No. 650,165. Patented May 22, 1900.

W. BRIMFIELD.

LOOM.

(Application filed June 30, 1898.)

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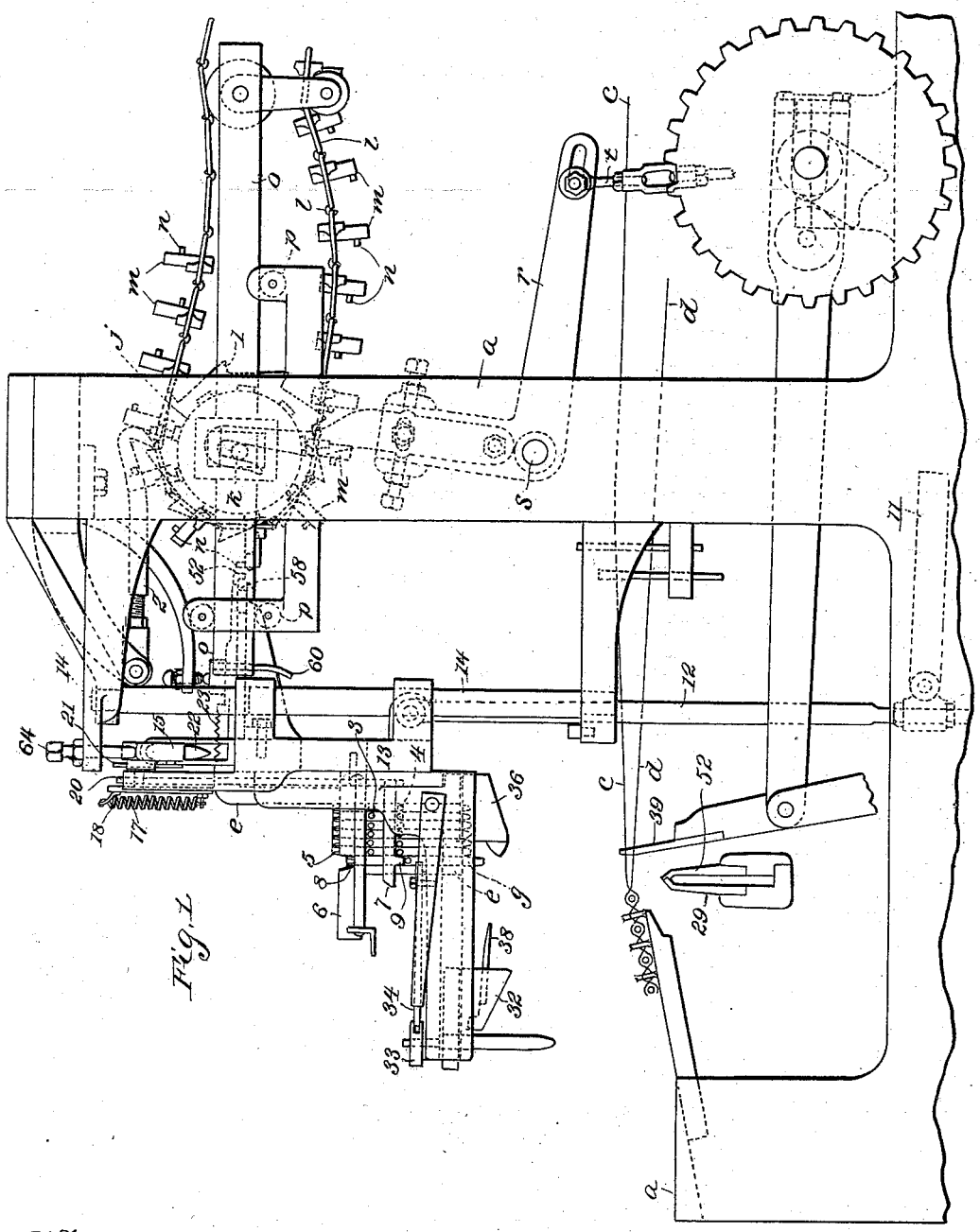

Fig. 1.

