

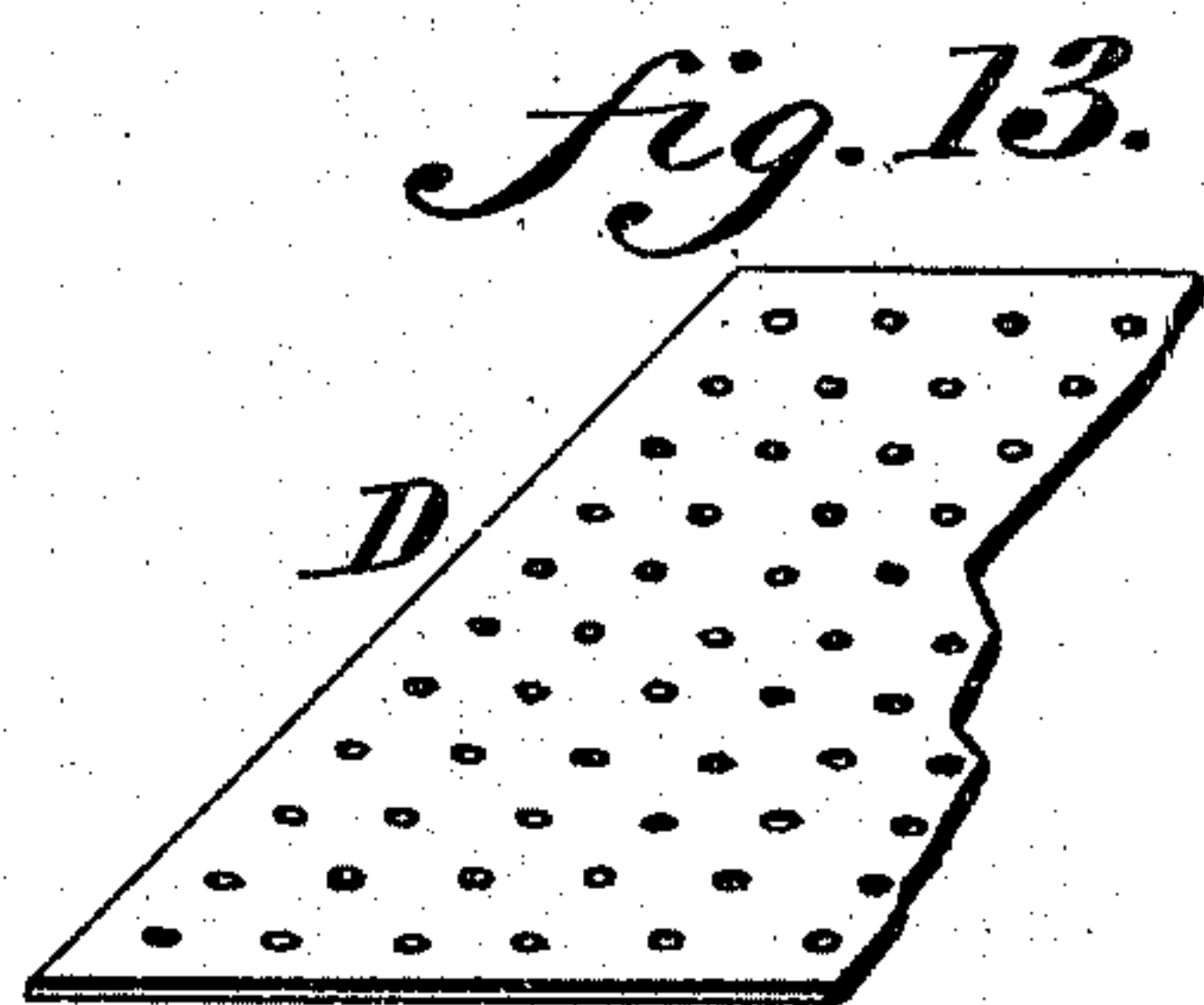
