

No. 636,635.

Patented Nov. 7, 1899.

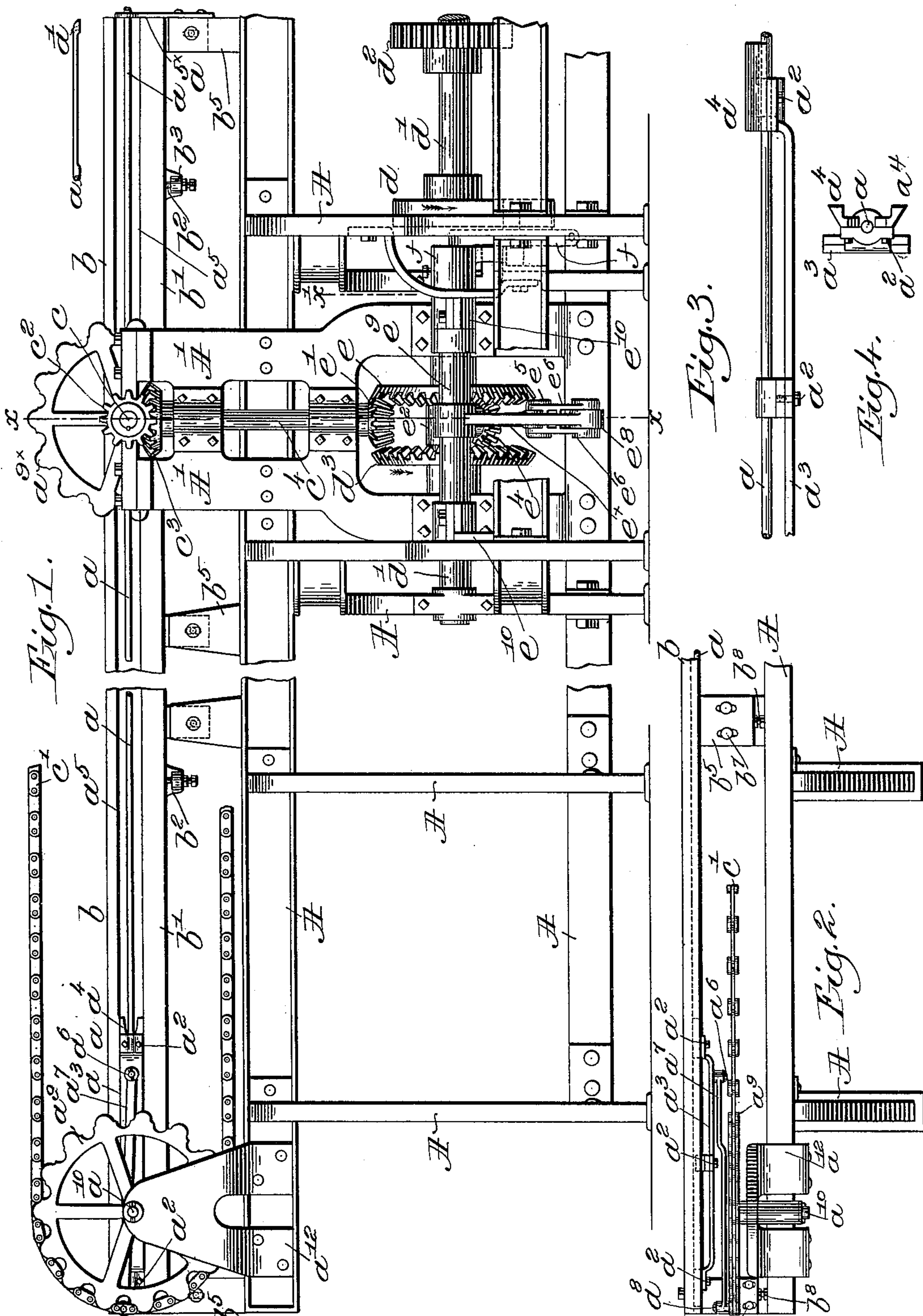
J. A. CLARK & J. T. CYR.

LOOM.

