No. 869,705. PATENTED OCT. 29, 1907.

T. F. HAGERTY.

MACHINE FOR WEAVING WIRE AND WOOD SLATS.

APPLICATION FILED OCT. 30, 1905.

5 SHEETS—SHEET 1

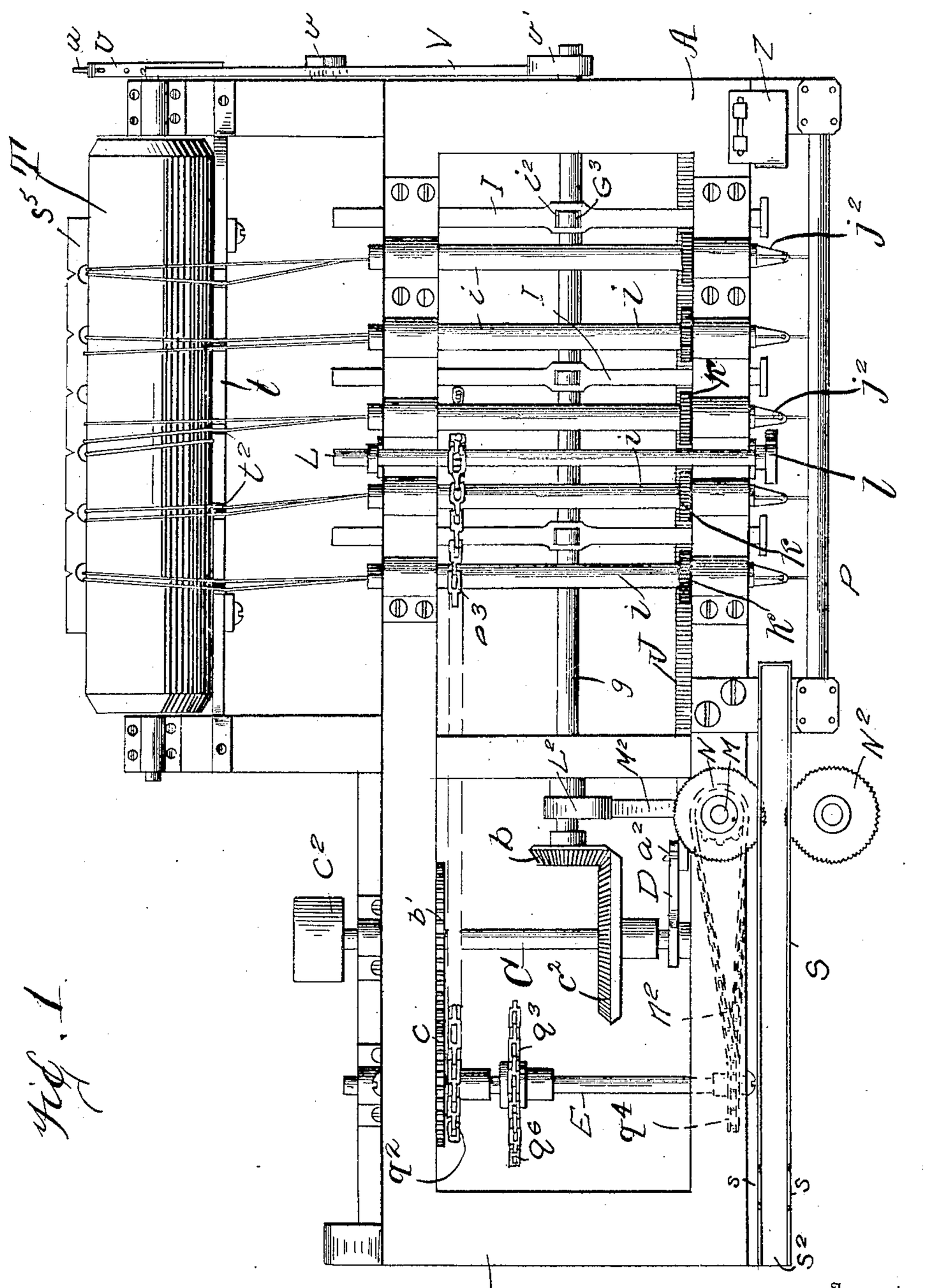

Fig. 1.

Witnesses
Philip A. H. Sewell.
Mary E. Moore.

Inventor
Thomas F. Hagerty

By David P. Moore.