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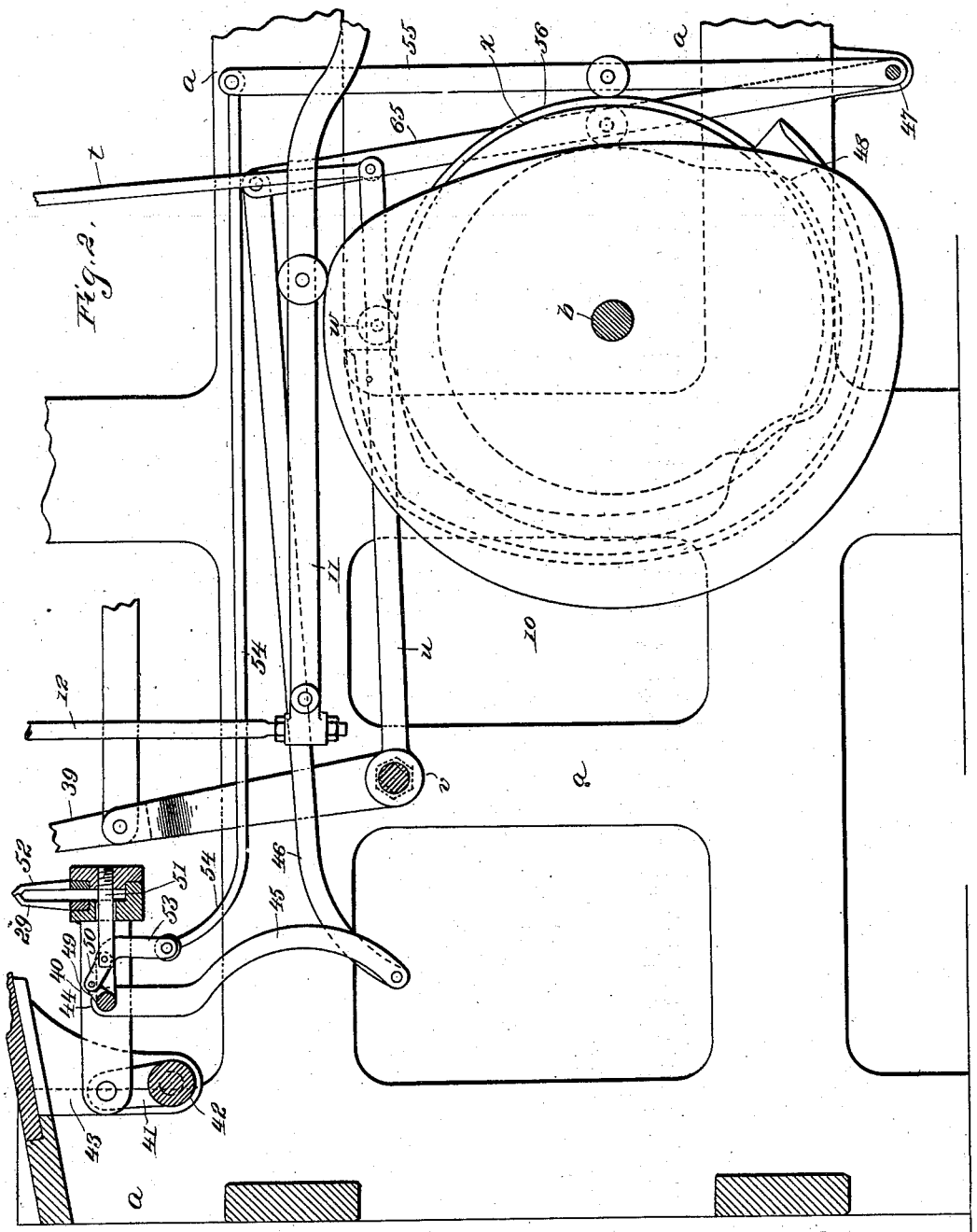