(Application filed Jan. 24, 1899.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:
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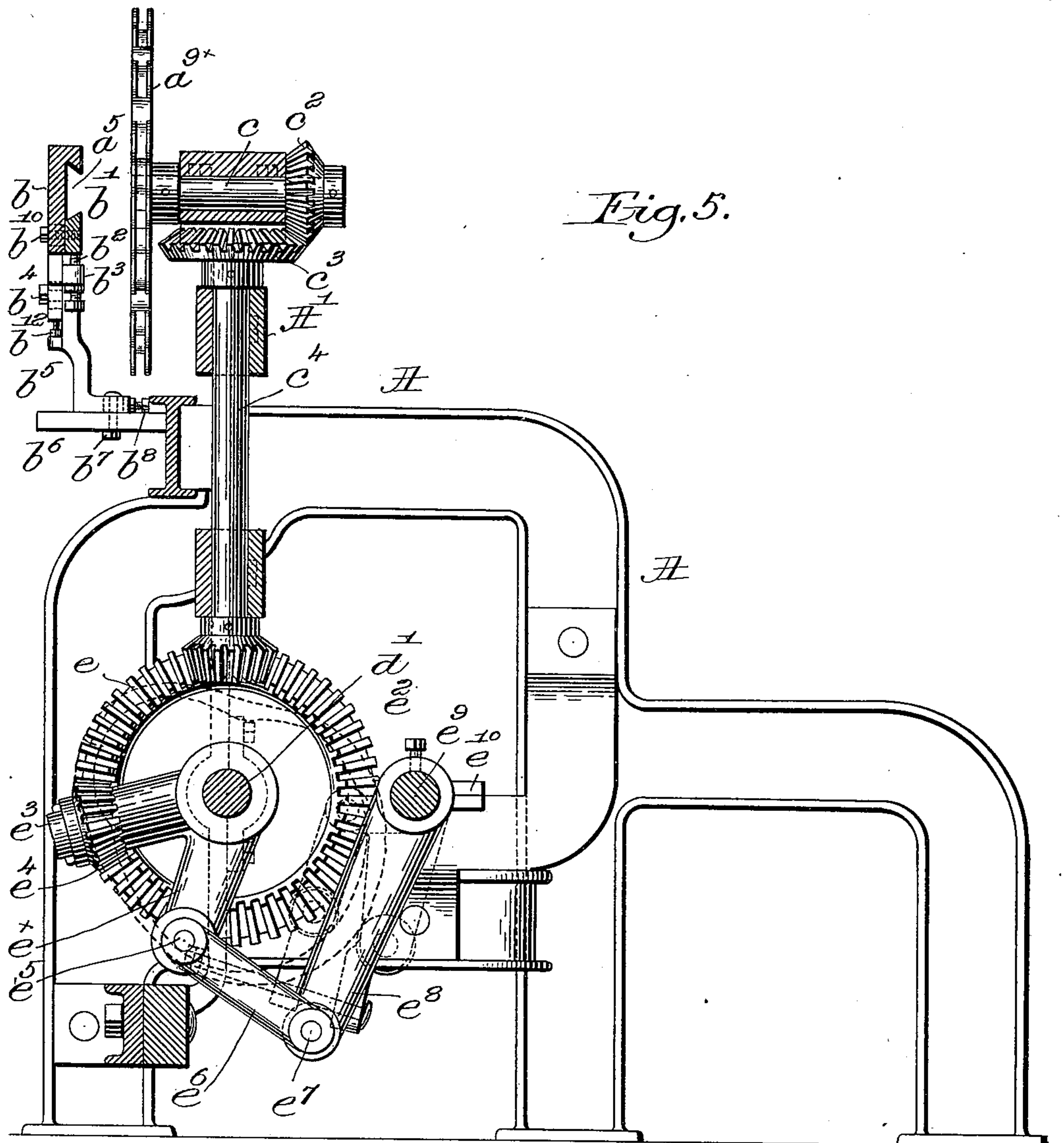


Fig. 5.

Fig. 6.