Attorney

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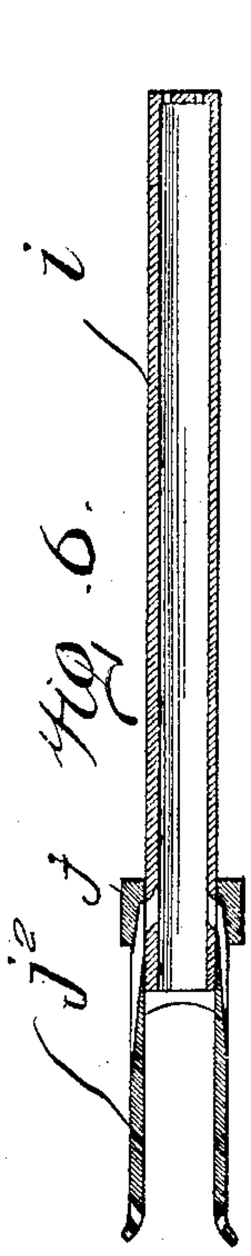

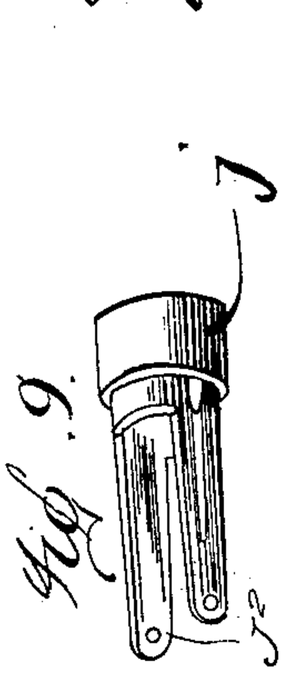

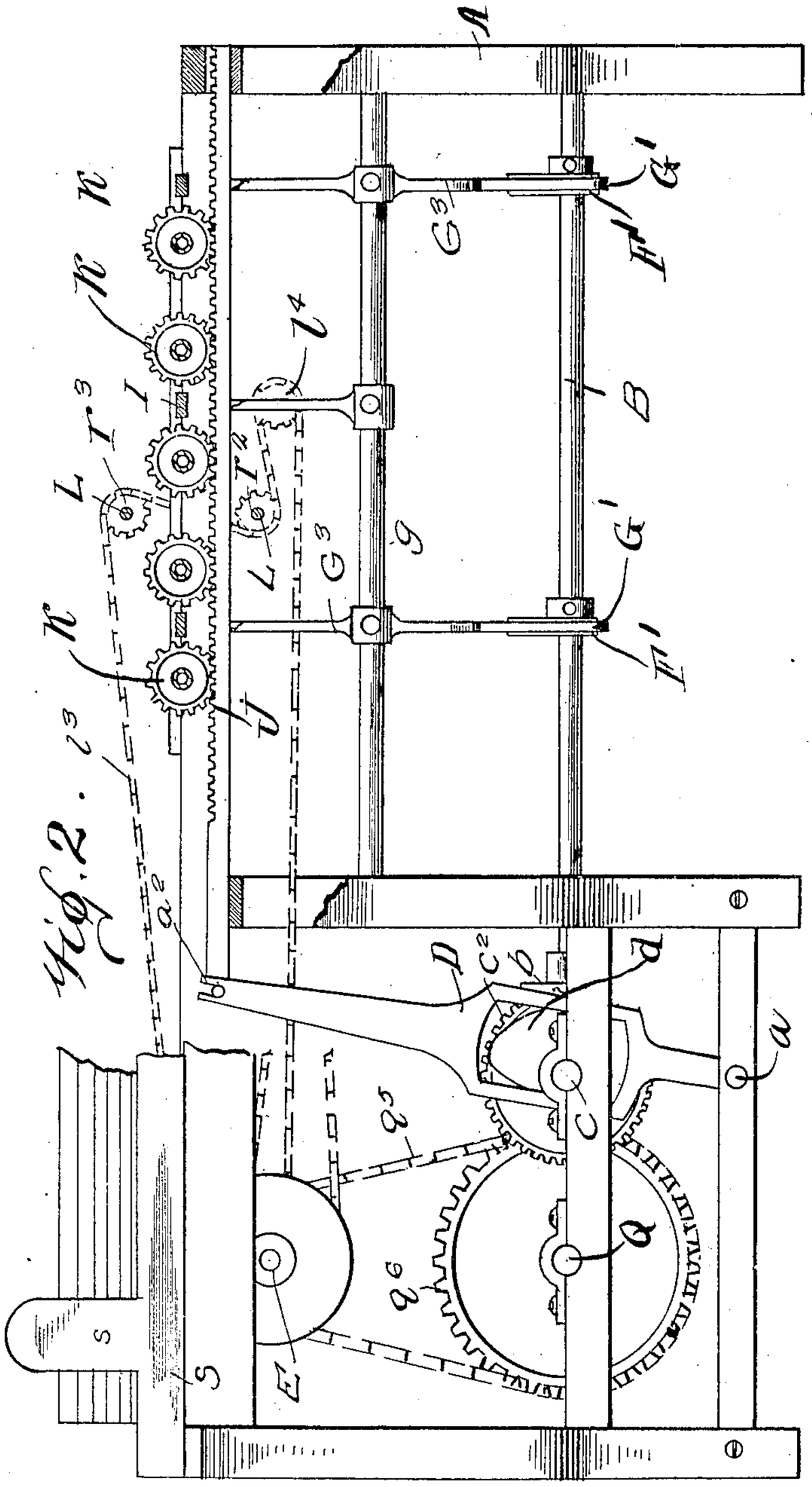

Witnesses
