No. 613,199. Patented Oct. 25, 1898.

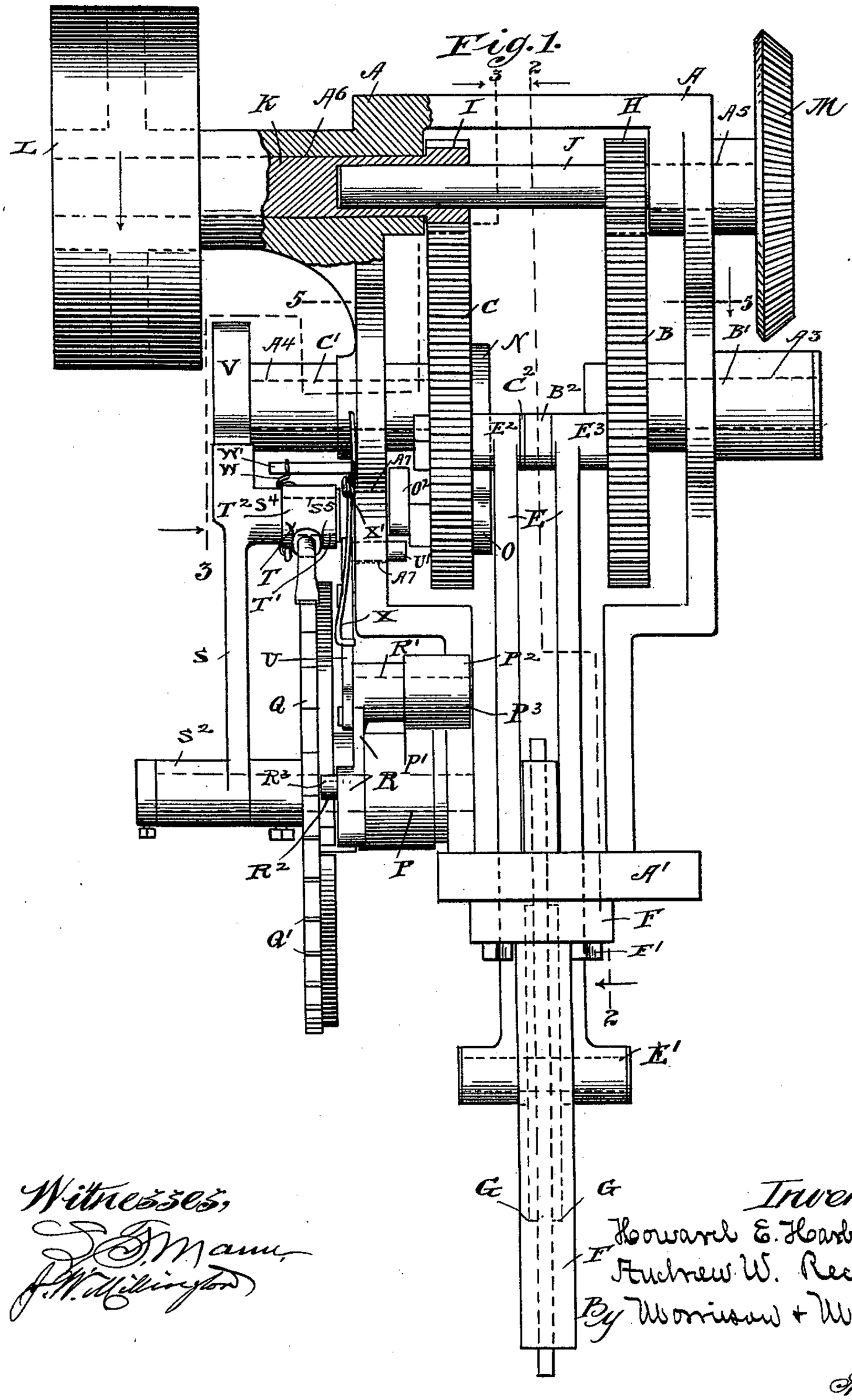
H. E. HARBAUGH & A. W. REDIN.

MECHANICAL MOVEMENT.

(Application filed June 4, 1898.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.



