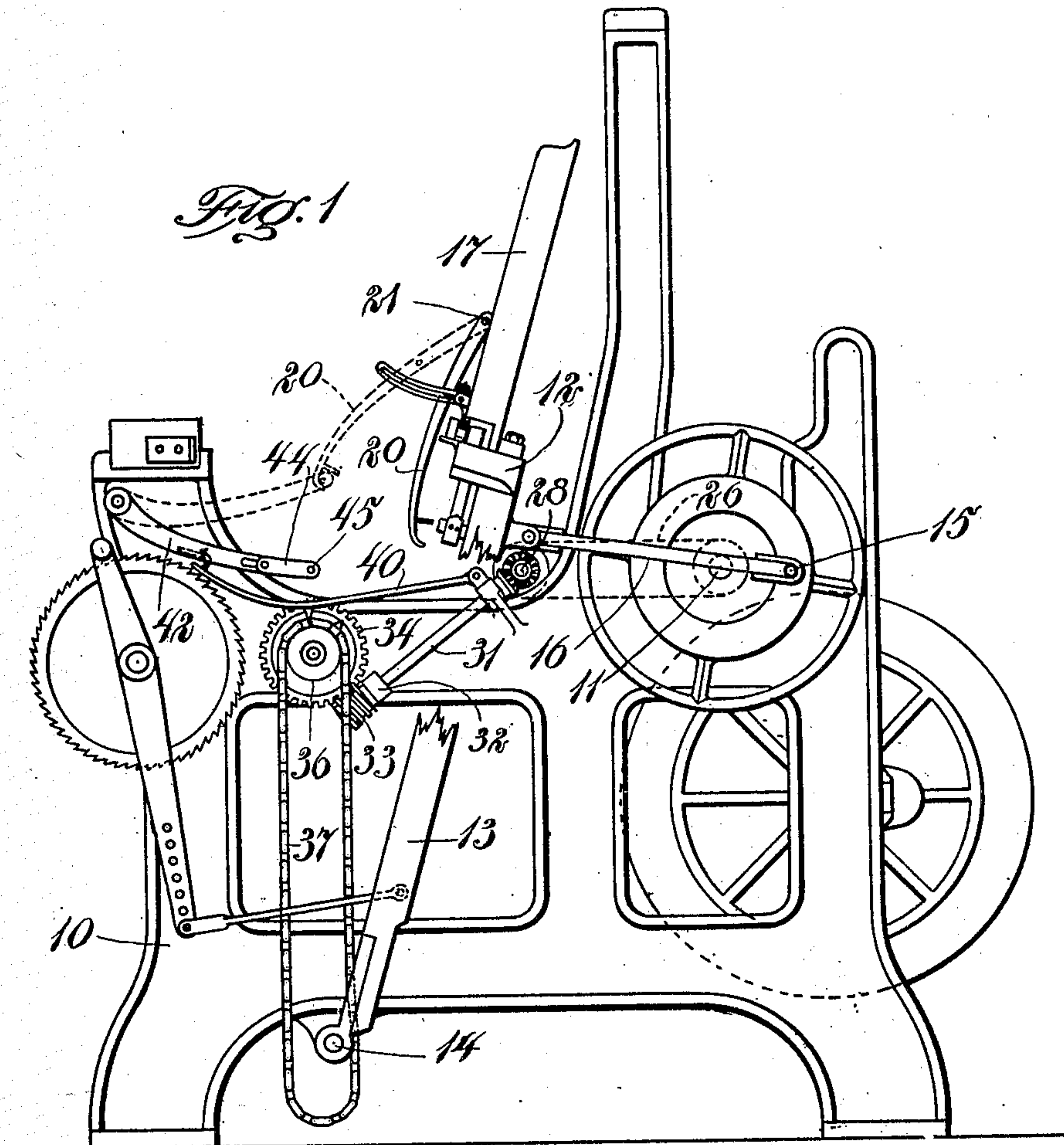


No. 860,567.

PATENTED JULY 16, 1907.