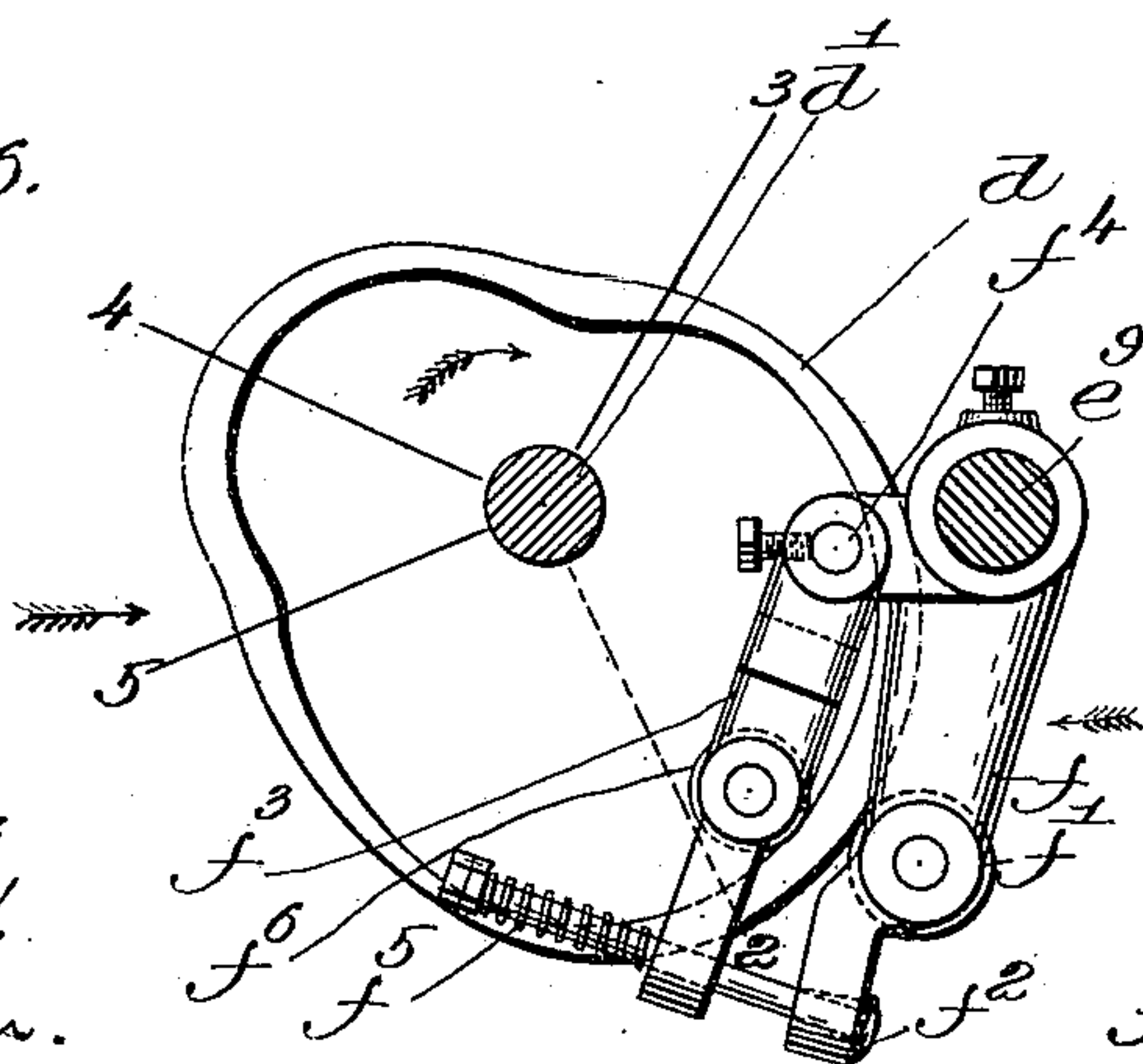