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Fig. 3

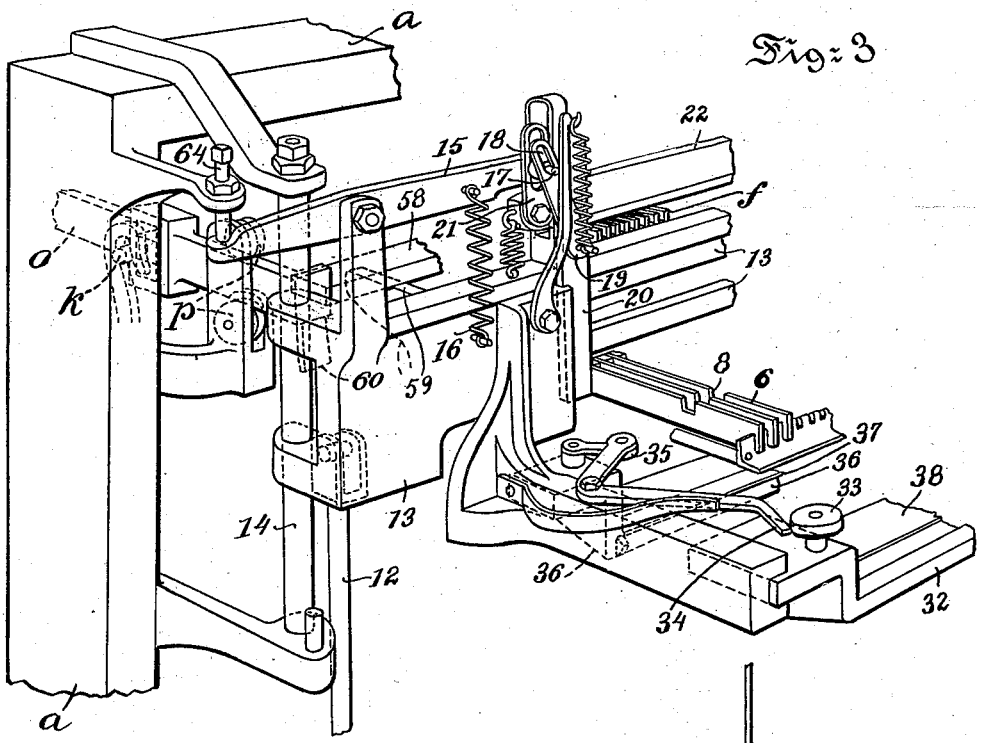

Fig. 4

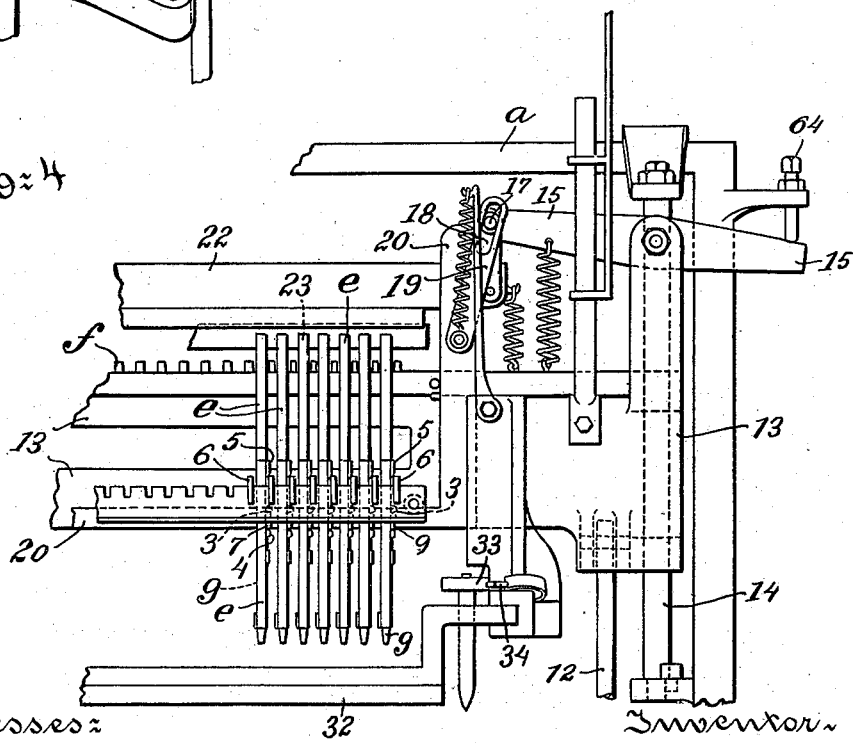

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Fig. 5.