Philip A. Sprecll.
Mary E. Moore.

Inventor
Thomas F. Hagerty.
By David B. Moore.
Attorney

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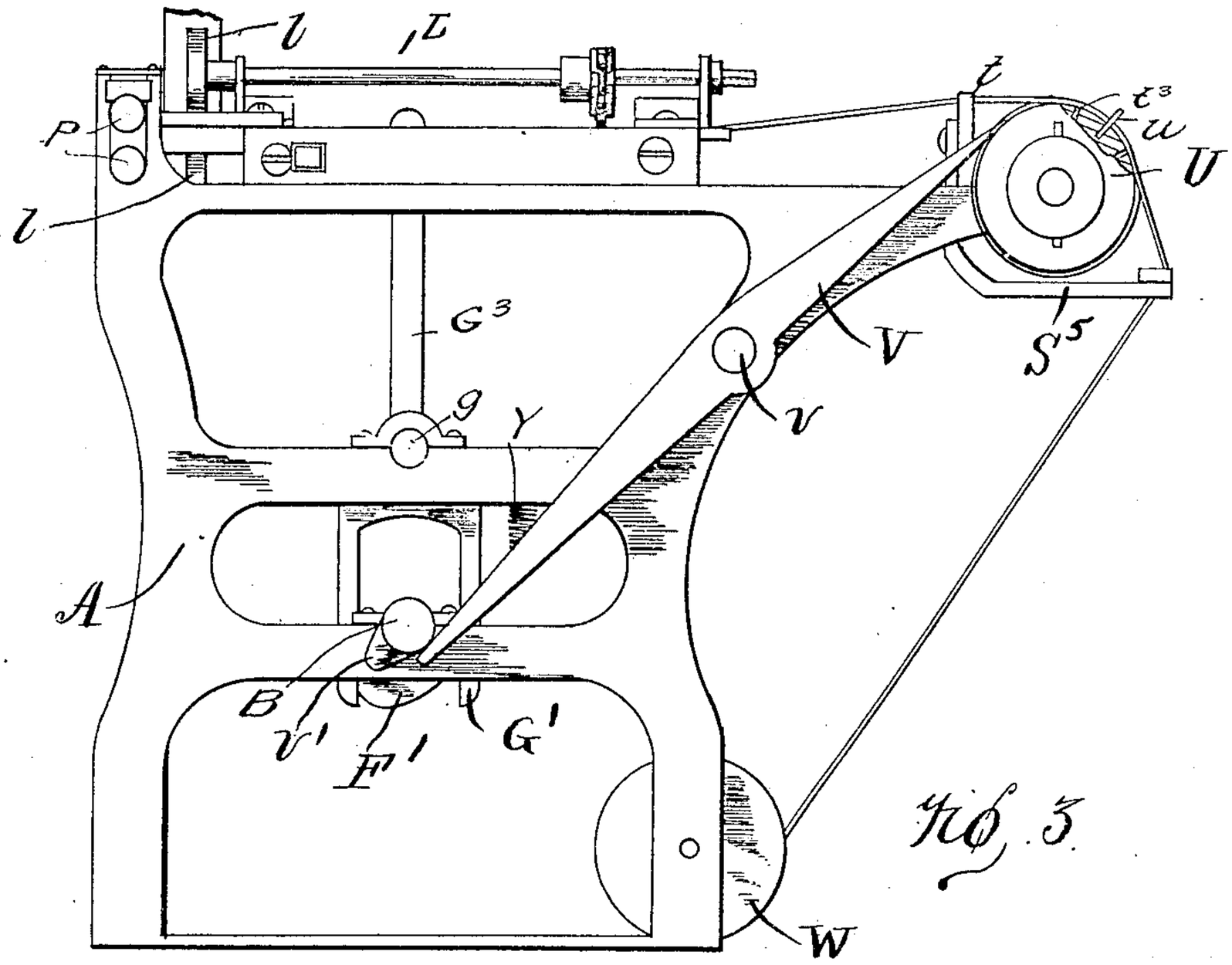

Fig. 3.