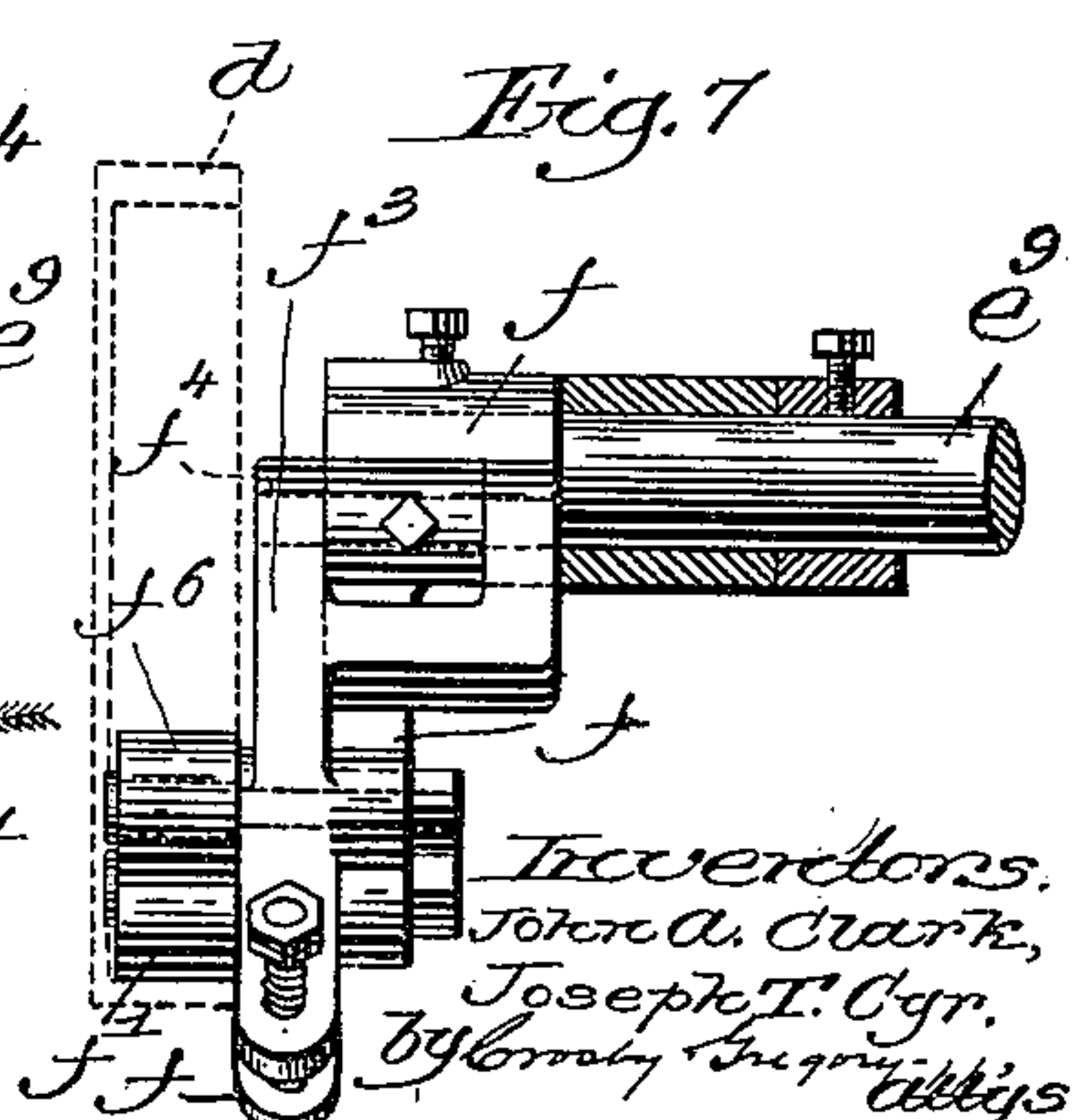