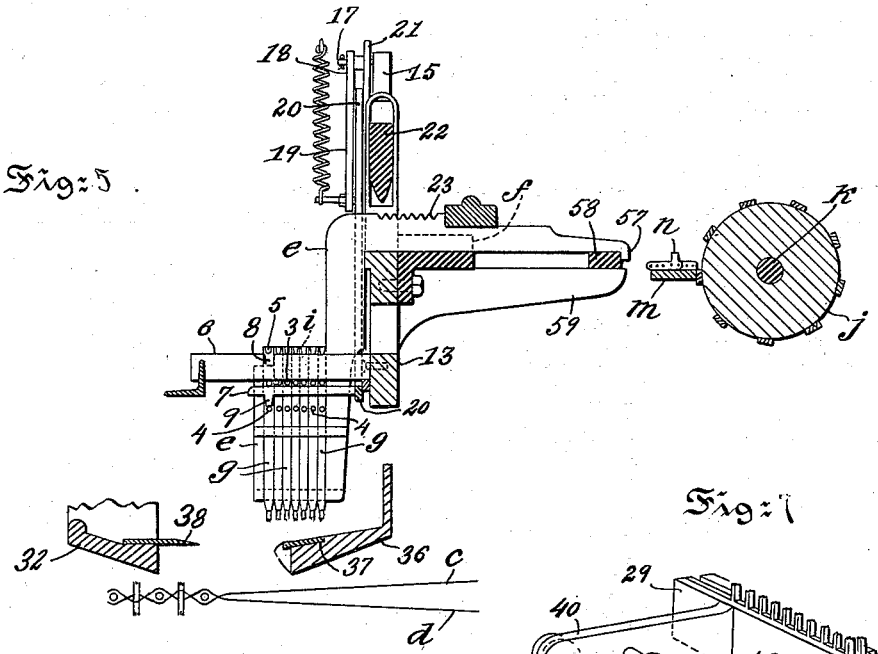

Fig. 7.

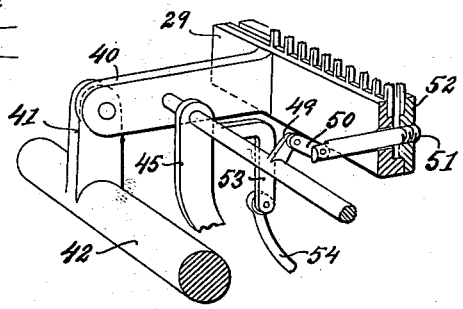

Fig. 6.