C. F. PERHAM.
SHUTTLE CHANGING MECHANISM FOR LOOMS.
APPLICATION FILED AUG. 27, 1904.

3 SHEETS—SHEET 1.



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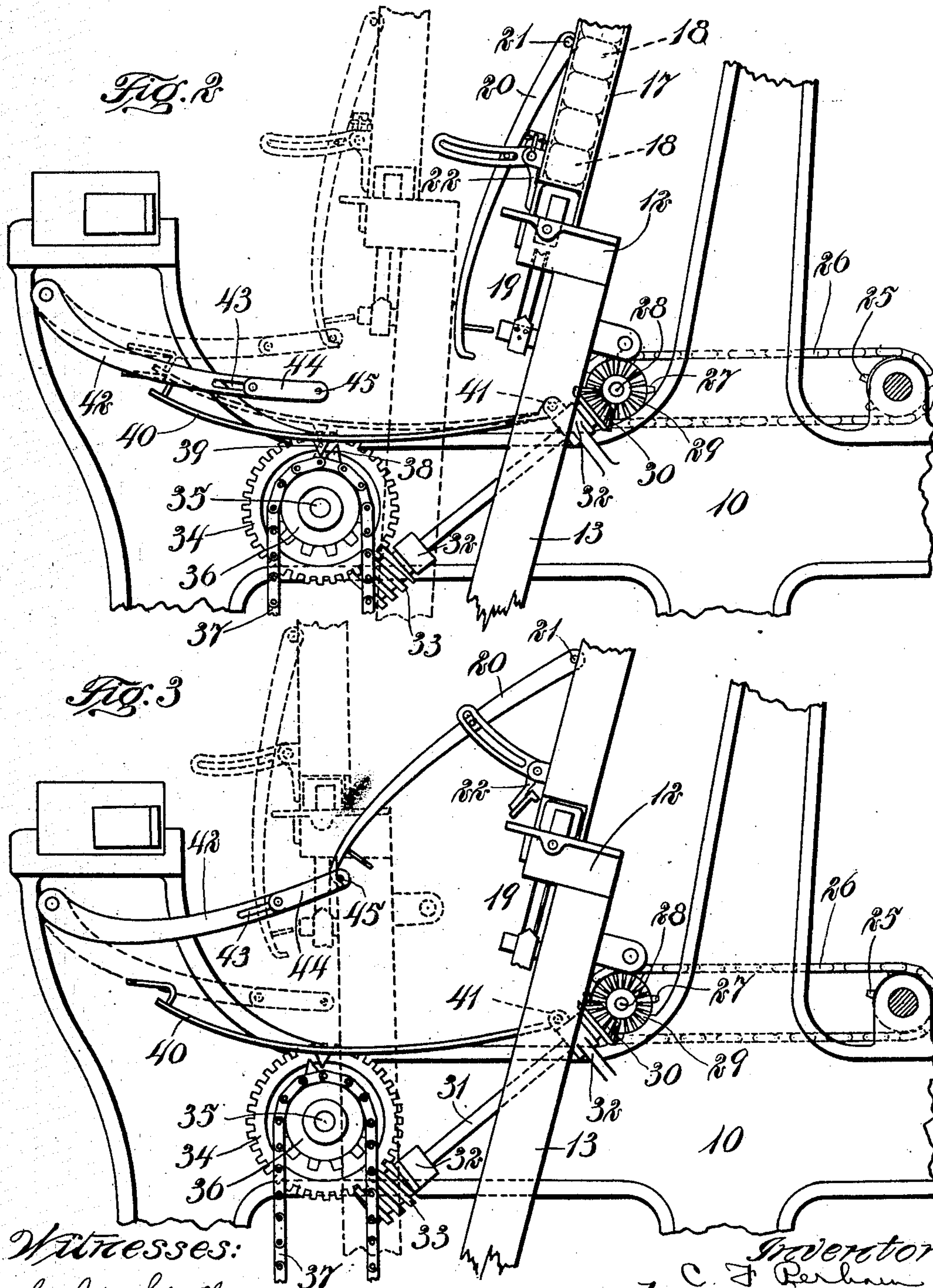
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3 SHEETS—SHEET 2.



