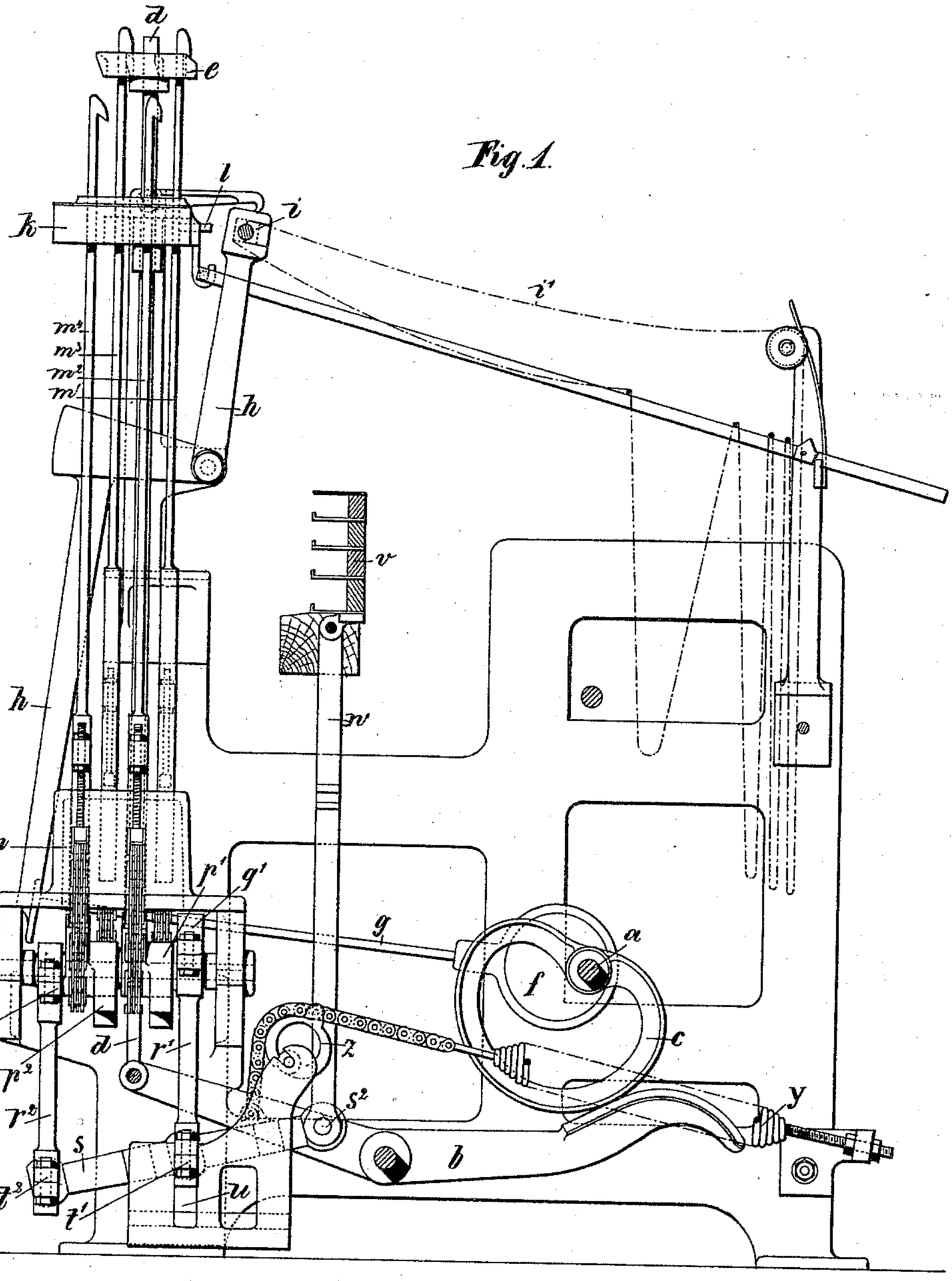
(No Model.) 2 Sheets—Sheet 1.