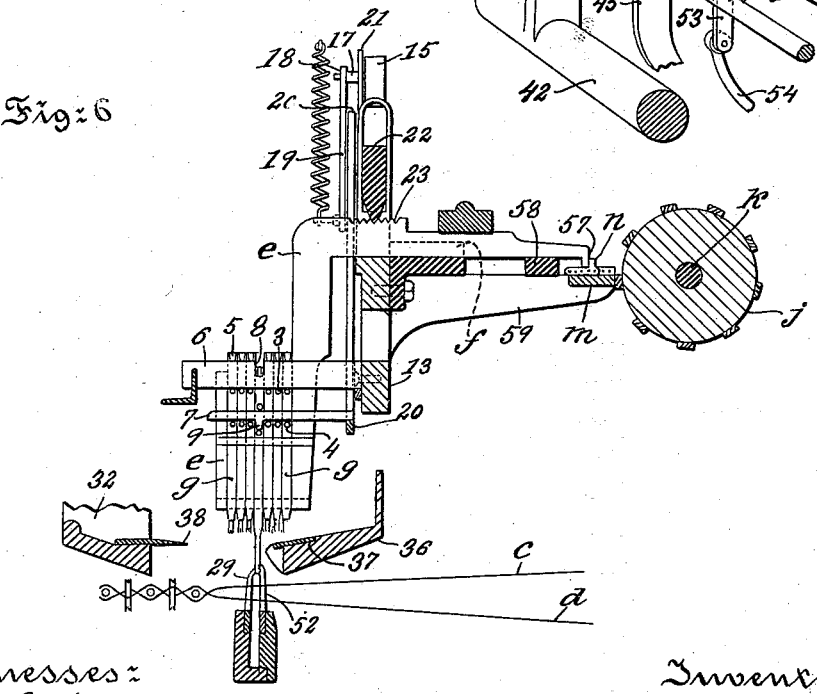

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Fig. 11

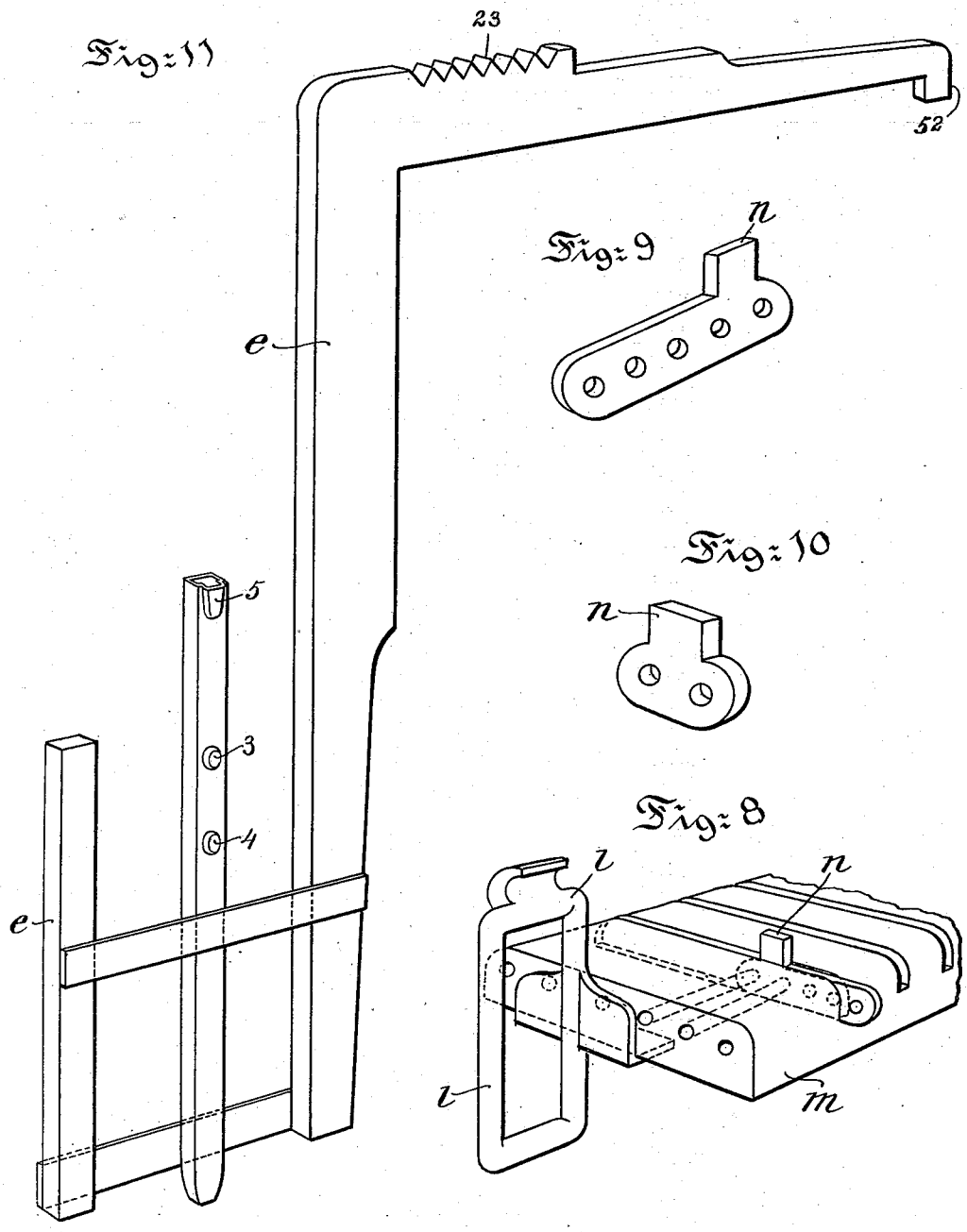

Fig. 9

Fig. 10

Fig. 8

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UNITED STATES PATENT OFFICE.

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LOOM.

SPECIFICATION forming part of Letters Patent No. 650,165, dated May 22, 1900.

Application filed June 30, 1898. Serial No. 684,778. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM BRIMFIELD, a citizen of the United States, and a resident of Blue Anchor, Camden county, New Jersey, have invented certain new and useful Improvements in Looms, of which the following is a specification.

My invention relates to an improvement in figuring-machines for the production of textile fabrics; and the object of my invention is to furnish a machine for the production of pile fabrics which will, in connection with a loom, produce such a fabric with the use of less yarn than is possible with the machines heretofore in use, which will produce the fabric direct from the yarn without first weaving the yarn in a chenille-loom, which will automatically and exactly reproduce any desired pattern to which the machine may be set, and which will produce a fabric at the same time of better appearance, cheaper, and of better quality than is possible with the mechanism heretofore in use for such purposes.

In the accompanying drawings, forming part of this specification, and in which similar letters and figures of reference indicate similar parts throughout the several views, Figure 1 is a side elevation of the upper part of a loom-frame furnished with my figuring device; Fig. 2, a side elevation of the lower part of the loom-frame, showing the cam-shaft, the cams which operate parts of the working mechanism, the levers intermediate between the cams and the figuring mechanism, &c.; Fig. 3, a perspective view of part of one side of the front of the loom-frame and of the figuring mechanism; Fig. 4, a front elevation of part of the figuring mechanism; Fig. 5, a side elevation, partly in section, of the figuring mechanism, the stops or pushers being out of contact therewith; Fig. 6, a similar view, the pushers being in gear with the yarn-tube carriers; Fig. 7, a perspective view of mechanism for opening and closing the nippers; Fig. 8, a perspective view of one end of the stop or pusher carrying slats, showing one of the adjustable pushers in position; Figs. 9 and 10, perspective views of different forms of adjustable stops or pushers. Fig. 11 is a perspective view of one of the yarn-tube carriers.