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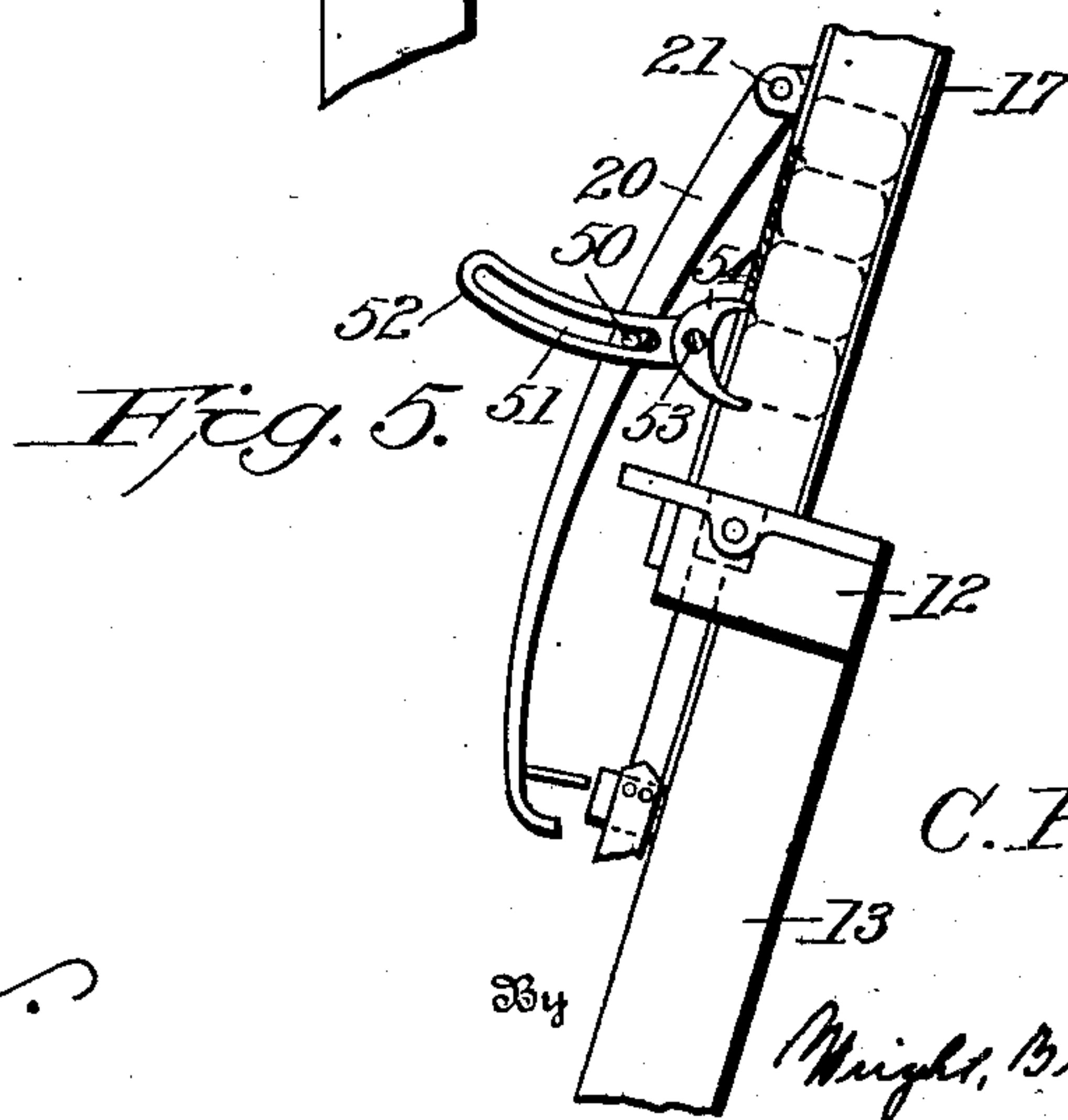