Witnesses,
S. G. Mann,
J. W. Millington

Inventors.
Howard E. Harbaugh,
Andrew W. Redin,
By Morrison & Miller,
Attys.

No. 613,199. Patented Oct. 25, 1898.

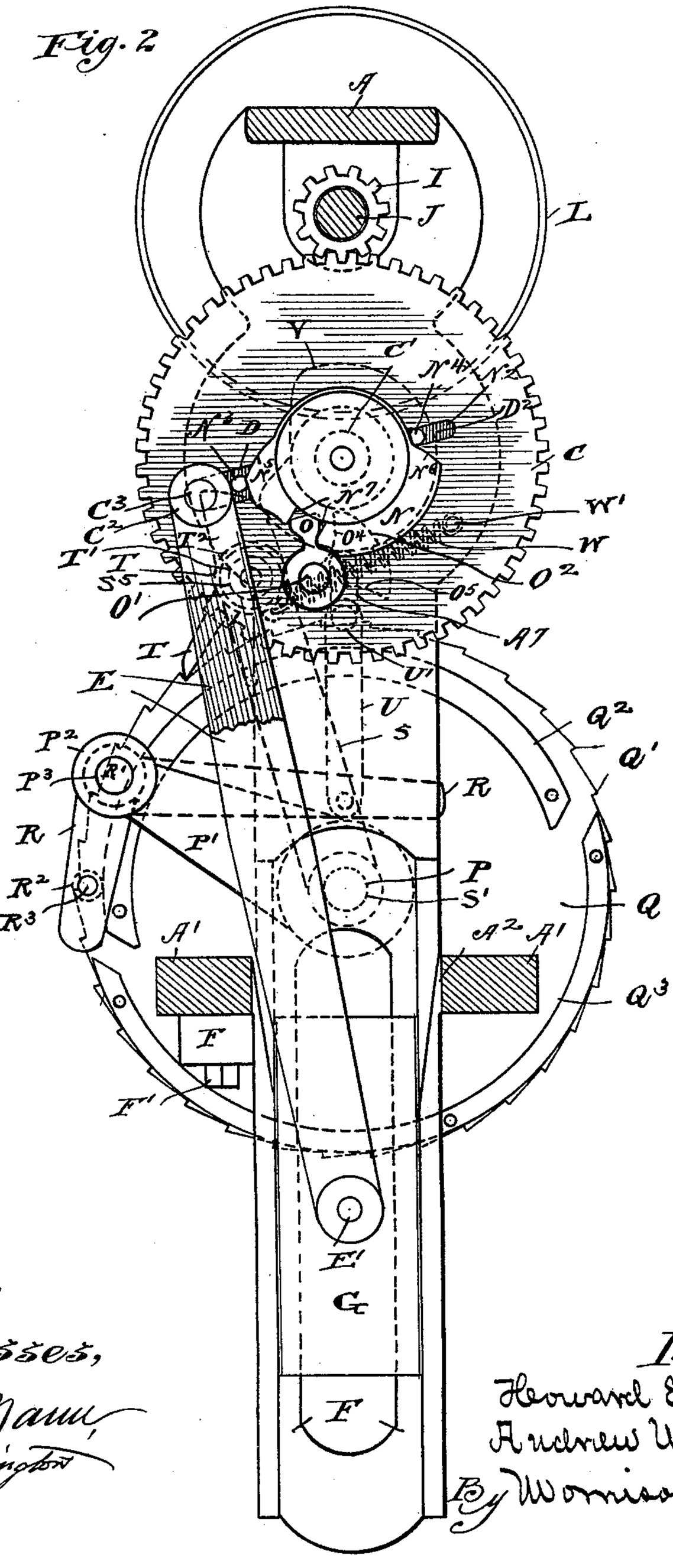
H. E. HARBAUGH & A. W. REDIN.

MECHANICAL MOVEMENT.

(Application filed June 4, 1898.)

(No Model.) 4 Sheets—Sheet 2.

Fig. 2



Witnesses,
D. J. Mann,
J. W. Millington

Inventors,
Howard E. Harbaugh,
Andrew W. Redin,
By Morrison & Willis,
Attys.