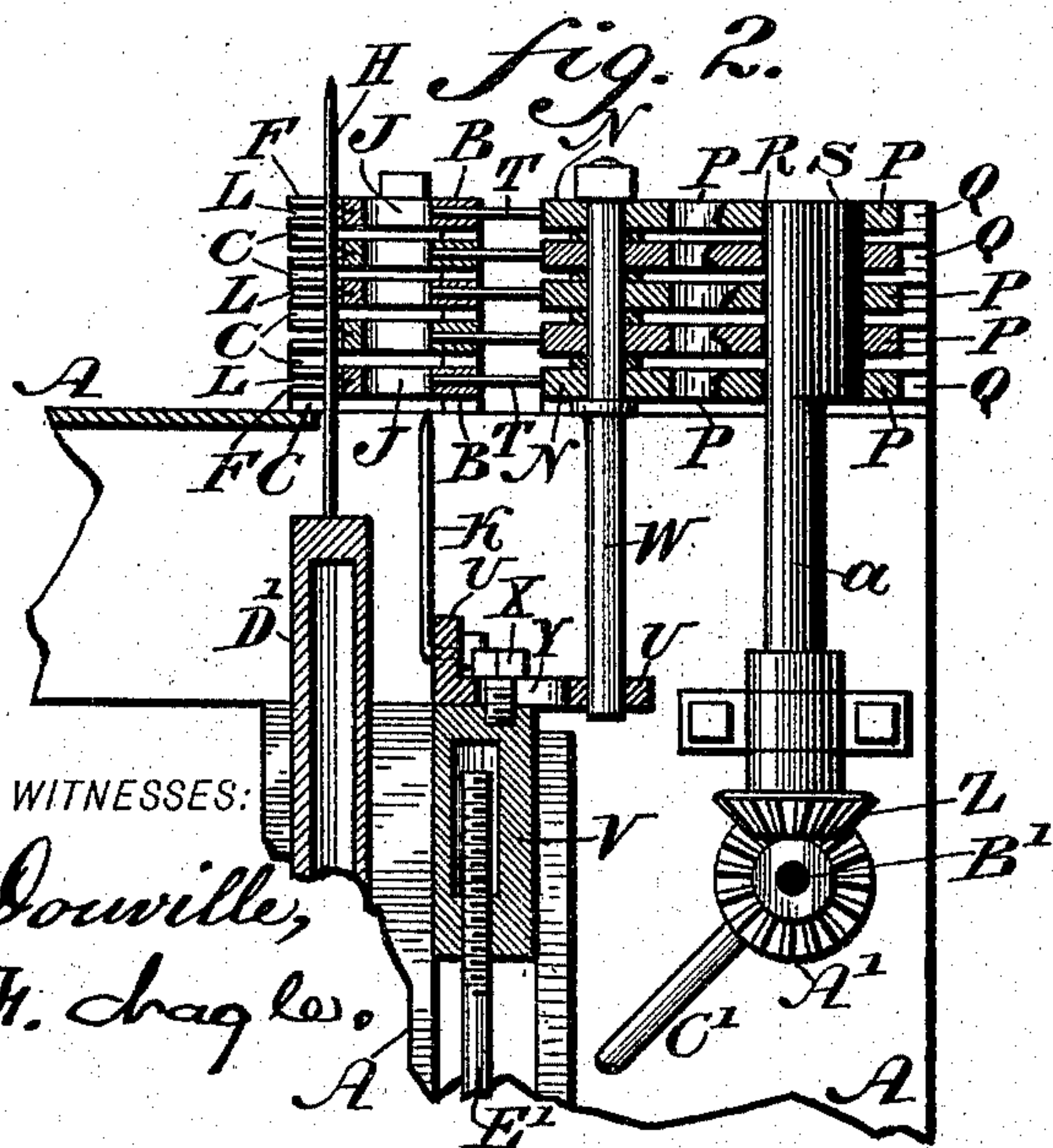