# F. HOFMANN.

## DROP BOX CHANGING MECHANISM FOR POWER LOOMS.

No. 500,768. Patented July 4, 1893.

*Fig. 1.*

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Inventor:
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(No Model.) 2 Sheets—Sheet 2.

# F. HOFMANN.

## DROP BOX CHANGING MECHANISM FOR POWER LOOMS.

No. 500,768. Patented July 4, 1893.

*Fig. 2.*

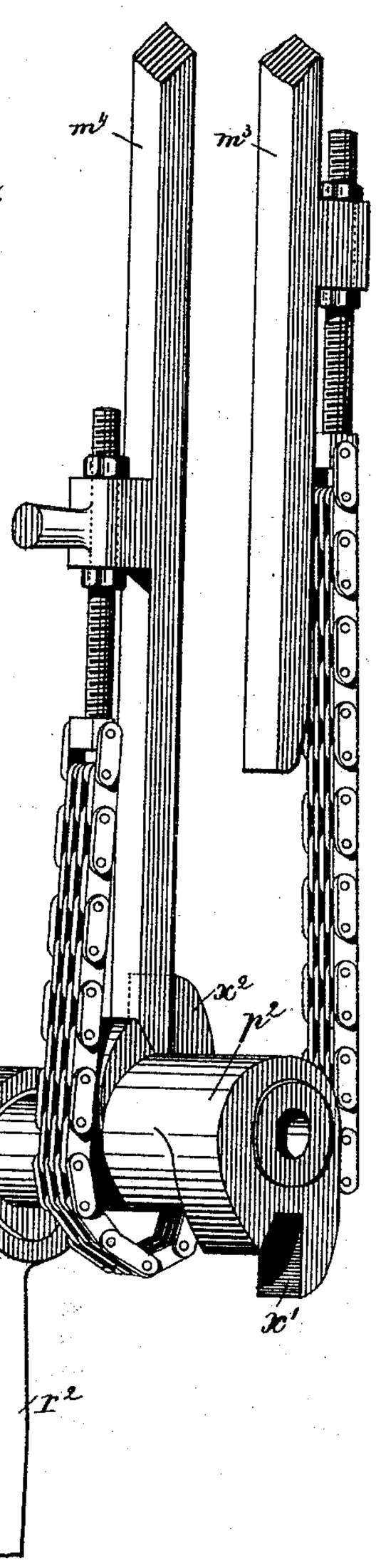



*Fig. 3.*

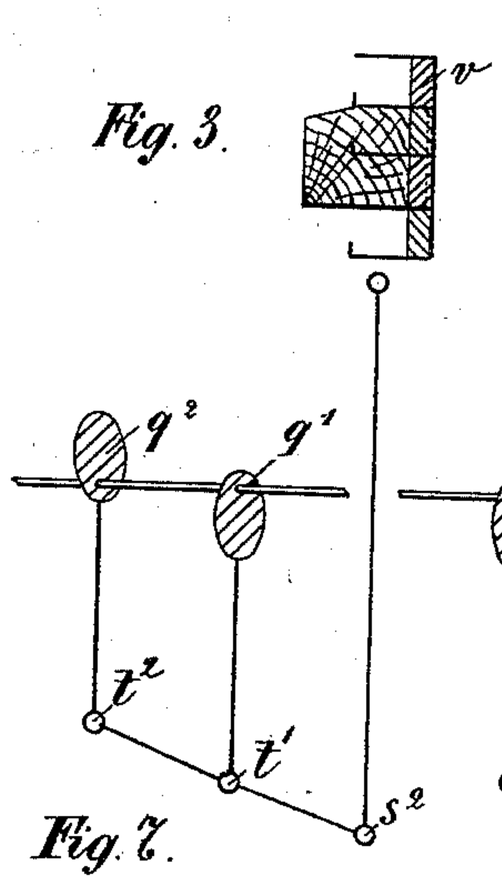



*Fig. 4.*

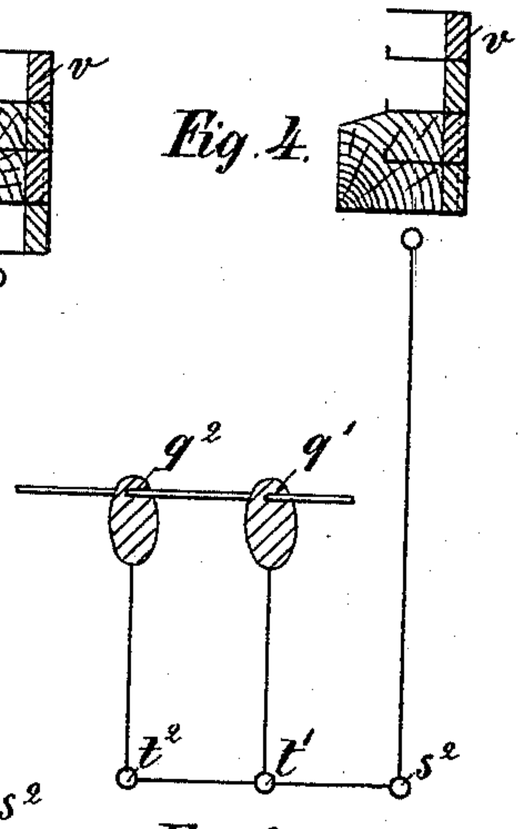



*Fig. 7.*

*Fig. 8.*

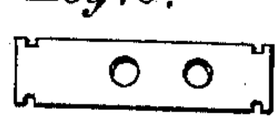


*Fig. 5.*

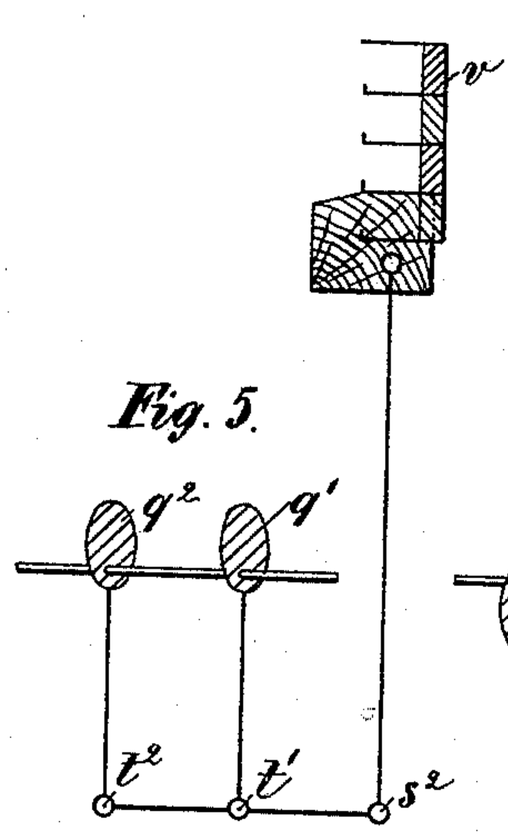



*Fig. 6.*

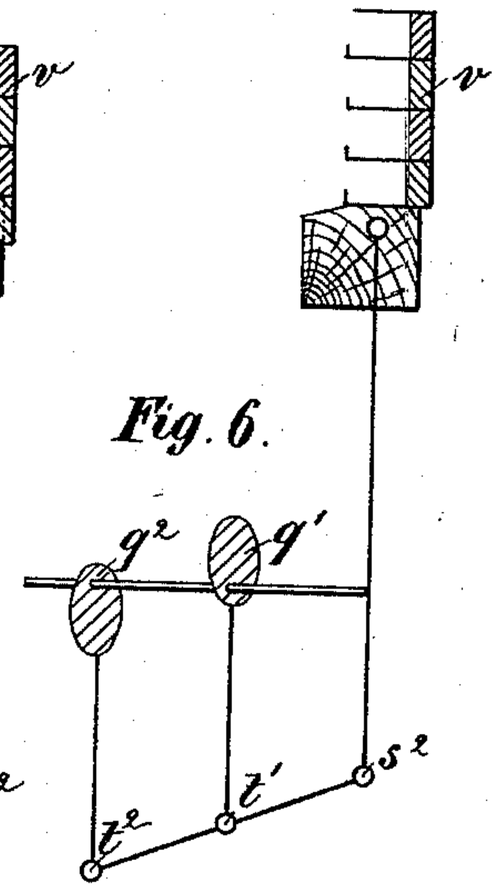
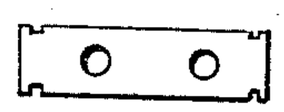



*Fig. 9.*