Fig. 7.



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UNITED STATES PATENT OFFICE.

JOHN A. CLARK AND JOSEPH T. CYR, OF WORCESTER, MASSACHUSETTS,
ASSIGNORS TO THE CROMPTON & KNOWLES LOOM WORKS, OF SAME
PLACE.

LOOM.

SPECIFICATION forming part of Letters Patent No. 636,635, dated November 7, 1899.

Application filed January 24, 1899. Serial No. 703,273. (No model.)

To all whom it may concern:

Be it known that we, JOHN A. CLARK and JOSEPH T. CYR, of Worcester, county of Worcester, and State of Massachusetts, have
5 invented an Improvement in Looms, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

10 This invention has for its object the production of a novel mechanism for inserting a needle into a shed formed between warps in a loom. This needle may have an eye to contain a thread and leave filling in the shed.

15 Our invention does not consist in the needle, but rather in actuating the carriage for operating the needle.

We have shown our invention as adapted to move the carriage through a very long
20 stroke in the least possible time, and to do this and provide that the needle remain out of the shed for a period of time sufficient to enable the loom to change in its operation and to also enable the needle to remain a shorter
25 time in the shed at the end of its stroke in order that the filling carried by the needle may be caught and held properly while the needle is being retracted from the shed has necessitated the production of mechanical means
30 whereby the carriage referred to has imparted to it fast or slow speeds and periods of rest, and the speed, whether fast or slow, or the periods of rest, whether shorter or longer, are all controlled by a cam. In our invention a cam
35 may be shaped to control the devices operative to move the said carriage, so that said devices may be run at any desired speed or have any desired periods of rest in a cycle of movement of the carrier.

40 Our invention comprehends in a loom having a reciprocating carriage adapted to be moved transversely with relation to the warp the combination, with a shaft and means intermediate it and said carriage to move the
45 same from said shaft, of gearing under the control of a cam to actuate said shaft at a variable speed dependent as to its character and time by the shape of said cam.

We have shown our invention embodied in
50 one working form as operating a needle to put filling in a shed; but it will be understood

that the carriage may be used to actuate other devices than a needle—as, for instance, a pile-wire.

Figure 1 is a rear side view of the carriage-
55 frame supposed to stand next one end of the loom-frame, said carriage-frame containing a suitable raceway for said carriage, the carriage-frame being broken out centrally and
60 the chain or other endless actuator employed in moving the carriage being partially omitted and the end of the needle being broken off and shown at the upper right-hand corner of the figure. Fig. 2 is a partial top or plan
65 view of the left-hand end of Fig. 1. Fig. 3 shows the carriage and part of the needles employed. Fig. 4 is a detail showing one end of the carriage, to which the needle is attached. Fig. 5 is an enlarged partial sectional detail
70 substantially in the line x , Fig. 1, looking to the right. Fig. 6 is a section in the line x' , Fig. 1, looking to the right. Fig. 7 shows the parts represented in Fig. 6, looking at the same in the direction of the arrow, Fig. 6.

The needle a may be supposed to be substantially the same as represented in United
75 States Patent No. 245,259, dated August 2, 1881, it having at its inner end an eye a' to receive a filling-thread taken from a large mass on a spool or bobbin. The end of the
80 needle a , Fig. 1, is shown as broken off in Fig. 1, that being necessitated by lack of space on the drawing; but said end is shown just above the right-hand end of the loom in that figure. The rear end of the needle is
85 clamped by suitable screws a^2 , one or more, in a carriage a^3 , said carriage having two like dovetailed feet a^4 , one near each end, said feet being secured to the carriage by said screws a^2 , said feet entering a suitable race-
90 way a^5 , made in the inner face of a bar b , the under side of said raceway-groove being constituted by an adjustable plate b' , the lower edge of which rests on stop-screws b^2 , extended
95 through ears b^3 , extended inwardly from the plate b , the lower end of said plate being secured or held in place by screws b^4 , extended through slots of said plate and entering threaded holes in the upright or stand b^5 ,
100 mounted on the shelf b^6 of the main frame A . By loosening the set-bolts b^7 the stands b^5 may be adjusted horizontally toward and from the

front of the loom, and by turning the positioning-screw b^8 the exact positions of the said stand may be secured. The plate b' is clamped in position by suitable screws b^{10} , extended through slots in the plate b and entering threaded holes in the plate b' . The lower edge of the plate b rests on adjustable stop-screws b^{12} . In this way the plate b may be adjusted both vertically and horizontally to put the same in exactly the spot desired to insure the proper position and line of movement of the needle in the shed. Both ends of plate b will be correspondingly supported and adjusted.