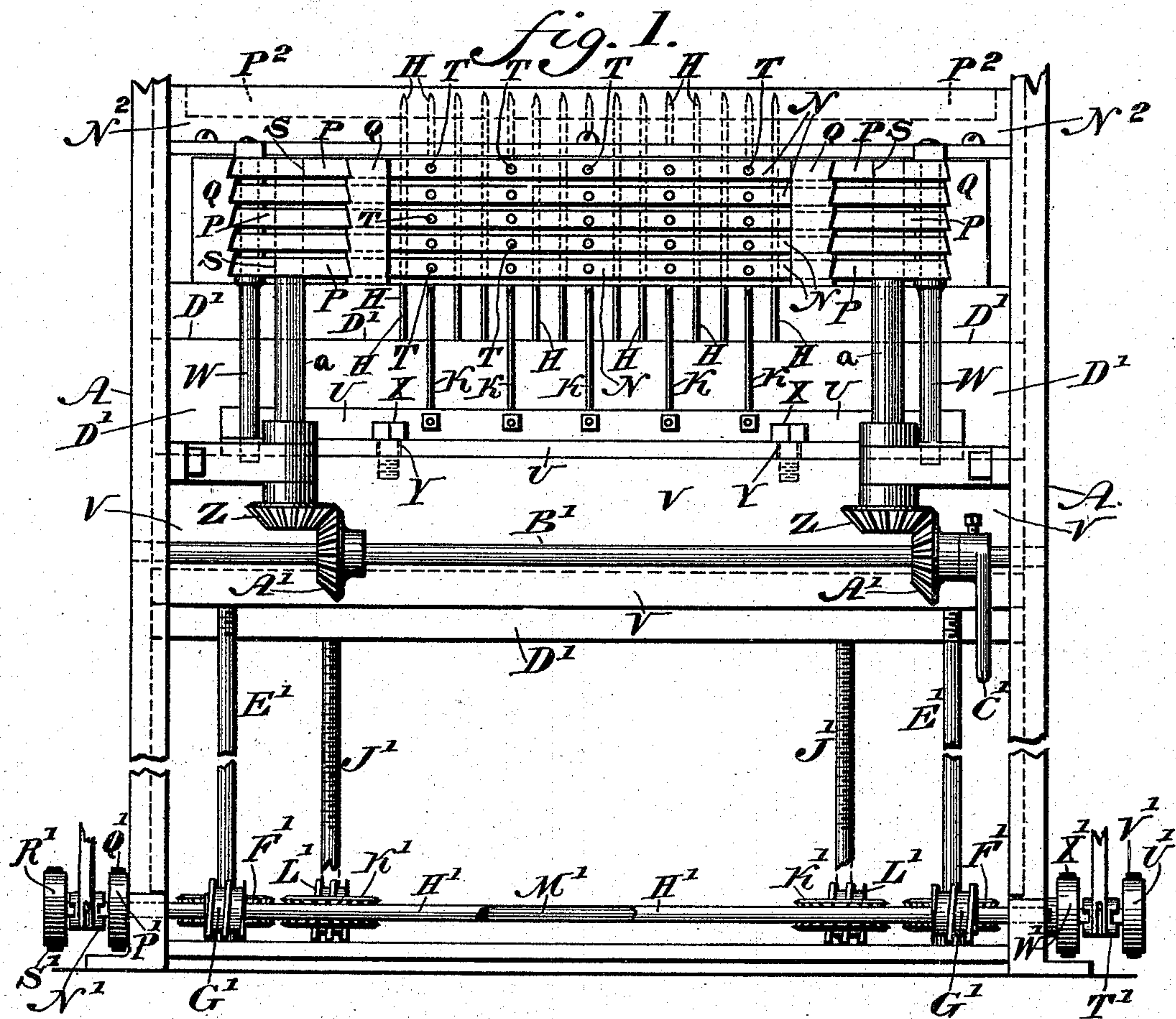
(No Model.)