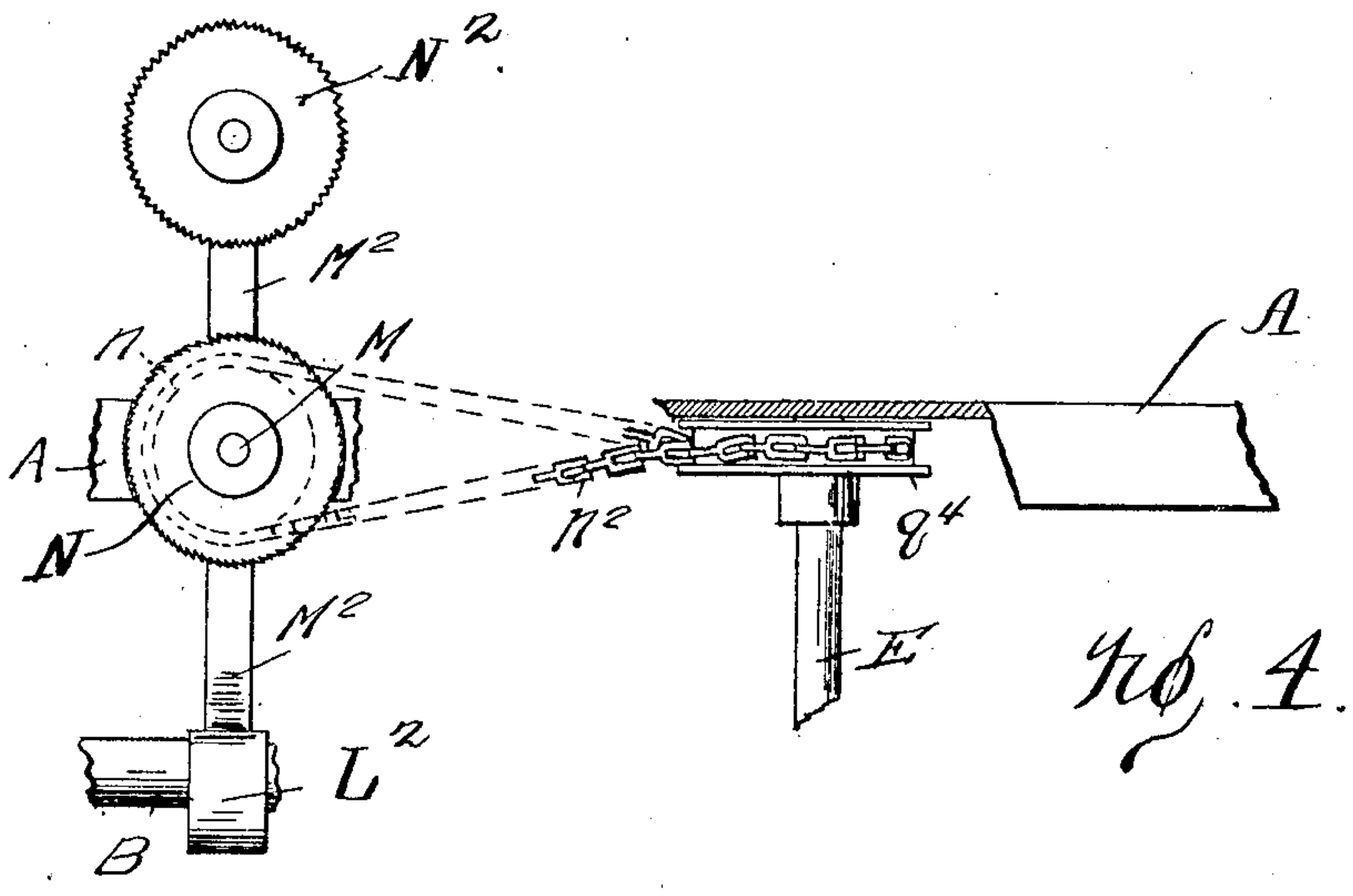

Fig. 4.

Witnesses
Philip A. Sewell
Mary E. Moore

Inventor
Thomas F. Hagerty
By David D. Moore
Attorney

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5 SHEETS—SHEET 4.