The free end of the needle is reciprocated back and forth in a guide a^{5x} .

The carriage has a stud a^6 , which is embraced by a link a^7 , the opposite end of said link fitting over a stud or crank pin a^8 , extended from the actuator c' , sustained by a rotatable wheel a^9 , turning on a stud a^{10} on a stand a^{12} , secured to the frame A.

The central part of the frame A has up-rights A' , which sustain at top a suitable plate or box forming bearings for a shaft c , provided at its front end with a second wheel a^{9x} , the two wheels a^9 and a^{9x} receiving about them said actuator c' , shown as a flexible endless chain, said wheels being represented as having a series of teeth to cooperate with said actuator; but the invention is not limited to the use only of the chain as an actuator and the toothed wheels, as instead we may use any known or suitable equivalents. The shaft c has an attached bevel-pinion c^2 , which is engaged and rotated by a bevel-pinion c^3 , fast on an actuator-shaft c^4 , the rotation of this latter shaft rotating the wheels c^9 and c^{9x} and moving the actuator and the needle, the actuator having a movement in one direction, while the needle is moved to and fro or reciprocated to enter and then retire from the shed.

The frame A is a strong well-braced frame to rest on the floor at one end of the loom, and it may be made of any usual or suitable shape to sustain the operative parts to be described.

The aim of the device to be described is to impart to the carriage and needle or other device attached to it rapid or fast motions as the needle or device enters the shed and while it is being retracted from the shed, and to also leave said carriage and needle or device at rest both when fully out of the shed and when fully in the shed, and we have so arranged this movement that the period of rest of the needle or device when out of the shed is for a greater period than when in the shed. To provide for these movements and periods of rest, we have provided means for rotating the shaft c^4 at a variable speed and for keeping it at rest, or substantially so, and the means for so moving said shaft are under the control of a cam d on a cam-shaft d' , provided with a pinion d^2 , which in practice is engaged with and rotated by a suitable rotatable pinion or gear deriving its motion from the main cam-shaft or other running shaft of the loom.

The cam-shaft d' takes bearings in the frame A and has fast on it a bevel-gear d^3 , and said cam and gear are rotated continuously during the operation of the loom at a uniform speed in the direction of the arrow. (See Fig. 1.) The shaft d' has mounted loosely on it the hub of a bevel-gear e , and the teeth of the said gear remain in constant engagement with the teeth of the bevel-pinion e' , fast on the lower end of the shaft c^4 ; but the teeth of the bevel-gear d^3 do not touch the teeth of the bevel-pinion e' . Between the hubs of the two gears d^3 and e the shaft d' is surrounded loosely by a hub e^2 , herein shown as presenting two arms, one of which carries a stud e^3 , on which is mounted an intermediate bevel-pinion e^4 , the teeth of which engage the teeth of both the gears e and d^3 . The arm e^x of the hub e^2 has jointed to it at e^5 a preferably double link e^6 , (see Figs. 1 and 5,) in turn jointed at e^7 to an arm e^8 , the hub of which is fast on a rock-shaft e^9 , having suitable bearings at e^{10} , said rock-shaft having secured to it, as herein shown, an arm f , having a roller or other stud f' , which bears against the periphery of the cam d . To always maintain contact between said roll and cam, we have extended through the lower end of the arm f loosely a bolt f^2 , which is extended loosely through a hole in a safety-arm f^3 , pivoted at f^4 on an ear extended from said arm f . (See Fig. 6.) The bolt after passing through said arm f^4 has applied to it a spring f^5 , and thereafter a suitable nut is applied to the rod to keep the spring in adjusted position. The arm f^4 has a roller f^6 , which rides on the inner side of the cam-shaped flange of the cam d .