2 Sheets—Sheet 1.

R. J. GRUBB.
APPARATUS FOR MAKING RUGS, &c.

No. 527,971.

Patented Oct. 23, 1894.



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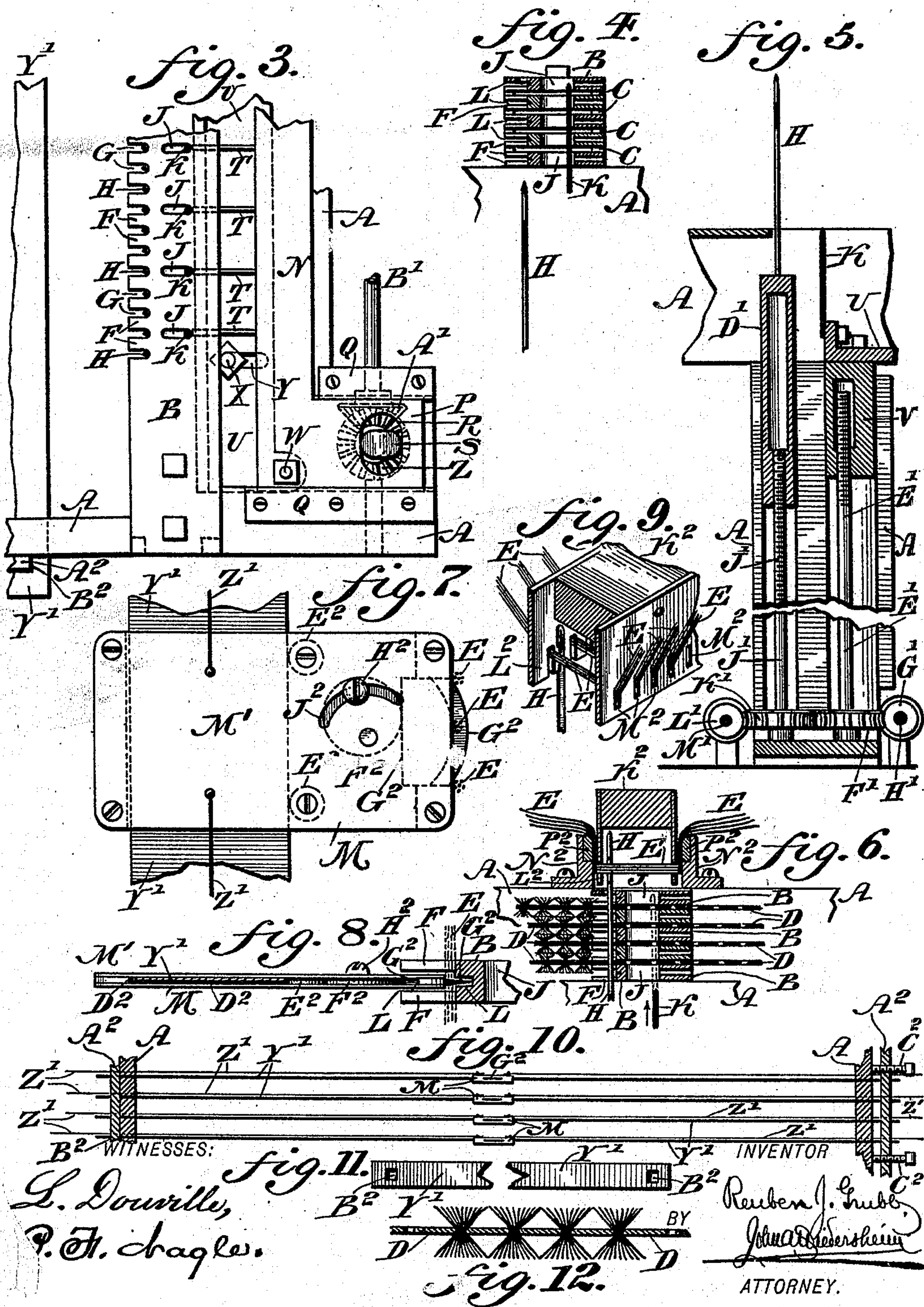
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UNITED STATES PATENT OFFICE.