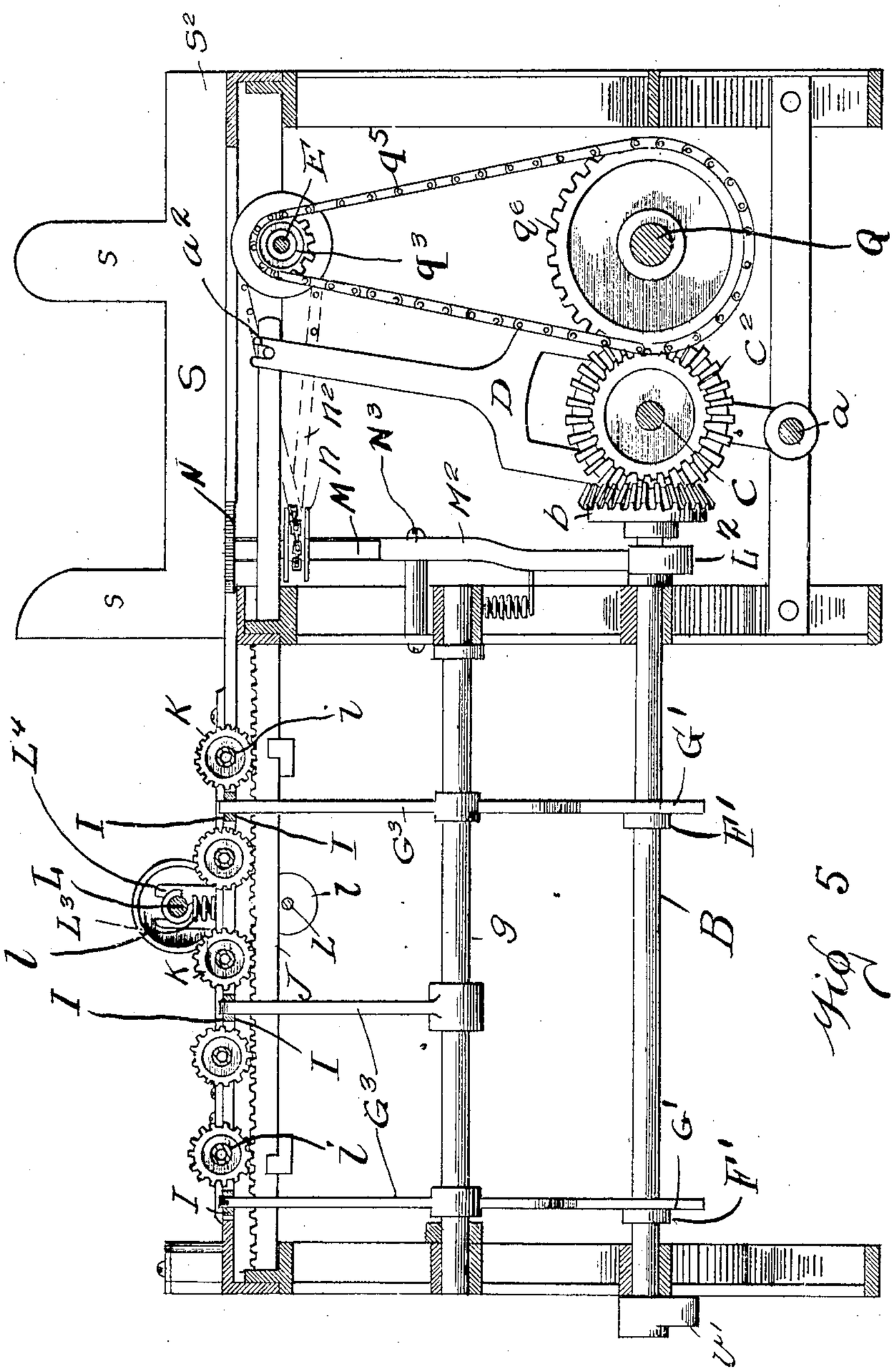

Fig 5

Witnesses
Philip A. Merrill
Mary E. Moore.

Inventor
Thomas F. Hagerty

By David P. Moore.

Attorney

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5 SHEETS—SHEET 5.