a is the main frame of a loom of any ordinary construction; *b*, Fig. 2, a cam-shaft, which may be driven in any convenient manner.

c d are the warp-threads of the fabric, which are operated by the mechanism of the loom (not shown) in the usual manner.

e represents yarn-tube carriers, which are carried in a guide *f*. (Best shown in Figs. 3 and 4.) The guide *f* is furnished with parallel grooves, as shown, to receive and guide the carriers in their forward and backward movements, and the carriers, each of which can move independently of the others, are placed side by side and extend across the whole front of the machine. Each carrier carries a number of yarn-tubes *g*, in the present instance seven, which number may be increased or diminished, as desired. The yarn-tube carriers are preferably constructed of metal. The set carried by each carrier are placed one directly back of the other and longitudinally of the loom, and the corresponding tube of each set of tubes forms a straight line transverse of the loom when in normal position. The tubes of each transverse row of tubes carry, ordinarily, the same color of yarn, and for purposes of this description they will be so described, and the tubes of each longitudinal row carry yarn of different colors.

j is a pulley or cylinder carried on a shaft *k*, carried in suitable bearings in a movable frame *o*, around each end of which passes a belt, preferably an endless belt *l*, Fig. 1.

m, Figs. 1, 4, 5, and 11, represents slats carried by belts *l*; *n*, stops carried by slats *m*, the size and position of which determine the movement of the several yarn-tube carriers and the pattern to be formed in the fabric.

The frame *o*, which carries the shaft *k* of the pulleys or cylinder *j*, is carried by the frame *a* of the loom and preferably upon rollers *p*, Figs. 2 and 3, in order to overcome friction as much as possible. The frame *o*, the cylinder *j*, and the chains *l* and connected parts are moved back and forth as follows:

r is a bell-crank lever pivoted to the frame *a* at *s*. The lower arm of this lever is attached to one end of a rod *t*, the other end of which is attached to one end of a lever *u*, Fig. 2, which is pivoted at *v* and which is furnished with a friction-roller *w*, which is en-

gaged by a cam x, carried by cam-shaft b. The upper arm of bell-crank r, Fig. 1, is connected in any suitable manner with the frame o. As shaft b is revolved the outer end of lever u is raised and lowered by cam x. The raising of lever u causes frame o and connected parts to be moved outward. The lowering of this lever causes the frame and connected parts to be moved inward.

Upon the shaft k is a ratchet-wheel 1, and carried by the frame a is a pawl 2. When the frame o is moved outward, the pawl 2 engages one of the teeth of ratchet 1, and when this frame is moved inward this pawl draws the ratchet around one space, turning cylinder j, bringing one of the slats m into operative position in front of this cylinder. Suppose one of the slats to be in operative position in front of the cylinder and frame o to be moved forward. As this takes place the several stops n, carried by slat m, will engage each an end of a yarn-tube carrier e, and the several carriers thus engaged will be pushed forward, as best shown in Fig. 6. The remaining carriers that have not been engaged will remain in their normal position—that shown in Fig. 5. The distance that the carriers are moved depends upon the position of stops n on slat m. If they be at the forward edge of this slat, they will be moved to their greatest forward position, if at the rear to their least forward position, and an intermediate position will cause them to be correspondingly moved. As the yarn-tube carriers are moved forward the yarn-tubes are moved with them, and the distance that the carriers are moved determines which of the several tubes carried by them will be brought to the working-point.

The yarn-tubes are furnished upon one side with two projections 3 4 and upon their upper end with a projection 5, all of which are best shown in Figs. 5 and 6. Normally the projections 5 rest upon the top of a stationary guide 6 and the projections 3 upon the top of a movable arm 7, Figs. 3, 4, 5, and 6, which is carried by a vertical rod 20. The guide 6 is furnished with a notch 8 and the arm 7 with a downwardly-projecting finger or lug 9. (Best shown in Figs. 5 and 6.) The frame o having been moved forward and the stops n having engaged and pushed forward the several yarn-tube carriers until the desired tubes are in line with notch 8 and lug 9, a cam 10, carried on cam-shaft b, Fig. 2, causes a lever 11, Fig. 2, to fall. The outer end of lever 11 is connected to one end of a rod 12, Figs. 1, 2, 3, and 4, the outer end of which is connected to a movable frame 13, which is carried by and vertically movable upon rods or guides 14, carried by the main frame of the loom. As the lever 11 falls the frame 13 and the parts carried by this frame fall with it, and a lever 15, Figs. 3 and 4, which is pivoted on the frame 13, is lowered.