REUBEN J. GRUBB, OF PHILADELPHIA, PENNSYLVANIA.

APPARATUS FOR MAKING RUGS, &c.

SPECIFICATION forming part of Letters Patent No. 527,971, dated October 23, 1894.

Application filed September 1, 1893. Serial No. 484,536. (No model.)

To all whom it may concern:

Be it known that I, REUBEN J. GRUBB, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Apparatus for the Manufacture of Rugs, Mats, &c., which improvement is fully set forth in the following specification and accompanying drawings.

My invention relates to improvements in apparatus for manufacturing rugs, mats, &c., of the class formed of a body or piece of suitable material, with tufts of yarn passed through the same and appearing on the faces thereof.

Figure 1 represents a front elevation of the apparatus employed for manufacturing a rug, mat, &c., in accordance with my invention. Fig. 2 represents a partial side elevation and partial vertical section of a portion thereof. Fig. 3 represents a plan view of a portion of the apparatus. Fig. 4 represents a vertical section of a portion of the apparatus. Fig. 5 represents a partial side elevation and partial vertical section of the apparatus. Fig. 6 represents a vertical section of a portion of the apparatus, certain parts being in different positions from those shown in Fig. 4. Fig. 7 represents a plan view of the knife employed for cutting the yarn and connected parts thereof. Fig. 8 represents a side elevation of the knife and adjacent parts. Fig. 9 represents a perspective view partly sectional, of the frame for locating the yarn on the apparatus. Fig. 10 represents a partial side elevation and partial vertical section of a portion of the apparatus, on a reduced scale. Fig. 11 represents a plan view of a strip or band on which a knife travels, same scale as Fig. 10. Fig. 12 represents a sectional view of a portion of a rug, mat, &c., as produced by the apparatus, on an enlarged scale. Fig. 13 represents a perspective view of the body or piece of material employed in the manufacture of a rug, mat, &c., in accordance with my invention.

Similar letters of reference indicate corresponding parts in the several figures.

Referring to the drawings: A designates the frame of the apparatus, in the upper portion of which are secured a series of plates B, one placed above another and separated,

leaving spaces C between adjacent plates, so that bodies or pieces D of material may be placed in the same, it being noticed that said bodies, which may be made of soft rubber or other suitable material, are perforated so that yarn or thread E may be inserted in the perforations, so as to form tufts on both sides of said bodies, as will be hereinafter described.

The plates B are serrated as at F, forming the slots G which are adapted to receive hooks H, which draw the yarn or thread E through the perforations in the bodies, said hooks being connected with a rising and falling cross head D', guided in the frame A, and said cross head D' receiving motion by means of screws J' which are rotated by worm wheels K' thereon which mesh with worms L' on a shaft M'.

N designates sliding plates, the same being in line with the plates B and provided with the side extensions P, which travel in the guides Q secured to the frame A. See Fig. 3.

Secured to the edges of the plates N are fingers T which are guided in the plates B, and whose free ends are adjacent to the slots J in said plates B, and adapted at certain times to press against the feeding pins K working in said slots, so as to advance the said feeding pins and carry with them the bodies D, for a purpose to be hereinafter described. In said extensions P of the plates N are the openings R in which work the eccentrics S, said eccentrics being secured to the shafts α having thereon the bevel gear wheels Z which mesh with the bevel gear wheels A' on the shaft B', which is journaled in the frame A. Secured to said shaft B' is a lever C' whereby the same can be rotated, thus imparting motion to the shafts α and thereby to the eccentrics S and plates N.

The feeding pins K are secured to a sliding plate U, which is guided on a rising and falling cross head V, the latter being mounted on the frame A. The motions imparted to the sliding plates N are transmitted to said plate U by means of rods W, which are connected with said plates N and U, the lower ends of said rods being loosely fitted in openings in the plate U, so as to permit said plate to rise and lower on said rods without transmitting similar motions to said rods W. See Fig. 2.