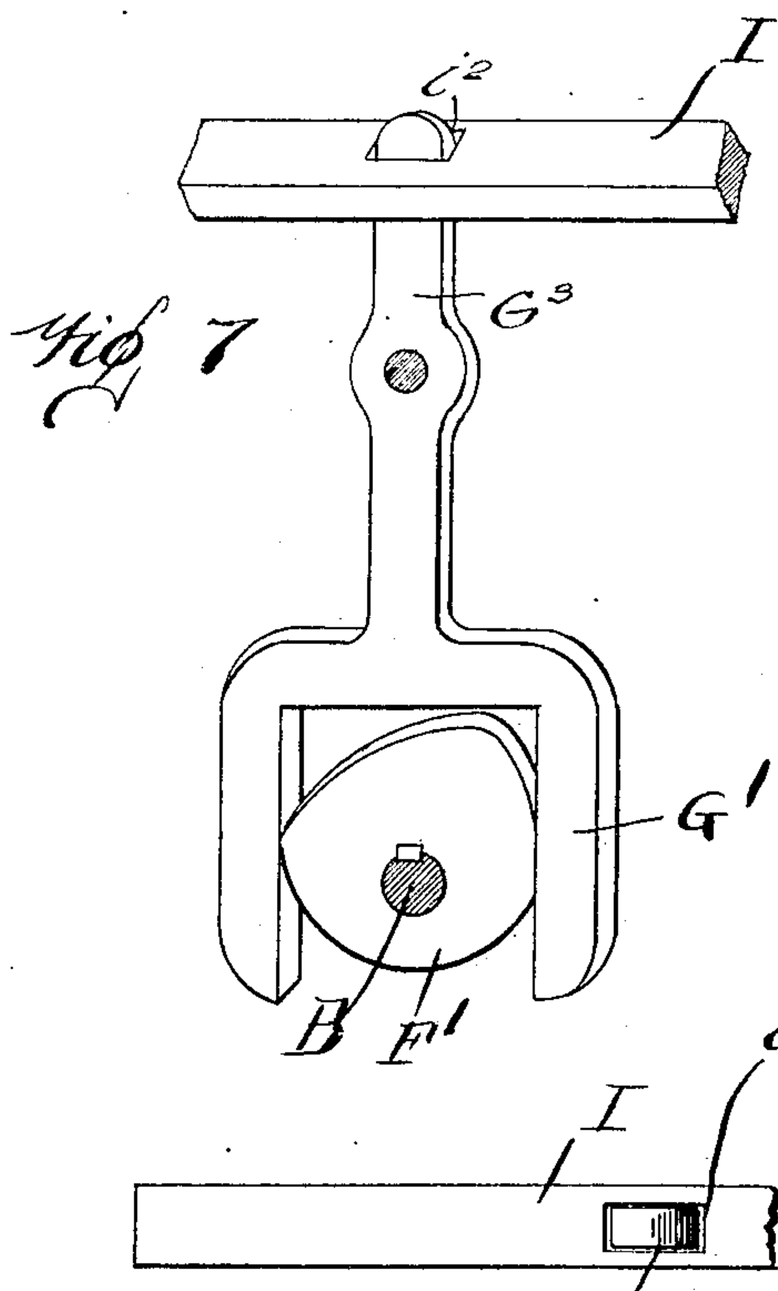

Fig 7

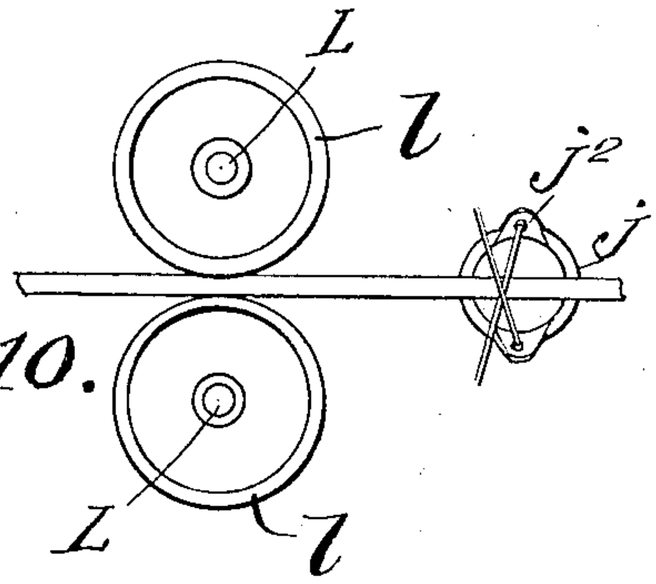

Fig. 10.

Fig. 8.