16 is a spring, one end of which is attached to the inner side of lever 15 and the other to frame 13.

64 is an adjustable stop carried by loom-frame a, which is adapted to bear against the upper outer end of lever 15, depressing the outer end of this lever when the frame is in its raised position and raising its inner end, as shown best in Fig. 4. When the frame 13 falls, the lever 15 falls with it, and immediately the spring 16 commences to draw down the inner end of the lever which carries a pin 17, which engages an arm or link 21, attached to a rod 22, which extends completely across the front of the machine, and the lower end of which is sharpened, as best shown in Figs. 5 and 6. The sharpened end or edge of this blade engages one of the teeth or notches 23, formed on the top of each of the tube-carriers e and brings the row of yarn-tubes into perfect alinement. The teeth or notches 23 correspond in number with the number of yarn-tubes carried by each carrier e, and the distance of one tooth from the next corresponds exactly to the distance from the center of one yarn-tube to the center of the next adjacent one. In other words, the pitch of the teeth 23 is equal to the pitch of the yarn-tubes. Both sides of the loom are furnished with the parts above described. A further downward movement of frame 13 causes pin 17 to engage the bottom of slot 18 in a connecting-rod 19, the lower end of which is attached to rod 20, which carries the arm 7. As soon as the pin 17 reaches the bottom of slot 18 it pushes down rod 19, which pushes down rod 20, which carries arm 7, and the lug 9 on this arm engages projection 4 on the yarn-tube which is in line with it, and the lug or projection 5 on the top of this particular tube entering notch 8 the yarn-tube is lowered, as shown in Fig. 6. The frame 13 having reached the end of its downward stroke the nippers 29, Figs. 1 and 2, of which there is one for each yarn-tube, are raised, passing between the warp-threads, opened, and engaged with the threads passing downward out of the tubes. The frame 13 is now raised a distance equal to the length of pile required and stops, which movements are given by the shape of the cam 10. When the frame 13 stops, a cam 30 on the cam-shaft b, through a lever 31, draws arm 25 inward, and the upper end of this arm engages and moves in a slide 32, which carries a roller 33, which engages a bell-crank lever 34, which through a link 35 is connected to a slide 36, which carries one blade 37 of a shears, the other blade 38 of which is carried by the slide 32. The operation of slides 32 36 causes the shears to cut off the threads passing downward through the tubes and held by the nippers. As soon as these threads are cut the cam 10 and connected parts raise the frame 13 and connected parts to their highest position and the several parts take position, as at first described. While the frame 13 is rising the nippers 29 are being lowered and draw

down through the warp-threads the cut yarn that they are holding, and when this yarn has been drawn down such a distance that its ends will project equally on each side of the warp-threads it is released by the nippers, a shot of filling is thrown in behind it by the loom, and the reed 39, which is actuated in any convenient manner, beats it up as usual.

The mechanism for operating the nippers is as follows: 40, Figs. 2 and 7, is an arm upon which one jaw of the nippers is carried. This arm is pivoted to one end of a link 41, which is pivoted at 42 to a bracket 43. Each side of the machine is similarly equipped. 44 is a pivot carried by arm 40. 45 is a lever depending from pivot 44, to the lower end of which is pivoted a link 46, the other end of which is pivoted to the upper end of an arm 65, the lower end of which is pivoted to frame *a* at 47. The arm 46 is operated by a cam 48 on cam-shaft *b*, which operates to throw arm 46 in and out, the outward movement operating to push rod 46 forward and to raise lever 45, arm 40, and the nippers, and the inward movement to lower these parts.

The nippers are opened and closed as follows: 49 is a crank fast to pivot 44. 50 is a link pivoted to the end of crank 49 and to a rod 51, which is connected to the movable jaw 52 of the nippers. 53 is an arm attached to pivot 44. 54 is a rod, one end of which is attached to the lower end of arm 53 and the other end to the upper end of a lever 55, which is pivoted at 47 to frame *a*. 56 is a cam which is carried on shaft *b* and which operates to throw lever 55 in and out. When cam 56 throws lever 55 out, the jaws of the nippers are closed. When the lever 55 is moved in, rod 54 pushes arm 53 forward, rocks pivot 44, and causes crank 49 and link 50 to assume a position in line with one another. This pushes out rod 51 and opens the jaws of the nippers.

The several shafts on cam *b* are so shaped and placed that the several movements dictated by them will take place at the proper time.