No. 613,199. Patented Oct. 25, 1898.

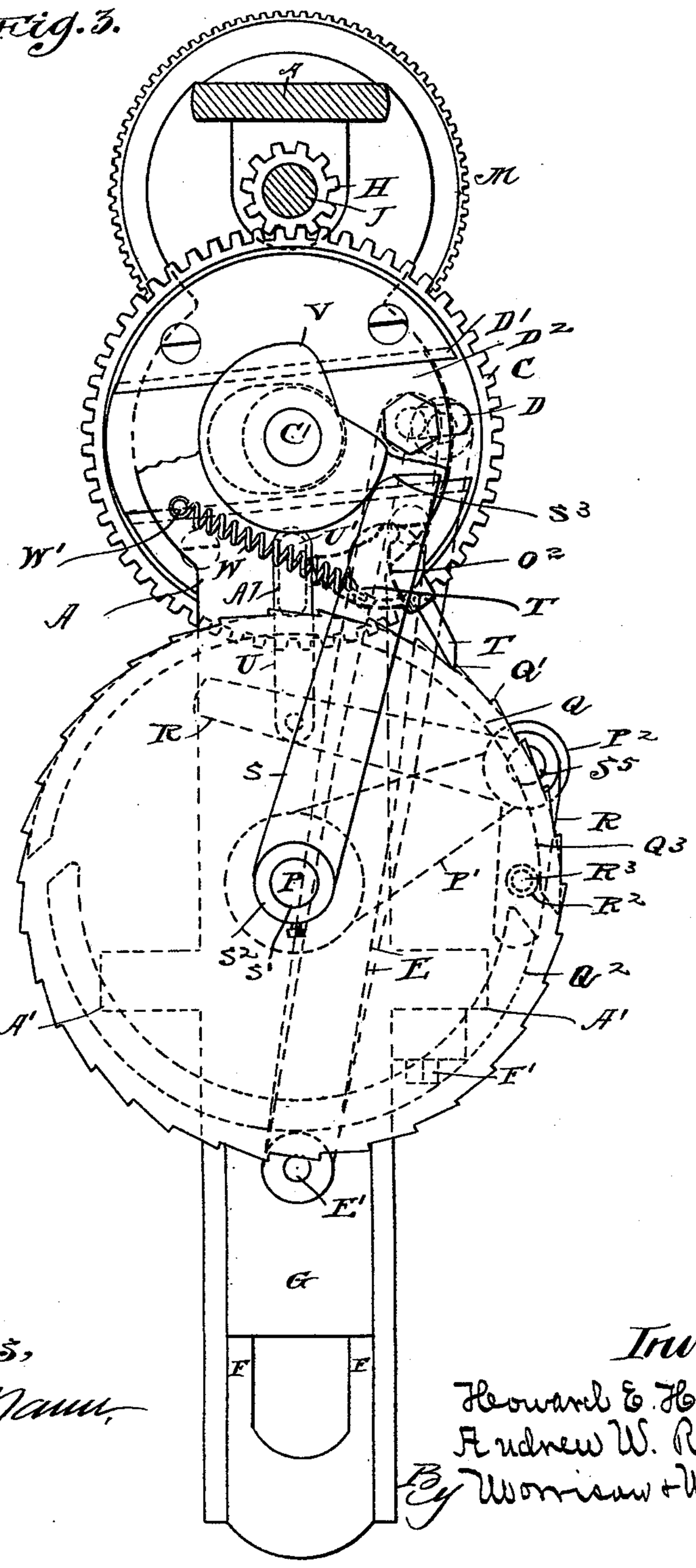
H. E. HARBAUGH & A. W. REDIN.

MECHANICAL MOVEMENT.

(Application filed June 4, 1898.)

(No Model.) 4 Sheets—Sheet 3.

Fig. 3.



Witnesses,
E. G. Mann,
J. W. Millington

Inventors
Howard E. Harbaugh,
Andrew W. Redin,
By Morrison & Miller,
Attys.

No. 613,199. Patented Oct. 25, 1898.

H. E. HARBAUGH & A. W. REDIN.

MECHANICAL MOVEMENT.