The drawings show the needle in its outermost position and the crank a^8 of the actuator c' at its dead-center point of movement. In this condition it will be understood that the part of the cam from the point 2 to 3 (see Fig. 6) is acting to gradually move the stud e^3 , carrying the intermediate bevel-pinion e^4 , upwardly at one-half the speed of movement of the bevel-gear d^3 , which enables the teeth of said intermediate pinion to run over the teeth of the bevel-gear e , but without imparting any movement to said wheel, and consequently the shaft c^4 stands at rest, and with it the carriage and needle. It will therefore be understood that while the intermediate pinion e^4 rises at the speed stated, the carriage remains at rest, and it will be understood that the cam d controls the position of the intermediate pinion, and consequently by shaping the cam properly we may cause the intermediate pinion e^4 to rise and fall whenever desired and to rise more or less as desired, that depending on whether the dwell or stop is to be of longer or shorter duration. When the needle is fully out of the shed, it is desired that the carriage remain at rest longer than when the carriage occupies a position with the needle fully in the shed. When the needle is fully in, the stud or crank-pin a^8 stands at the extreme right of

the wheel a^{9x} viewing Fig. 1. While the intermediate pinion e^4 is rising, as stated, the part of the cam from 2 to 3 then operating, the actuator c' stands still; but the loom having "changed" and the parts being in condition to receive the filling the needle should start and rapidly increase its movement into the shed, gradually slowing its motion as the needle reaches its extreme inward throw. This is provided for by the part of the cam from 3 to 4, it being of such shape as to effect the partial descent of the intermediate pinion e^4 , it moving at such time in opposition to the movement of the gear d^3 , which causes said pinion to be rotated very rapidly, so that it turns the loose gear e' at a fast rate of speed, and consequently moves the actuator and carriage at a fast rate of speed. The speed at which the carriage is moved commences slowly, so as to avoid shock, and then becomes very rapid and gradually slows down to avoid shocks, and this is controlled by the shape of the cam d . The needle having arrived at its extreme inward position should stop substantially for an instant, so that the filling carried by it may be caught properly, and to effect this the portion of the cam from 4 to 5 acts to impart a short rising movement to the intermediate pinion e^4 , which stops the rotation of the gear e and shaft c^4 , and the said parts having been stopped for a period long enough to enable the filling to be caught the part of the cam d from 5 to 2 acts to again further depress the intermediate pinion e^4 , causing again the fast movement of the actuator and carriage to effect the quick withdrawal of the needle from the shed, and then the intermediate pinion e^4 is again raised into its full upward position by a long stroke, thus keeping the carriage and actuator still for a longer period than at the inward position of the carriage and needle. It will thus be understood that the intermediate pinion e^4 has a long upward movement, a partial downward movement to run the needle in, a short rise to temporarily hold the mechanism substantially stationary when in, and then down again to complete the full downward stroke and release the needle and carriage quickly.

This invention is not in all cases limited to moving a needle with the carrier, and instead we may move a pile-wire or a hook to engage and draw filling into the shed, both the pile-wire and the hook being old and in common use.

Having described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a loom, a raceway, a carriage fitted to slide to and fro on said raceway, a shaft, means to rotate said shaft at a variable speed; combined with an endless actuator deriving its movement in but one direction from said shaft through suitable intermediate devices, and means connecting said carriage and actuator loosely, whereby by movement of said

actuator in one direction only the carriage is moved to and fro, substantially as described.

2. The carriage, means to sustain and guide it, an endless actuator, an actuator-shaft, means intermediate it and said actuator to move the same, combined with a loose gear in mesh with a pinion on the end of said actuator-shaft, a shaft provided with a cam and a fast gear, an intermediate pinion engaging said two gears, and means actuated by said cam to move said intermediate pinion to and fro between said gears, the gear engaging the pinion on the actuator-shaft being held at rest while the said intermediate pinion moves in one direction, and being moved very rapidly when said intermediate pinion is moved in the opposite direction, substantially as described.