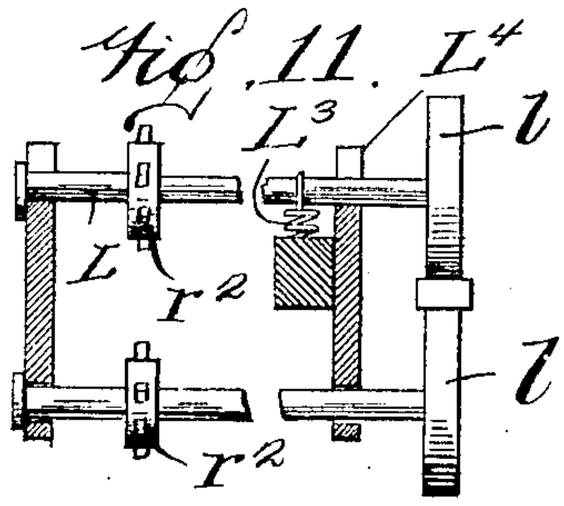

Fig. 11.

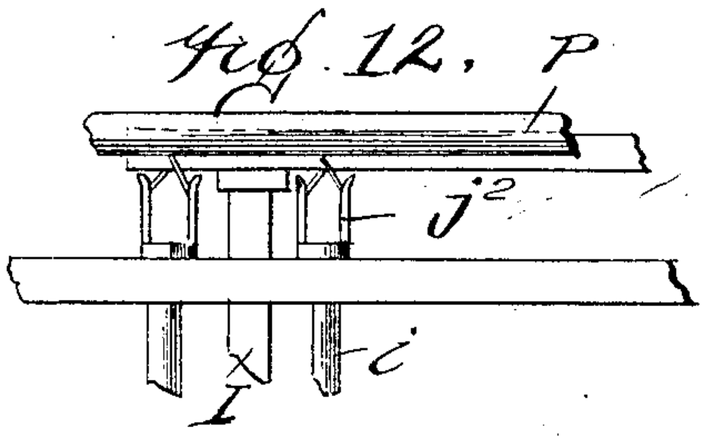

Fig. 12.

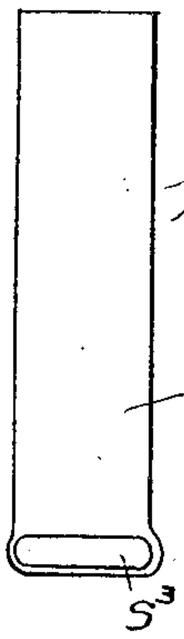

Fig. 13.

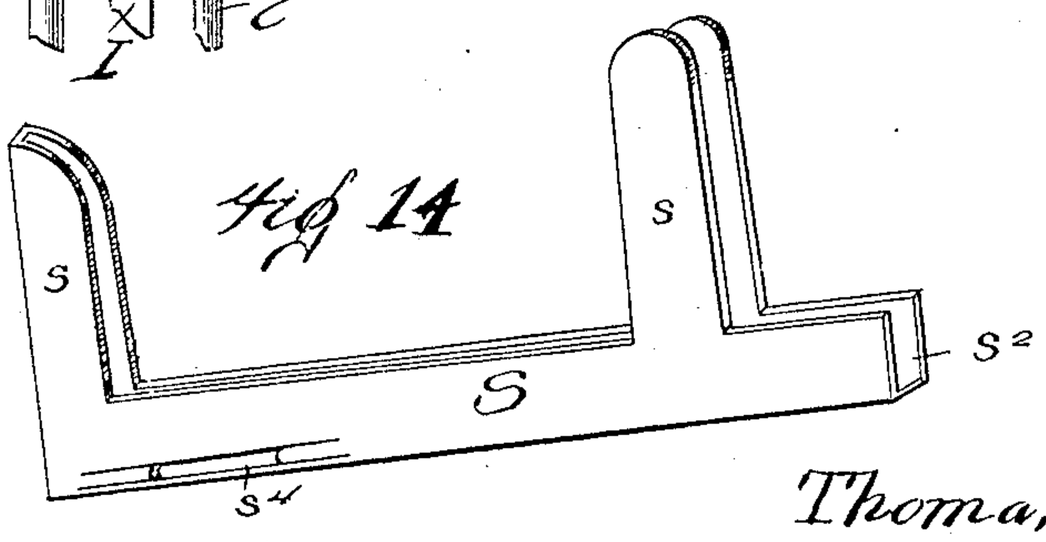

Fig 14

Witnesses

Philip A. Sherrell

Mary E. Moore.

Inventor

Thomas P. Hagerty

By David Moore.

Attorney

UNITED STATES PATENT OFFICE.

THOMAS F. HAGERTY, OF NEW YORK, N. Y.

MACHINE FOR WEAVING WIRE AND WOOD SLATS.

No. 869,705. Specification of Letters Patent. Patented Oct. 29, 1907.