(Application filed June 4, 1898.)

(No Model.) 4 Sheets—Sheet 4.

Fig. 4.

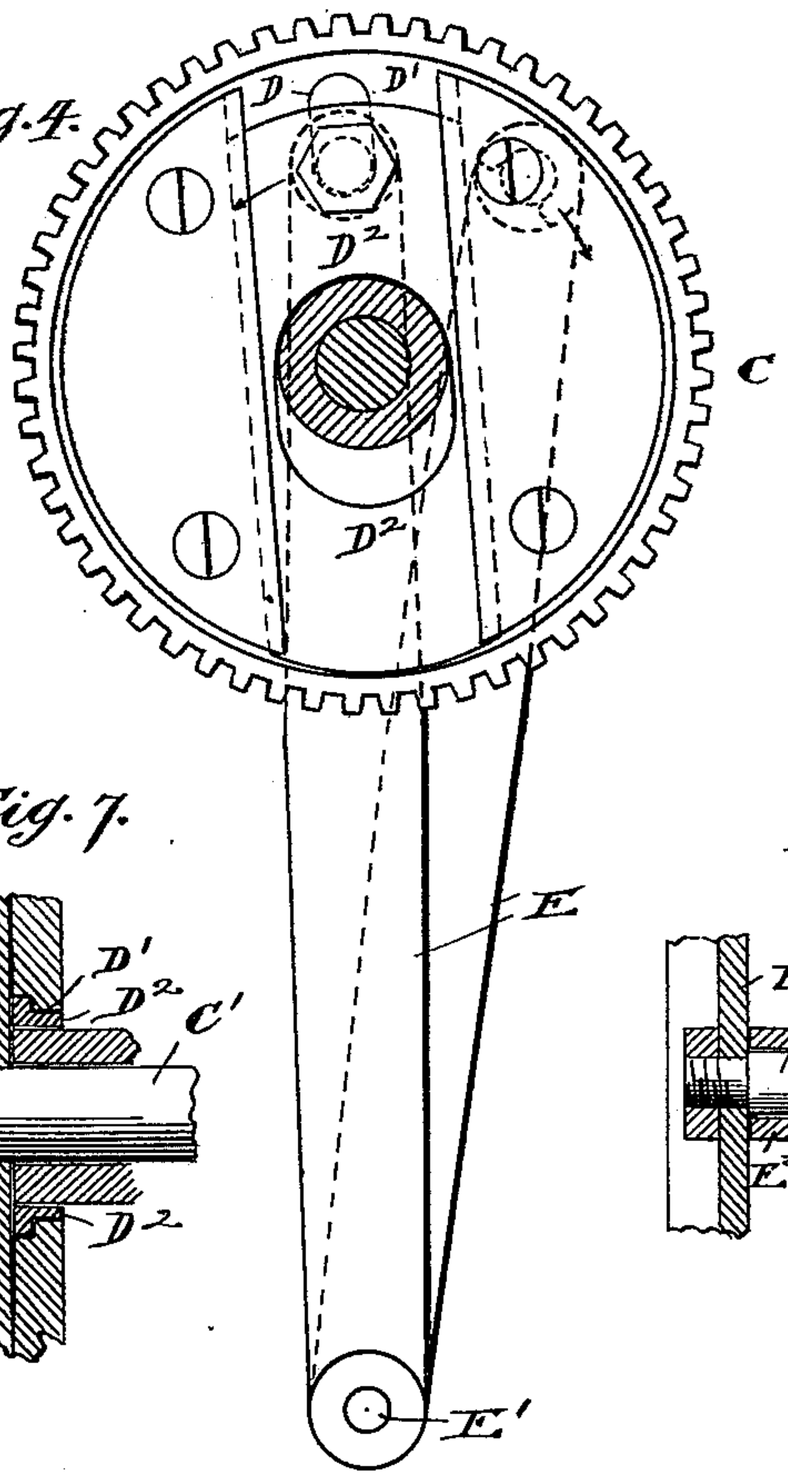


Fig. 7.

Fig. 8.