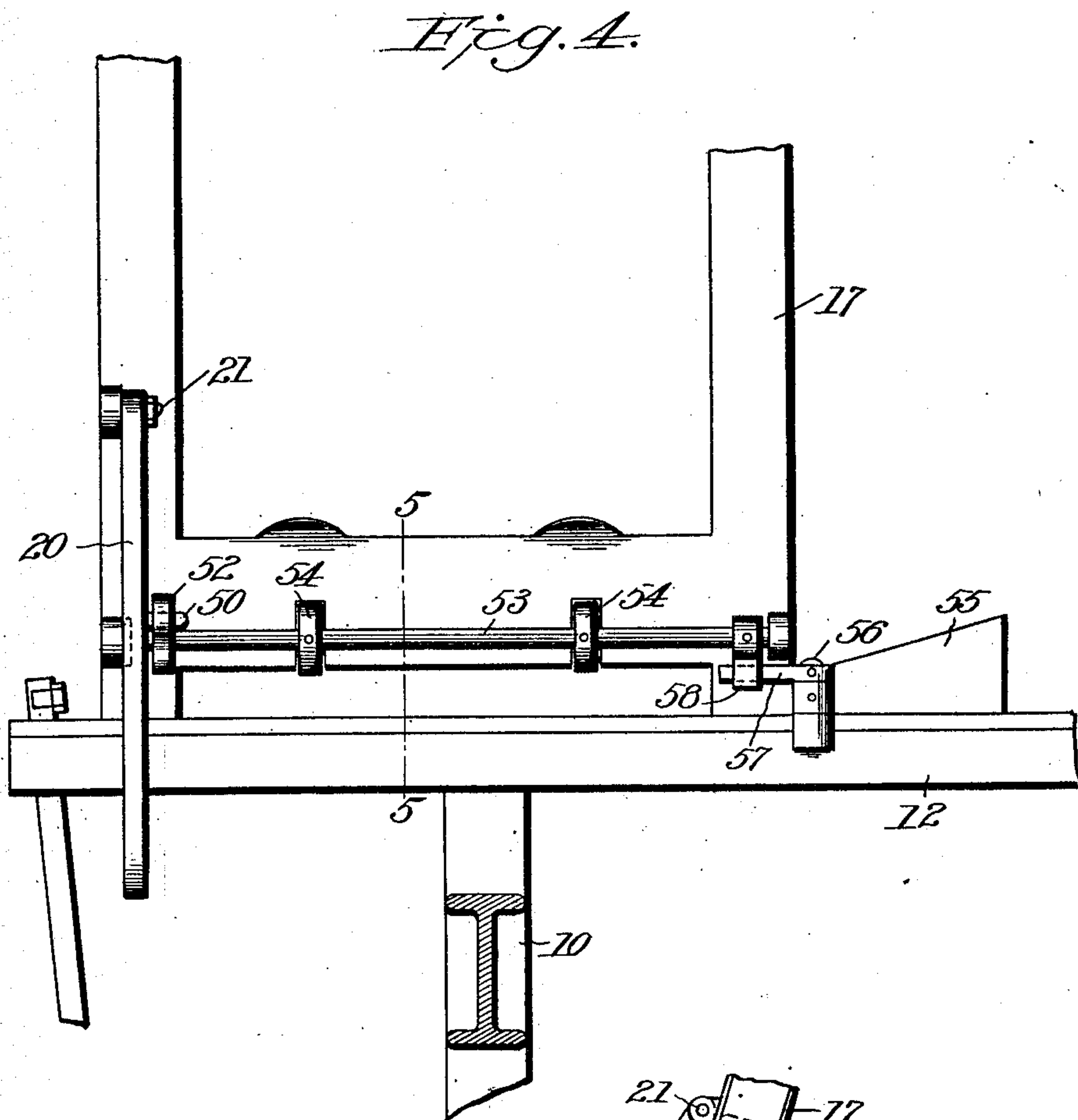
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