The plate U is connected with the cross head V, by bolts X, which enter slots Y in

said plate, it being evident that by this connection said plate will rise and fall with the cross head V, and also move to and fro with the sliding plates N, so as to press the fingers T against the feeding pins K and move the same with the body D, the object of these various motions being to cause the feeding pins K to pass through the perforations in the bodies D and when required to carry the latter forward. The plates B are also provided with grooves L, in which travel the edges of knives M adapted to cut the yarn passed through the perforations in the bodies D. See Fig 8.

Plates Y' extending from the ends of the frame A, parallel with the plates B serve as guides for the knives M, said knives being adapted to be drawn to and fro by means of wires Z' or in lieu thereof cords, chains, &c., which may be operated by hand, or in any suitable manner, it being noticed that the shanks M' of the knives are slotted as at D² see Fig. 8 to receive said plates Y' and slide therein, the friction being greatly reduced by rollers E² mounted within said slots, and contacting with the edges of the plates when the knives are in motion.

The plates Y' are kept taut on the frame A by means of pins A² which enter openings B² in the plates, it being noticed that one of said pins A² is engaged by screws C² and that when it is desired to tighten said plates by properly rotating the screws C² they cause the pin A² to move from the frame A, and thus prevent sagging of said plates. See Fig. 10.

Motion is imparted to the cross head V by screws E' which are rotated by the worm wheels F' thereon which mesh with worms G' mounted on a shaft H'.

In order to cause the screws E' to revolve from right to left, a clutch N' secured to the shaft H' is caused to engage a pulley P' loosely mounted on said shaft, and driven by an open belt Q'. When it is desired to reverse the motion of the screws E', the clutch N' is caused to engage a pulley R' loosely mounted on the shaft H', and driven by a cross belt S', it being evident that the cross head V will be either raised or lowered according to the direction in which the screws E' revolve.

In order to cause the screws J' to revolve from right to left, a clutch T' secured to the shaft M' is caused to engage a pulley U' loosely mounted on said shaft, and driven by a cross belt V'. When it is desired to reverse the motion of said screws J', the clutch T' is caused to engage a pulley W' loosely mounted on the shaft M' and driven by an open belt X'.

Mounted within the shanks M' of the knives M are eccentrics F² adapted to act as an abutment for the knife blades G², it being noticed that any wear on said blades may be taken up by said eccentrics, and the latter after being adjusted may be firmly retained in posi-

tion by screws H² working in segmental slots J² in said shanks M'.

K² designates a frame provided at opposite sides with slots L² and M² through which is passed the yarn to be supplied from a reel, cop, &c., the slots L² being open from below, as clearly shown in Figs. 6 and 9.

Secured to the frame A above the plates B is a box N² open at top and bottom and formed of pieces which have on their inner upper edges the cushions P² of soft rubber or other suitable material. The frame K² is adapted to be seated in said box N² and when in position the cushions P² contact with the sides of said frame K² and engage the yarns E so that the portion thereof within said box is held perfectly taut when fed to the hooks H, but when the latter exert a downward force or pull on the said yarn, the slight tension of the cushion on the yarn is overcome to such an extent that it permits the movement of the yarns from both sides, so that a double thread may be drawn through each of the openings in the bodies D.