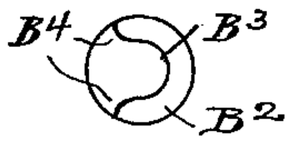


Fig. 9.

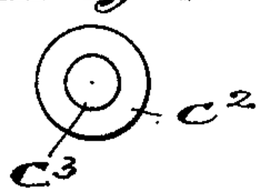


Fig. 6.

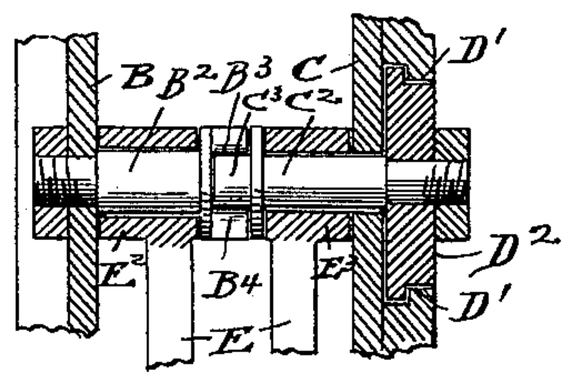
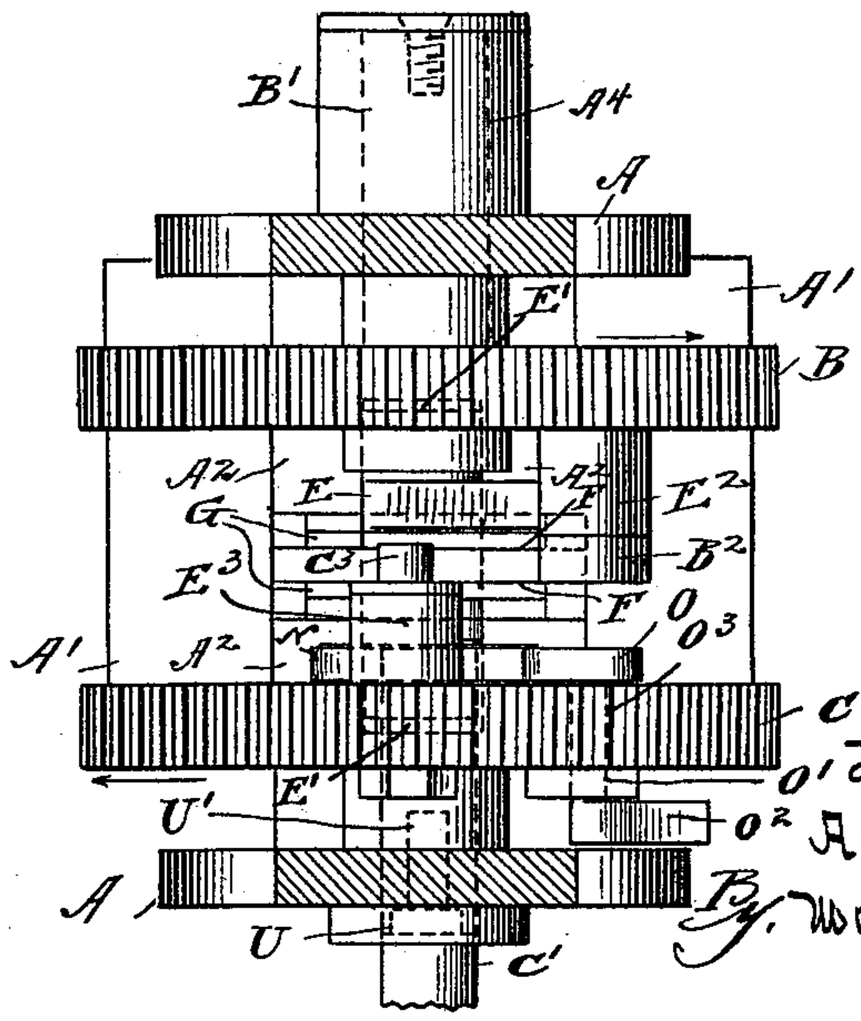


Fig. 5.



Witnesses,
S. S. Mann,
J. W. Mellington

Inventors,
Howard E. Harbaugh,
Andrew W. Redin,
By Morrison & Miller,
Attys.