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SHUTTLE-CHANGING MECHANISM FOR LOOMS.

No. 860,567.

Specification of Letters Patent.

Patented July 16, 1907.

Application filed August 27, 1904. Serial No. 222,431.

To all whom it may concern:

Be it known that I, CHARLES F. PERHAM, of Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Shuttle-Changing Mechanism for Looms, of which the following is a specification.

This invention has relation to looms, and more especially to shuttle-supplying mechanism therefor.

The object of the invention is to automatically deflect a shuttle from the picking mechanism at a predetermined time and substitute another shuttle therefor.

In carrying out the invention, I utilize the "weft-replenishing mechanism" shown and described in my co-pending application Serial No. 734,343, filed October 21, 1899. The essential feature of the present invention, however, is the mechanism for automatically actuating the weft-replenishing mechanism at predetermined times and at uniform intervals, for producing a pattern in the material being woven.

On the drawings, forming a part of this specification,—Figure 1 is a right-end elevation of a loom having the essential features of the invention. Fig. 2 is a fragmentary view of the same on a larger scale. Fig. 3 is a fragmentary view showing the parts in another position. Fig. 4 is a detail front elevation of the shuttle-magazine and some of the mechanism adjacent thereto. Fig. 5 represents a section on line 5—5 of Fig. 4, looking toward the left.

Referring to the drawings, the same reference numerals indicate the same parts in all the figures.

A loom of well-known construction is shown, supported by end-frames 10, in which is journaled a driving-shaft 11. The lay 12 mounted upon swords 13 is pivoted at 14 to the end frames 10, and is operated by a crank-pin 15 on the driving-shaft and connecting rod 16. A shuttle-box or magazine 17 is mounted upon the lay 12, and is adapted to contain a plurality of reserve shuttles 18, as shown by dotted lines in Figs. 2 and 5.

No complete shuttle-picking mechanism is illustrated on the drawings, but indicated at 19 is a portion of the mechanism illustrated in my co-pending application 222,430, filed concurrently herewith.

The shuttle-box 17 is provided with a depending hooked arm 20, pivoted at 21, and having a pin 50 entering a slot 51 formed in an arm 52 projecting from one end of a rock-shaft 53 mounted in suitable bearings on the magazine 17, (see Figs. 4 and 5). On the rock-shaft 53 are two detents or feeding dogs 54 which project through apertures into the magazine. When the lever or hooked arm 20 is oscillated in the manner hereinafter described, the pin 50 acts on arm 52 so as to rock the shaft 53 and cause the upper and lower ends of the dogs 54 to release the lowermost shuttle and retain the one next above in a manner that will be readily understood.

The arm 22, shown in Figs. 2 and 3 but omitted from Figs. 4 and 5, may also be employed, to aid in retaining the lowermost shuttle in place.

At the same time that the dogs 54 are operated, a deflector 55 is swung across the shuttle-race at an acute angle to deflect a shuttle from the shuttle-race. Said deflector is shown as of the type illustrated in my aforesaid application 734,343 and comprises a plate mounted to swing on a vertical pivot 56 and having an arm or finger 57 engaged by a forked arm or finger 58 secured to the rock-shaft 53.

The mechanism hereinbefore described forms no essential part of the present invention, and needs no detailed description, but the mechanism hereinafter described for actuating the shuttle-replacing mechanism at predetermined times, constitutes the essential feature of the invention.

A sprocket 25, affixed to the driving-shaft 11, close to the end frame 10, drives, by means of a chain 26, a sprocket 27 affixed to a stud-shaft 28. The shaft 28 is journaled in a suitable bearing projecting from the frame 10, and to its outer end is affixed a beveled gear 29. The gear 29 meshes with and drives a beveled gear 30, affixed to one end of a worm-shaft 31. The shaft 31 is journaled in suitable bearings 32 32 projecting from the outer side of the end frame. Upon its other end is secured a worm 33, which rotates a worm-gear 34, mounted upon a stud 35 projecting from the frame. Affixed to the gear 34, and concentric therewith, is a sprocket 36 over which a chain 37 is hung.