The operation is as follows: A body or piece D of perforated rubber, or any suitable material is inserted, in the present case by hand, in each space C, and advanced therein until the foremost row of openings in said body is in alignment with the row of hooks H, which latter are in their lowermost position, or below the plates B. See Fig. 4. The clutch T' is then caused to engage with the revolving pulley U', which owing to the worms L' and worm wheels K', cause the screws J' to revolve, and thereby raise the cross head D', so that the hooks H secured to the same will enter and pass through the aligned perforations in the several bodies D, and their noses project above the latter so that the yarn in the frame K² may be supplied to said hooks. See Figs. 6 and 9. The clutch T' is disengaged from the pulley U' as soon as the hooks H have been raised the desired distance. The frame K² having had yarn passed between the slots L², in the present case by hand, and drawn through its slots M², see Fig. 9, is inserted in the box formed by the pieces N² as shown in Fig. 6, it being noticed that the distance between the slots L² and the distance between the slots M² is the same as that between the hooks H. See Fig. 9. The clutch N' is then caused to engage with the revolving pulley P', which owing to the worms G' and worm wheels F' cause the screws E' to revolve and thereby raise the cross head V, which was in its lowermost position, so that the feeding pins K secured to the same will enter the aligned perforations in the several bodies D, see Fig. 6, the clutch N' being disengaged from the pulley P', when said feeding pins K have been raised the desired distance. The clutch T' is then caused to engage with the revolving pulley X', which owing to the worms L' and worm wheels K' cause the screws J to revolve in an opposite direction from that de-

scribed in connection with the pulley U', so that the cross head D' is lowered, and with it the hooks H, the latter in descending engaging and carrying with them the yarn they received from the frame K², and drawing a doubled strand of the same through the perforations in the bodies D. Each knife blade G² which is normally at one extremity of the supporting plate Y' is then drawn from one end of the latter to the opposite one by the wires Z', either from right to left or vice-versa, as the case may be, so as to cut the tightly held yarn in their path, as shown in Figs. 6 and 8, and thereby disconnect one body D from another and leave the yarn in the perforations in each body D project from both faces thereof, so as to form tufts, as shown most clearly in Fig. 12. The parts are so timed that when one row of openings in the body pieces has been tufted, the operation of the sliding plates N laterally moves the rods W and the plate U with the feeding pins so that the body pieces D are advanced in the frame and another row of openings is in line with the hooks H, when the latter are rising, and the operation as before described is repeated. The yarn is placed in the frames K² by hand or by any suitable mechanism, before each rising of the hooks H so as to be in the path of the said hooks on their descent and be engaged by the same.

The hooks H are comparatively thicker than the yarn or thread they carry, so that the former in passing through the perforations in the bodies D, temporarily stretch the material thereof and increase the size of said perforations, thus providing means whereby the yarn in the hooks may easily pass through said perforations, after which the walls of the perforations will contract or resume their original size, owing to the nature of the bodies D, and will thereby close around the yarn in the perforations and firmly hold the same in position, while the portions of yarn not in contact with the bodies D will spread and form tufts, as shown in Fig. 12. After a set of bodies D have been tufted or converted into rugs, a new set of bodies may be inserted in the spaces C and the operation as described herein repeated.

The operation hereinbefore described is repeated each time a row of perforations is brought in the path of the hooks H by the action of the needles K advancing the bodies D, until the desired length of the rug, mat, &c., has been obtained, when the rug, &c., is removed and another series of bodies D may be placed in the apparatus, and the operation hereinbefore described of forming a rug, mat, &c., repeated.

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

1. In an apparatus for manufacturing rugs, a frame, a series of plates supported thereon and having intervening spaces, a rising and falling cross-head provided with hooks mov-

able in slots in said plates, mechanism for feeding yarn to said hooks, a second rising and falling cross-head, having independent operating mechanism from said first cross-head, a plate laterally guided on said second cross head and having feeding pins connected therewith, means for connecting said latter mentioned plate to said second cross-head so as to vertically move therewith, a sliding plate with fingers engaging said feeding pins and a rod connected with said sliding plate and loosely fitting in said feeding pin plate, said parts being combined substantially as described.

2. The supporting plates B having the slots G and J therein, the vertically-moving hooks H mechanism substantially as described for supplying yarn to said hooks, the sliding plates N with the openings R therein, the eccentrics S in said openings and the shafts a and operating gearing thereof, in combination with the fingers T secured to said sliding plates, the feeding pins K adapted to be pressed by said fingers, and mechanism substantially as described for raising and lowering said pins, as stated.