UNITED STATES PATENT OFFICE.

HOWARD E. HARBAUGH AND ANDREW W. REDIN, OF KENOSHA, WISCONSIN.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 613,199, dated October 25, 1898.

Application filed June 4, 1898. Serial No. 682,616. (No model.)

To all whom it may concern:

Be it known that we, HOWARD E. HARBAUGH and ANDREW W. REDIN, citizens of the United States, residing at Kenosha, in the county of Kenosha and State of Wisconsin, have invented certain new and useful Improvements in Mechanical Movements, of which the following is a specification.

Our invention relates to mechanism for producing an intermittently rotary and oscillatory movement from a driving-pulley driven continuously in one direction; and it consists of certain new and useful features of construction and combinations of parts specially devised to that end, all of which are hereinafter fully described, and particularly pointed out in the claims.

Referring to the accompanying drawings, which form a part of this specification, Figure 1 is a side elevation of our improvement. Fig. 2 is a section on the line 2 2 in Fig. 1. Fig. 3 is a section on the line 3 3 in Fig. 1. Fig. 4 is a diagrammatic view of parts shown in the foregoing views and will be fully described hereinafter. Fig. 5 is a section on the line 5 5 in Fig. 1 with parts omitted and with the parts shown in Fig. 4 in the same relative positions as there shown. Fig. 6 is a sectional detail of the pitman and wrist-pins of the machine. Fig. 7 is a sectional detail of parts of the wrist-pin-sliding mechanism. Figs. 8 and 9 are end views of the wrist-pins of the spur-wheels of the machine.

Like letters of reference indicate corresponding parts throughout the several views.

A, Fig. 1, is the machine-frame, resting on a base A′, having a rectangular opening A^2 therein.

A^3 A^4 are bearings in the machine-frame A for the shafts of the spur-wheels.

A^5 A^6 are bearings in the machine-frame A for the shafts of the pinions.

A^7, Fig. 3, is a slot in the machine-frame A, the purpose whereof will be explained hereinafter.

B C, Fig. 1, are spur-wheels concentrically mounted on separate shafts B′ C′ in the bearings A^3 A^4 in the machine-frame A.

B^2, Figs. 6 and 8, is a wrist-pin rigidly connected with the spur-wheel B and provided at its free end with a tubular socket B^3, having a slot B^4 opening laterally thereout.

C^2, Figs. 6 and 9, is a wrist-pin adjustably connected with the spur-wheel C by means of the radial slot D, way D′, and longitudinally-reciprocating plate D^2 therein and provided at its free end with a cylindrical stud C^3, adapted to laterally enter or leave the tubular socket B^3 in the wrist-pin B^2 through the lateral slot B^4 therein.

E, Figs. 1 and 6, is a pitman provided with a joint E′ and connecting the wrist-pin B^2 with the wrist-pin C^2 by means of the pitman-heads E^2 E^3, respectively.

F, Figs. 2 and 5, is a double slideway and is secured to the base A′ of the machine-frame A by means of the set-screws F′.

The joint E′, Figs. 1 and 2, of the pitman E connects the two slides G together and retains them in the double slideway F, thereby forming a guide for the pitman E.

H I, Fig. 1, are pinions meshing with the spur-wheels B C, respectively, and concentrically mounted on separate shafts J K in the bearings A^5 A^6 in the machine-frame A.

L, Fig. 1, is a driving-pulley fast to the outer end of the sleeve-shaft K.

M, Fig. 1, is a bevel gear-wheel fast to the outer end of the shaft J.

N, Figs. 1 and 7, is an oscillatory cam mounted on the annular integral collar N′ on the spur-wheel C.

N^2, Fig. 2, is a radial slot extending through the spur-wheel C.

N^3 N^4, Fig. 2, are lugs rigdily connected with the longitudinally-reciprocating plate D^2 and project therefrom through the slots D N^2 in the spur-wheel C into engagement with the curved peripheral portions N^5 N^6 of the reciprocatory cam N.

