e which project laterally from the pattern chain, all as clearly shown in Figs. 1 and 3.

The operation of the parts above described is as follows: It being understood that when the clutch-member C is in engagement with the pinion B' the shaft b will be continuously rotated, and that when said clutch-member is engaged with the pinion B^2 said shaft b will be oscillated or reciprocated back and forth, let it be assumed that said clutch-member is in engagement with the pinion B' , as shown in Fig. 1, and the mechanism in operation with the shaft b in rotation. At each revolution of the gear-wheel or driving-wheel B, the pattern chain E will, by means of the cam-groove g , the lever h , the pawl h^2 , the ratchet wheel F and the sprocket wheel D, be fed along one link, until the pattern chain has been fed along so as to bring the lug e into the position shown in Fig. 3, when the next feed of said pattern-chain will bring the lug e into a position where it will be struck by the cam k on the face of the pinion B' as the latter revolves, and the revolution of said pinion will cause the cam k to force the lug e and the pattern chain, and consequently the clutch-member C, in a direction to disengage said clutch-member from the pinion B' and to engage the other pinion B^2 . This movement of the pattern chain and the clutch-member is facilitated by the ability of the sprocket wheels D, D' to slide upon their shafts. The parts are so arranged that the hole d' in the pinion B^2 will not be at the proper position to be engaged by the projecting pin d upon the clutch-member C at the instant, but the spring behind said pin will yield as the end of said pin comes in contact with the face of the pinion B^2 , thereby enabling said clutch-member to be moved close up to the face of said pinion and thus become disengaged from the pinion B' , the spring-pressed pin being forced into and housed within the body of the clutch-member, as shown in Fig. 6. When now in the movement of the pinion B^2 under the action of its rack-bar, the hole d' in the face of said pinion is brought into the proper position, the pin d will be shot by its spring so as to quickly and firmly engage said pinion and thus connect the movable clutch member therewith. The shaft b will then partake of the motion of the pinion B^2 and be oscillated back and forth until the next lug e on the opposite side of the pattern chain E is brought by the feed of said pattern chain to a position where it will be actuated by the cam k on the face of the pinion B^2 to move the pattern chain and the clutch-member C in the opposite direction, *i. e.*, in a direction to disengage the clutch-

member C from the pinion B^2 and to engage said clutch-member with the pinion B' , which said pinion B' will be engaged with the clutch-member C as soon as the hole d' in the face of said pinion is brought to a position where it can be engaged by the appropriate spring-pressed pin d . When this engagement has taken place the shaft b will be again continuously rotated under the action of the pinion B' until another lug on the pattern chain operates to again shift the clutch-member. Any desired number of lugs e on the pattern chain may of course be employed, and by properly locating and arranging said lugs the times for shifting the clutch-member may be varied and regulated as desired.

It will be observed that with the combination and arrangement of parts above described the clutch member is shifted directly by the pattern chain under the action of lugs thereon which are engaged by cams on the pinions which operate said clutch-member, said pattern chain running directly in the groove of said clutch-member. This combination and mode of operation constitutes a characteristic feature of the present invention.

The mechanism above described may be used for various purposes, and will be found particularly useful in connection with that class of knitting machines which knit first around and around, as in knitting the foot and leg of a stocking, and then backward and forward, as in knitting the heel and toe.

I do not claim broadly in the present application the combination of a shaft, two pinions loosely mounted thereon, means for actuating said pinions at different rates of speed, a movable clutch-member connected to said shaft so as to be revolved therewith, but so as to be capable of sliding thereon, said clutch-member being constructed to engage one or the other of said pinions while both are in motion, but at different rates of speed, and means for automatically shifting said clutch-member. Neither do I claim broadly in the present application the combination of a shaft, two pinions loosely mounted thereon, means for actuating said pinions at different rates of speed, a movable clutch-member connected to said shaft so as to be revolved therewith, but so as to be capable of sliding thereon, and provided with spring-pressed pins adapted to engage corresponding recesses in said pinions, and means for shifting said movable clutch-member, whereby said clutch-member may be disengaged from one of said pinions and engaged with the other while both pinions are in motion, but at different rates of speed. Nor do I claim broadly in the present application the combination of a shaft, two pinions loosely mounted thereon, one of said pinions having a continuous rotation, and the other of said pinions having an oscillating or forward and back movement imparted thereto, means for actuating said pinions at different rates of speed, a movable clutch-member con-

5 nected to said shaft so as to be revolved there-
with, but so as to be capable of sliding there-
on, and constructed to engage one or the other
of said pinions, and means for automatically
10 shifting said movable clutch-member, where-
by said shaft will be caused to rotate continu-
ously or be oscillated back and forth accord-
ing as said movable clutch-member is in en-
gagement with one or the other of said pin-
15 ions, the combinations above referred to be-
ing made the subjects of claims in the appli-
cation of even date hereinbefore referred to,
the same being Serial No. 424,342.

15 What I claim as my invention, and desire
to secure by Letters Patent, is—

1. The combination of a shaft, two pinions
loosely mounted thereon, a movable clutch-
member connected to said shaft so as to be
20 revolved therewith, but so as to be capable
of sliding thereon, said clutch-member being
constructed to engage one or the other of
said pinions, a pattern chain running in the
groove of said clutch-member, means for feed-
25 ing said pattern chain, and means for giving
to said pattern chain a lateral movement to
shift said clutch-member, substantially as de-
scribed.

2. The combination of a shaft, two pinions
loosely mounted thereon, each of said pinions
30 being provided with a cam, a movable clutch-
member connected to said shaft so as to be
revolved therewith, but so as to be capable of
sliding thereon, said clutch-member being
constructed to engage one or the other of said
35 pinions, a pattern-chain running in the groove
of said clutch and provided with projecting
lugs to be engaged by the cams on said pin-
ions, and means for feeding said pattern-
chain, whereby said clutch-member will be

shifted directly by said pattern-chain, sub- 40
stantially as described.

3. The combination of a shaft, two pinions
loosely mounted thereon, each of said pinions
being provided with a cam, a movable clutch-
member connected to said shaft so as to be 45
revolved therewith, but so as to be capable of
sliding thereon, and provided with spring-
pressed pins adapted to engage correspond-
ing recesses in said pinions, a pattern-chain
50 running in the groove of said clutch-member
and provided with projecting lugs to be en-
gaged by the cams on said pinions, and means
for feeding said pattern-chain, whereby said
clutch-member may be disengaged from one
55 of said pinions and engaged with the other
when both are in motion, and at different
rates of speed, substantially as described.

4. The combination of a shaft, two pinions
loosely mounted thereon, each of said pinions
being provided with a cam, a driving wheel 60
or tooth gear engaging directly with one of
said pinions to revolve the same, and also op-
erating a rack-bar for oscillating the other of
said pinions, a movable clutch-member con-
65 nected to said shaft so as to be revolved there-
with, but so as to be capable of sliding there-
on, and constructed to engage one or the
other of said pinions, a pattern chain running
in the groove of said clutch and provided
70 with projecting lugs to be engaged by the
cams on said pinions, and means operated by
said driving wheel for feeding said pattern
chain, substantially as described.

GEORGE E. FRINK.

Witnesses:

W. H. THURSTON,
S. J. MURPHY.