The pattern to be formed in the fabric is first designed in the usual manner. The stops *n* on the slats *m* are then set so as to correspond with the pattern—that is, the stops regulating the use of one color of yarn are all preferably on one line on the slat and the stops of each other color are all preferably on their own particular line. The design is changed, as desired, by changing the positions of the stops, which can be moved in or out on the slats in order to bring any one of the yarn-tubes to the operative position, as heretofore described. The slats and stops form what may be called an "adjustable card." As has been described before, the forward movement of the frame *o* causes the stops *n* to engage and move forward the carriers *e*, so as to bring the desired yarn-tube to the operative position. As the carriers are moved forward their inner ends, which form a hook 57, engage and move inward a bar 58, which slides upon guides 59. After the yarn has been drawn out of the tubes *g* and cut off, as described, and after the frame 13 has been again raised to its original position the frame *o* is moved backward, and projections 60, Fig. 1, on this frame engage the ends of bar 58 and draw it back and with it carriers *e*, that have been moved forward. The carriers *e* are thus returned to their first position. Upon the backward movement of frame *o* pawl 2 engages one of the teeth of ratchet 1, turning shaft *k* and cylinder *j* and bringing a new slat *m* and its stops *n* into operative position in front of the cylinder.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a figuring mechanism for looms, in combination, a connected series of slats, a series of stops mounted on each slat, each stop being adjustable laterally on its slat and having an operative portion projecting from the face thereof, and means for bringing the stops of successive slats into position to adjust the yarn-carrying devices.

2. In a figuring mechanism for looms, the combination with a series of sets of yarn-carrying tubes, and a movable holder for each set, of a movable series of slats arranged transversely of the loom, a series of stops connected to each slat and adjustable laterally thereof, said stops having projecting portions adapted to operate upon the tube-carriers, and means for bringing the stops of consecutive slats successively into engagement with said tube-carriers.

3. In a figuring mechanism for looms, the combination of a connected series of slats, a series of transverse slots in each slat, a series of stops mounted in said slots in each slat, said stops being adjustable laterally of the slat and having projecting portions adapted to select the different yarns for the pattern, means for locking the stops in any desired relation on the slats, and means for moving the series of slats to bring them successively to operative position.

4. In a figuring mechanism for looms, the combination of a connected series of slats, a series of transverse slots in each slat, a series of stops mounted in said slots in each slat, said stops being adjustable laterally of the slat and having projecting portions adapted to select the different yarns for the pattern, means for locking the stops in any desired relation on the slats, and means for moving the series of slats to bring them successively to operative position, a series of yarn-tube carriers and means for bringing said slats successively into engagement with said carriers.

5. In a figuring mechanism for looms, a series of slats, a series of stops adjustably connected to one face of each slat, and having portions projecting from said face, a rotating support for said slots about which said slats pass in radial arrangement, and means for

moving said support to give each slat an edgewise forward reciprocation as it comes into operative position.

6. In a figuring mechanism for looms, the combination with a connected series of slats, a series of adjustable stops mounted on each slat, and means for bringing the successive slats into operative position, of a series of sets of yarn-carrying tubes, a movable carrier for each set, means for bringing the slats into engagement with the tube-carriers to select the desired yarn-tubes, and means for advancing each yarn-tube selected from its normal position to render the yarn carried more accessible.

7. In a figuring mechanism for looms, the combination with a set of yarn-tubes, arranged side by side, and provided with projecting lugs, of an alining bar upon which lugs normally rest, said bar having in its edge a notch adapted to receive one of said lugs, means for moving the tubes to bring a desired tube into position opposite said notch, and means for depressing the selected tube to bring its lug into the notch.

8. In a figuring mechanism for looms, the combination with a fixed bar having a notch in its upper edge and a movable bar having a projection corresponding to said notch, of the yarn-tubes, each having three projections or shoulders, means for adjusting said tubes to bring the selected tube opposite the notch in the fixed bar, means for depressing the movable bar to advance the selected tube, and means for raising the selected tube into alinement with the remaining tubes of the set.

9. In a figuring mechanism for looms, the combination with a series of slats, each having a series of transverse slots in one of its faces, of a sliding piece mounted in each slot, each sliding piece having an operative projecting portion and a series of perforations by means of which it may be interlocked with the slat in different positions.

10. In a figuring mechanism for looms, the combination with a series of slats, a rotating support for said slats, adjustable stops upon the slats, means for causing said slats to stand radially to the rotating support in passing around the same, means for imparting bodily movement to said support, whereby the operative slat is given an edgewise forward movement; of a series of movable yarn-tube carriers having portions extending into the path of the operative slat, said carriers being adjusted by the edgewise movement of said slat, the alining bar for the carriers, and a set of yarn-tubes mounted on each carrier.

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