*Fig. 10.*



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Inventor:
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# UNITED STATES PATENT OFFICE.

FRIEDRICH HOFMANN, OF BARACCONNE, NEAR TURIN, ITALY, ASSIGNOR TO THE MASCHINENFABRIK RÜTI, FORMERLY KASPER HONEGGER, OF RÜTI, CANTON OF ZURICH, SWITZERLAND.

## DROP-BOX-CHANGING MECHANISM FOR POWER-LOOMS.

SPECIFICATION forming part of Letters Patent No. 500,768, dated July 4, 1893.

Application filed December 31, 1892. Serial No. 456,910. (No model.)

*To all whom it may concern:*

Be it known that I, FRIEDRICH HOFMANN, a subject of the King of Italy, residing at Baracconne, near Turin, Italy, have invented certain new and useful Improvements in Drop-Box-Changing Mechanism for Power-Looms, of which the following is a specification.

This invention relates to improved drop shuttle box, changing mechanism for power looms and has for its object to insure the bringing of the shuttle boxes to their proper positions without shock, even when working at a high speed.

Reference is to be had to the accompanying drawings, forming part of this specification, wherein—

Figure 1 is a sectional elevation showing the improved mechanism. Fig. 2 is a perspective view of a part thereof. Figs. 3, 4, 5 and 6 are diagrams illustrating its operation. Figs. 7, 8, 9 and 10, show the four pattern cards corresponding to the four pattern cards corresponding to the four positions of the mechanism.

The same letters of reference denote like parts in all the figures.