O O′ O^2, Fig. 5, are respectively a bit, cylindrical stem, and bow and are rigidly secured together to form a key the bit O whereof engages with the slot N^7, Fig. 2, in the reciprocatory cam N, the stem O′ being mounted in the circular bearing O^3, Fig. 5, in the spur-wheel C and the bow O^2 terminating in curved ends O^4 O^5, Fig. 2.

P, Figs. 1 and 2, is an axle rigidly connected with the machine-frame A.

P′, Figs. 1 and 2, is an arm rigidly connected by one end to the machine-frame A and provided with a head P^2 at its free end and having a bearing P^3 therein.

Q, Fig. 2, is a pattern-wheel having ratchet-teeth Q′ around the periphery thereof, provided with bell-crank depressor and elevator cams Q^2 Q^3, projecting from one face thereof and mounted on the axle P.

R, Figs. 1 and 2, is a bell-crank mounted at the angle thereof, by means of a circular stud R′, in the bearing P^3 in the arm P′ and having a roller R^2, mounted on a stud R^3, projecting into the path of the bell-crank depressor and elevator cams Q^2 Q^3.

S, Figs. 1 and 3, is an oscillatory arm mounted, by means of the bearing S′, in the head S^2 on the axle P, terminating at its free end in a cam portion S^3 and provided with a laterally-projecting lug S^4, terminating in a spindle S^5.

T, Figs. 1 and 2, is a pallet mounted, by means of a bearing T′, in the head T^2 on the spindle S^5.

U, Figs. 1 and 2, is a link pivotally connected at its lower end with the free end of the long arm of the bell-crank R and provided at its upper end with a lug U′, projecting horizontally therefrom through the slot A^7 in the machine-frame A into the path of the end portions O^4 O^5 of the bow O^2.

V, Figs. 1 and 2, is a cam mounted on the shaft C′ and engaging with the cam portion S^3 of the oscillatory arm S.

W, Figs. 1 and 2, is a spring for maintaining the pallet T in engagement with the teeth Q′ of the pattern-wheel Q.

X, Fig. 1, is a spring secured to the machine-frame A by means of a screw X′. While the spring X is not necessary to the successful operation of the machine, it by frictional contact with the link U renders it positively certain that the lug U′ thereon will always be retained thereby at its upper position, as in Fig. 3, until it is depressed to its lower position, as in Fig. 1, by the positive action of the parts of the machine controlling the same. It has not been thought necessary to show this spring in any of the other views of the drawings.