A projection or actuator 38 is formed on or affixed to a link of the chain 37 and is adapted to engage, each time it passes around the sprocket 35, a similar projection 39, formed on a flexible blade 40, pivoted to an ear 41 on one of the bearings 32. The actuator 38, in engaging the projection 39 raises the blade to a position shown by dotted lines in Fig. 2. The forward end of the blade lies under and sustains a rearwardly extending arm 42 pivoted to the end-frame 10 under the breast-beam. A slot 43 is formed in the rear end of the arm 42 to which is clamped an adjustable extension 44 having a pin 45 in its extreme end. When the arm 42 is in the position shown by dotted lines in Fig. 2, the pin 45 carried thereby is adapted to lie in the path of the hooked arm 20 which actuates the shuttle-changing mechanism. The arm 20 during its forward movement strikes the pin 45 and forces it down by reason of the flexible support afforded to the arm 42 by the blade 40. The forward movement of the arm 20 being enough to carry it over the pin 45, said pin is once more raised into the path of the arm by the spring tendency of the blade 40, so that the next rearward movement of the arm is arrested thereby. Continued rearward movement of the shuttle-box 17, without that of the arm 20, causes the latter to effect the ejection of the shuttle already in the shed, and the substitution of another

shuttle therefor. Continued rotation of the sprocket 36 carries the actuator 38 past the projection 39, thereby allowing the arm 42 to free the arm 20 and return to its normal position.

5 From the foregoing description, it can be seen that, as the lay and shuttle-changing mechanism are actuated by the same driving-shaft, they operate at a constantly uniform ratio of speed, and that a change of shuttles is made only when the predetermined number of picks has been made. Although only one
10 actuator 38 is shown on the chain 37, there might be others at equal or at varying intervals without departing from the principle involved. The chain, too, might be of indefinite length, to conform to requirements, and be guided by idle sprockets, or the actuators might be directly affixed to a gear of suitable speed. By the disposition of the actuators on the chain, the effect due to changing of shuttles is predetermined so that the pattern hereinbefore referred to may be produced in the material being woven in a manner that
20 will be readily understood.

Having thus explained the nature of the invention, and described a way of constructing and using the same, although without attempting to set forth all of the forms
25 in which it may be made, or all of the modes of its use, I declare that what I claim is:—

1. In a loom, the combination with the lay and shuttle-race, of a shuttle magazine containing reserve shuttles, means for automatically deflecting a shuttle from said shuttle race and substituting one from the magazine therefor, and automatic means for controlling the deflection and substitution of the shuttles at a predetermined time.
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2. A loom comprising a driving-shaft, a lay actuated thereby, a shuttle-race, a shuttle magazine containing reserve shuttles, means for automatically deflecting a shuttle from said shuttle-race and substituting one from the
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magazine therefor, and means actuated by said driving-shaft for controlling the deflection and substitution of the shuttles.

3. A loom comprising a driving-shaft, a lay actuated thereby, a shuttle-race, a shuttle magazine containing reserve shuttles, means for automatically deflecting a shuttle from said shuttle-race and substituting one from the magazine therefor, and means actuated by said driving-shaft for causing the deflection and substitution of the shuttles at predetermined times.
40 45

4. In a loom, the combination with the lay and shuttle-race, of a shuttle-magazine containing reserve shuttles, an arm pivoted to said magazine and adapted when swung forward about its pivot to effect the discharge of a shuttle from the shuttle-race and the substitution of one from the magazine therefor, and automatic means for causing said arm to swing about its pivot, deflect the operative shuttle and substitute one from the magazine at predetermined times.
50 55

5. A loom comprising a driving-shaft, a lay actuated thereby, a shuttle-race, a shuttle magazine containing reserve shuttles, an arm connected to said shuttle magazine, which, when held forward during the rearward movement of the lay, causes the discharge of the operating shuttle from the shuttle-race and the substitution of one from the magazine therefor, and means operated by the driving-shaft for engaging and withholding said arm during the rearward movement of the lay at predetermined times.
60 65

6. A weft-replenishing mechanism comprising a shuttle-race, a normally inoperative shuttle magazine containing reserve shuttles, a normally inoperative deflector for deflecting the operating shuttle from the shuttle-race, means for operating said deflector and said shuttle magazine, and mechanically driven adjustable traveling actuators for causing said means to operate the deflector and magazine at predetermined times.
70

In testimony whereof I have affixed by signature, in presence of two witnesses.

CHARLES F. PERHAM.

Witnesses:

M. B. MAY,
C. C. STECHER.