The mechanism receives its motion from the shaft *a* which by a cam *c* oscillates the lever *b* to which is attached the rod *d* carrying the griff *e* which is thereby raised at each revolution of shaft *a*. An eccentric *f* also fixed on shaft *a* imparts through the medium of connecting rod *g* and lever *h* the necessary horizontal oscillations to the pattern card cylinder *i* for the purpose of rotating the cylinder, changing the pattern cards, and moving the cylinder toward and away from the needle box *k* which contains four spring needles *l*, each needle being in connection with one of the lifting hooks $m'$, $m^2$, $m^3$, $m^4$. These hooks $m'$, $m^2$, $m^3$, $m^4$, are actuated in the usual way by the pattern cards acting through the needles, those of the hooks to whose needles perforations in the pattern cards coincide remaining in position to be engaged by the griff *e* while the remainder of the hooks are forced back so as not to be engaged thereby. The hooks $m'$ to $m^4$ are arranged behind one another as shown in Fig. 1 and work at the upper part through the needle box *k* and at the lower part in the guide *n*. $m'$ and $m^2$ constitute one pair and $m^3$ and $m^4$ another pair of hooks, the two hooks of each pair being connected by chains, bands or cords with and acting oppositely on a chain drum of which there are two $p'$ $p^2$ corresponding respectively to the two pairs of hooks. To each of the chain drums is attached an eccentric $q'$ or $q^2$ each drum and its respective eccentric being rotatable independently of the other upon a stationary shaft *o* and each chain drum has formed upon it two notched projections $x'$ $x^2$, each in the plane of the corresponding hook rod. At every ascent of the one or other hook of a pair, the eccentric $q'$ or $q^2$ connected with the drum thereby actuated is rotated through a semicircle so as to be brought either from its lowest to its highest position or vice versa, according to which hook of the pair is actuated. The two eccentrics $q'$ and $q^2$ are connected by links $r'$ $r^2$ to the drop box lever *s*, the link $r'$ being connected to the middle of the lever at $t'$ and the link $r^2$ with the end $t^2$ of the lever, the connection in both cases being made by a spherical joint and the socket of the joint $t'$ being guided in transverse vertical slots *u* in a guide bracket having a longitudinal vertical slot in which the lever *s* is guided whereby both lateral and longitudinal motion of said lever are prevented. The standard *w* jointed to the end $s^2$ of the lever *s* carries the drop box *v* which is raised and lowered to four different positions by the eccentrics $q'$ and $q^2$ being brought to the various relative positions shown diagrammatically in Figs. 3, 4, 5 and 6, the eccentrics in their various positions acting on the lever *s* and bringing it to the various heights and inclinations shown. For instance the position of the eccentrics and lever in Fig. 3 is produced by raising the hooks $m^2$ and $m^4$ and that shown in Fig. 4 by raising hooks $m^2$ and $m^3$ while those shown in Figs. 5 and 6 are produced by raising wires $m'$ $m^4$ and $m'$ $m^3$ respectively, the operation of the hooks being determined as before stated by the perforations of the pattern cards shown in Figs. 7, 8, 9 and 10. From these figures it will be seen that for each position of the shuttle box the simultaneous raising of one hook of each pair is requisite. If the same hook be raised twice,

in succession, it will not cause the drum in connection with it to rotate the second time but will only uselessly pull its chain.

The height of the shuttle box is accurately determined by the engagement with the chain drums of the hook rods which are not raised. For this purpose the lower ends of the hook rods are beveled and those which are not raised by the griff, ride upon the corresponding cam-like projections on the chain drums and each drops into the notch $x'$ or $x^2$ which is presented to it, when the other hook of the pair has been raised to such a height as to cause the eccentric attached to that drum to perform a half-turn. The weight of the shuttle box is counterbalanced by a spiral spring $y$, Fig. 1, connected to the lever $s$ by a chain passing over and engaging with an eccentric pulley mounted on the guide bracket of the lever $s$, the eccentricity of the pulley compensating for the variable height of the lever $s$.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, I claim—

1. In combination, the shuttle box with its support $w$, the lever $s$ connected to said support at one end, the independent shafts $p'$, $p^2$, the two eccentrics on said shafts arranged to have independent action, the eccentric rod $r^2$ leading from one of said eccentrics to one end of the lever and the rod $r'$ leading from the other eccentric to the middle part of the lever, the pair of lifter hooks $m'$, $m^2$, the chains connecting said rods to opposite sides of the shaft $p'$, the second pair of rods $m^3$, $m^4$ with their chains connecting them in like manner to opposite sides of the shaft $p^2$ and the means for operating the lifter hooks, substantially as described.

2. In combination, the shuttle box and its support, the lever $s$, the two shafts $p'$, $p^2$ having eccentrics and drums thereon with notched projections, the eccentric rods connected to the lever $s$, the two pairs of lifter hooks, the chains connecting them to opposite sides of the chain drums, said lifter hooks being arranged when in their lowest position to engage the notched projections of the drums and act as stops and the means for operating the lifter hooks, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

FRIEDRICH HOFMANN.

Witnesses:
RAFFAELE ROSS,
GIUSEPPE ROSSE.