3. The carriage, means to sustain and guide it, a needle secured to said carriage, an endless actuator, an actuator-shaft, means intermediate it and said actuator to move the same, combined with a loose gear in mesh with a pinion on the end of said actuator-shaft, a shaft provided with a cam and a fast gear, an intermediate pinion engaging said two gears, and means actuated by said cam to move said intermediate pinion to and fro between said gears, the gear engaging the pinion on the actuator-shaft being held substantially at rest while the said intermediate pinion moves in one direction, and being moved very rapidly when said intermediate pinion is moved in the opposite direction, substantially as described.

4. A cam-shaft having an attached irregular cam and a gear, a loose gear mounted on said shaft, an actuator-shaft occupying a position at right angles to the shaft having said cam, a hub interposed between said fast and loose gear and surrounding the shaft having the cam, said hub having an intermediate pinion; combined with means to turn said hub about the shaft having said cam in one or the other direction according to the shape of said cam to thereby change the direction of movement of the said intermediate pinion, causing it, when moved in one direction, to insure rapid rotation of said actuator-shaft, and when moved in the other direction to cause said shaft to remain substantially idle, substantially as described.

5. In a loom, a raceway, a carriage mounted in said raceway, an endless actuator, and means to move said actuator substantially continuously in one direction but at varying speeds; combined with a link joining together said carriage and actuator, substantially as described.

6. In a loom, a raceway, a carriage guided thereby, an endless actuator, connections between said carriage and actuator, a rotatable shaft, and means intermediate said shaft and actuator to impart to the latter a motion substantially continuous in the same direction; a cam-shaft, and gearing under its control to actuate said rotatable shaft at a variable speed depending as to its character and time

upon the shaft of said cam, substantially as described.

7. The shaft d' , its cam, and gear d^3 fast thereon, a gear loose on said shaft, and a hub 5 surrounding said shaft loosely between said gears, said hub having an intermediate pinion, combined with a rock-shaft having an arm provided with a roller-stud bearing on said cam, means to keep said roller-stud 10 against said cam, a second arm connected to said rock-shaft, and a link connecting it with said hub to move the said hub and intermediate pinion as demanded by said cam, substantially as described.

8. In a loom, a raceway, a carriage mounted thereon, wheels having their axes of motion at right angles to the length of said raceway, an endless actuator extended about said wheels, a link connecting said actuator with 20 said carriage, and means to move said wheels and actuator always in the same direction at a variable speed, substantially as described.

9. A shaft provided with a cam and a fast gear, a loose gear on said shaft, an actuator-shaft having a pinion in engagement with said loose gear; combined with an intermediate pinion engaging said gears and under the control of said cam to move said intermediate pinion to and fro between said gears; 30 the loose gear engaged by the pinion being held at rest while the said pinion moves in one direction and being moved very rapidly when said pinion is moved in the opposite direction, substantially as described.

10. In a loom, a raceway, a carriage mounted thereon and adapted to be reciprocated trans-

versely with relation to the warp; a link connected with said carriage; a shaft; and means intermediate it and said link to move it and said carriage; combined with a cam, means 40 to actuate it; and gearing under the control of said cam to rotate said actuating-shaft and impart to it a variable speed and periods of rest in its rotation, substantially as described.

11. In a loom, a shaft having an attached 45 toothed gear, a toothed gear loose on said shaft, the teeth of the gears facing each other, an actuator-shaft occupying a position at right angles to the shaft carrying said fast and loose gears, a hub interposed between said 50 shaft and loose gear and surrounding loosely the shaft carrying said gears, and an arm extended from said hub, said arm having a stud carrying an intermediate pinion, combined with a cam, and means actuated by it to turn 55 said arm in one or the other direction about said shaft to thereby change the direction of movement of said intermediate pinion, causing it when moved in one direction to insure motion of said actuator-shaft, and in the other 60 direction to enable said shaft to stand substantially still or without motion, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of 65 two subscribing witnesses.

JOHN A. CLARK.
JOSEPH T. CYR.

Witnesses:

JUSTIN A. WARE,
GEORGE CROMPTON.