3. The plates B having two series of slots therein, the hooks H working in one series of said slots, and the feeding pins K working in the other series, the sliding plate U with which said pins are connected, the rising and falling cross head V for said plate U, the rods W and the sliding plates N, said rods being attached to said plates N and loosely fitted in said plates U, and mechanism for supplying yarn to said hooks, said parts being combined substantially as described.

4. The supporting plates B, the hooks H movable in slots in said plates, mechanism for supplying yarn to said hooks the feeding pins K, the plate U carrying said pins, the cross head V supporting the plates U, the sliding plates N with the fingers T, the rods W attached to said sliding plates and freely inserted in the plate U, the latter having the slots Y through which passes the bolt X connecting the plate U with the cross head V, and permitting sliding motions thereof, while said plate U rises and falls on said rods W, and means for raising and lowering said cross head, said parts being combined substantially as described.

5. An apparatus for manufacturing rugs, &c. having a frame, a series of supporting plates with intervening spaces and having the slots G and J therein, a rising and falling cross head having hooks attached thereto, mechanism for supplying yarn to said hooks a rotatable shaft with worms thereon, screws working in said cross head and having worm wheels thereon meshing with said worms, a plate with feeding pins thereon and mechanism substantially as described for laterally moving said feeding pins, said parts being combined substantially as described.

6. In a machine for manufacturing rugs, &c. the plates B having therein the slots G and

J, the hooks H working in said slots G, mechanism for operating said hooks mechanism for supplying yarn to said hooks, the feeding pins K with mechanism for raising and lowering the same, the plates N with fingers T guided in the plates B, and mechanism for laterally moving said plates N, said parts being combined substantially as described.

7. In a machine for manufacturing rugs, &c. the plates B having the slots G and J therein, hooks with mechanism for working the same as described, in said slots G, mechanism for feeding yarn to said hooks, feeding pins with mechanism for raising and lowering the same, mechanism for laterally moving said pins in said slots J, and reciprocating knives for cutting said yarn, said parts being combined substantially as described.

8. An apparatus for manufacturing rugs, &c. having a frame supporting plates thereon and having spaces between them, said plates having two series of slots therein, a row of hooks with mechanism for imparting a rising and falling motion thereto, a row of feeding pins secured to a sliding plate, with mechanism for imparting a rising and falling motion to the same, mechanism for imparting a lateral reciprocating motion to said pins, and a yarn-holding mechanism, said parts being combined substantially as described.

9. The frame K² with yarn-directing slots L², M², the box N² in which said frame is seated, the plates B below said box, the hooks H adapted to pass through said plates into said frame so as to engage the yarn therein, and mechanism for raising and lowering said hooks, said parts being combined substantially as described.

10. In an apparatus substantially as described, the slotted frame K² in combination

with the box N², the supporting plates B and the hooks H, with means for operating the same, said box having facings or cushions P² with which the yarn from said frame is in contact, said parts being combined substantially as described.

11. An apparatus for manufacturing rugs, &c. having a series of supporting plates with intervening spaces, each of said series of plates having slots therein, a vertically-movable hook working in a slot in each of said plates mechanism for feeding yarn to said hooks, a series of sliding plates provided with fingers, mechanism for reciprocating said sliding plates, a sliding cross head having a sliding plate connected therewith, feeding pins on said plate adapted to be engaged by said fingers and having both vertical and longitudinal movements in slots in said supporting plates, mechanism for raising and lowering said cross head, and mechanism for reciprocating said sliding plates, said parts being combined substantially as described.

12. In an apparatus for manufacturing rugs, &c. a supporting plate with slots therein, a cross head with mechanism for raising and lowering the same, a reciprocating plate with fingers, a rod connected with said reciprocating plate, a plate with a slot therein connected with said cross head so as to rise and fall therewith and to slide thereon, said plate being movable on said rod, feeding pins secured to said sliding plate on said cross head, and vertically moving hooks, with mechanism for feeding yarn to the same, said parts being combined substantially as described.

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