Supposing all the parts of the machine to be in the positions shown in Figs. 1 and 2 and that power be applied to the driving-pulley L, as indicated by the arrow in Fig. 1, power would be communicated thence through the shaft K, pinion I, spur-wheel C, wrist-pin C^2, pitman E, wrist-pin B^2, spur-wheel B, pinion H, shaft J to the bevel gear-wheel M, which will then be in rotation. It will be observed that the roller R^2 is in engagement with the outer and operative surface of the bell-crank-depressor cam Q^2 and that the bell-crank R, through the stud R^3, and the stud U′, through the link U, are being thereby depressed to their lower limit. Each rotation of the shaft C′ by rotating the cam V oscillates the arm S, which, acting through the pallet T, turns the pattern-wheel Q a distance equal to the peripheral length of one of the ratchet-teeth Q′. The series of operations last described continue until the roller R^2 passes from the depressor-cam Q^2, Fig. 3, to the inner and operative surface of the elevator-cam Q^3 and elevates the lug U′, through the bell-crank R and link U, to its upper position, whereupon the under portion of the curved end O^4 of the bow O^2 strikes the lug U′, which turns the key, composed of the parts O O′ O^2, to the right, thereby oscillating in the opposite direction the cam N, which, through the curved peripheral inclines N^5 N^6 thereon acting upon the lugs N^3 N^4, slides the longitudinally-reciprocating plate D^2 endwise to the position shown in Fig. 4, thereby sliding the wrist-pin C^2 inward and away from the periphery of its spur-wheel C and causing the same to become axially eccentric with the wrist-pin B^2. Change of the wrist-pins B^2 C^2 from axial concentricity to complete axial eccentricity may be readily understood by observing those parts in such concentricity in Figs. 2 and 6; next observing Fig. 3, where they begin to become so eccentric, and, lastly, observing Figs. 4 and 5, where they are shown in such complete eccentricity. So long as the wrist-pins B^2 C^2 continued axially concentric the spur-wheels B C continued to revolve synchronously in the same direction; but as soon as they became axially eccentric the pitman-joint E′ became operative and motion was communicated down the member of the pitman E, connected with the wrist-pin C^2, and thence through the joint E′ and up the member connected with the wrist-pin B^2, and the spur-wheel B and bevel gear-wheel M are thereby and so continue to be oscillated until the pattern-wheel Q completes another half-revolution, when the roller R^2 engages with the bell-crank-depressor cam Q^2, which, descending, depresses the lug U′ to its lower position, whereupon the under side O^5 of the bow O^2 strikes the same, and the key, composed of the parts O O′ O^2, turns in a direction opposite to that last mentioned and reverses the oscillatory cam N, which, acting upon the lugs N^3 N^4, therethrough returns the longitudinally-reciprocating plate D^2 to its original position and slides the wrist-pin C^2 toward the periphery of its spur-wheel C into axial concentricity with the wrist-pin B^2, whereupon the spur-wheels B C and bevel gear-wheel M will again begin to rotate as at the outset. So long as the wrist-pins B^2 C^2 remain axially concentric the spur-wheels B C, being thereby locked together, will both continue to rotate, and rotary motion will continue to be thereby imparted to the bevel gear-wheel M. As soon, however, as the wrist-pins B^2 C^2 become axially eccentric the spur-wheel C will alone continue to rotate and will communicate motion through the pitman E to the spur-wheel B, which will be thereby turned about one-third of a revolution in the same direction that the spur-wheel C constantly moves. The wrist-pins B^2 C^2 will then have reached their highest upward point of travel and will begin to separate and travel downward until the wrist-pins B^2 C^2 reach their lowest point of

travel, during which separation and downward travel of the wrist-pins B^2 C^2 the spur-wheel B will have been turned by the pitman E in a direction opposite to that of the spur-wheel C, which constantly rotates in one direction. A continuation of the operations just described would obviously cause the bevel gear-wheel M to continue to oscillate.

This machine may be used whenever intermittently oscillatory and rotary movements are required and will be found to be especially useful in connection with knitting machinery requiring the two movements just referred to.

We claim—

1. In a mechanical movement, in combination, two spur-wheels concentrically mounted on separate shafts and each provided with a wrist-pin adapted to interlock with, and unlock from, the other, at predetermined intervals—the wrist-pins being adjustably arranged to become axially concentric or eccentric—and a jointed pitman connecting the wrist-pins of the spur-wheels, substantially as and for the purpose specified.

2. In a mechanical movement, in combination, two spur-wheels concentrically mounted on separate shafts and each provided with a wrist-pin adapted to engage with, and disengage from, the other, at predetermined intervals—the wrist-pins being adjustably arranged to become axially concentric or eccentric—a jointed pitman connecting the wrist-pins of the spur-wheels, and a pitman-guide, substantially as and for the purpose specified.

3. In a mechanical movement, in combination, two spur-wheels concentrically mounted on separate shafts and each provided with a wrist-pin adapted to interlock with, and unlock from, the other, at predetermined intervals—the wrist-pins being adjustably arranged to become axially concentric or eccentric—a jointed pitman connecting the wrist-pins of the spur-wheels, and two pinions concentrically mounted on separate shafts and meshing with the spur-wheels, substantially as and for the purpose specified.

4. In a mechanical movement, in combination, two spur-wheels concentrically mounted on separate shafts and each provided with a wrist-pin adapted to interlock with and unlock from, the other, at predetermined intervals—the wrist-pins being adjustably arranged to become axially concentric or eccentric, by sliding one of them toward the periphery of its spur-wheel into engagement with the other or vice versa out of engagement therewith—means for interlocking and unlocking, and a jointed pitman connecting, the wrist-pins, substantially as and for the purpose specified.

HOWARD E. HARBAUGH.
ANDREW W. REDIN.

Witnesses:
W. W. COOPER,
G. H. CURTIS.