Application filed October 30, 1905. Serial No. 285,166.

To all whom it may concern:

Be it known that I, THOMAS F. HAGERTY, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Machines for Weaving Wire and Wood Slats, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to slat-weaving machines. Among the objects of the invention may be mentioned the provision of means whereby the wires are woven in with the slats by twisting, as distinguished from decussation.

Further objects are to control in an advantageous manner the tension of the wires passing to the twisting mechanism, and to provide improved instrumentalities for feeding the slats to the wires.

According to the present invention, the mechanism for weaving the wire in with the slats is embodied in a series of twisting devices disposed adjacent the region to which the slats are fed. These twisting devices are preferably in the form of hollow rotary needles, through which the wires are conducted, and which are rotated first in one direction and then in the other, by certain novel mechanism presently to be described.

A feature of novelty is the disposition of pushers intermediate and parallel to the twisters, these pushers operating alternately with the operation of the twisters to force the fabric from the machine in a step by step manner.

Another phase of the invention, and one which is regarded as of peculiar novelty, relates to the means for feeding the slats into coöperative relation with the wire operating devices. This feeding mechanism is characterized by having a continuous feed movement, which, however, is capable of advancing the slats only at the proper intervals. More specifically, there is a pair of opposed feed rollers, one at least of which rotates continuously, and between which are placed the slats preparatory to feeding, mechanism being provided for bringing said rollers into operative relation intermittingly. Further, this portion of the invention may be said to consist of a plurality of continuously operating sets of feed rollers, those rollers remote from the point of initial feeding being constantly in operative relation, while those adjacent such point are actuated into and out of operative relation.

One of the peculiar advantages of the form of feed mechanism just referred to is that it adapts itself remarkably to the feeding of slats from a magazine; and this combination of a magazine adapted to receive a plurality of slats and a feed mechanism constructed to remove the slats automatically one by one from the magazine is considered to be one of the distinguishing features of the present invention.

Attention may also be directed to the means whereby the tension of the wires is regulated. According to this phase of the invention, the wires, in transit to the twisters, or other wire-operating devices, are passed over and about a tension roll, and means is provided whereby the extent of rotation of the roll at each advance of the fabric is regulated, thus producing greater or less tension on the wires.

In the drawings: Figure 1 is a plan view; Fig. 2 is a front elevation, partially in section, the wire tensioning mechanism being omitted; Fig. 3 is an end elevation showing the weaving portion of the machine; Fig. 4 is a detail view of the first pair of feeding rollers; Fig. 5 is a longitudinal section looking from the rear of the machine; Figs. 6 and 9 are details of the twisters; Figs. 7 and 8 are details of the pusher operating mechanism; Figs. 10 and 11 are details of the second pair of feeding rollers; Fig. 12 is a detail of two of the twisters and an intermediate pusher; and Figs. 13 and 14 are, respectively, an end elevation and a perspective of the slat-feeding magazine.

In these drawings, A indicates a suitable frame for supporting the mechanism. A plurality of parallel twisters *i* in the form of hollow tubes are journaled transversely at one end of the frame, and are provided with heads *j* having forwardly projecting apertured fingers j^2, through which the wires coming from the interior of the twisters are threaded. The shanks of the twisters are furnished each with a pinion K which meshes with a rack J, shown as mounted slidably longitudinally of the front of the machine. This rack is reciprocated to rotate the twisters first in one direction and then in the other, in the following manner: C is a driving shaft, illustrated as journaled transversely of the frame toward one end thereof: it may be driven at the end C^2 in any desired manner. A cam *d* is mounted upon this shaft and coacts with a cam-yoke D, conveniently pivoted to the frame at its lower end *a*, and having, at its upper end, loose pivotal connection a^2 with the rack J.

S designates a magazine for the slats disposed at the front of the machine and at the opposite end of the frame from the twisters. This trough is in parallelism with the series of wire-operating devices consisting of the twister heads *j* and is disposed, when the twisters are at rest, in which event the fingers j^2 of each head are disposed one above the other, to direct the slats in between the members of the several pairs of fingers, and consequently between the wires carried thereby. The magazine is of considerable depth, so as to accommodate a plurality of slats, and its depth is increased by upstanding fingers or projections *s* on its sides. The end s^2 of the magazine remote from the twisters, and also the top, are open to facilitate positioning the slats therein. The other end of the magazine is closed with the exception of a slot s^3 located adjacent the bottom of the magazine and of a size to permit the passage of

one slat. The sides of the magazine are furnished adjacent the bottom with opposed slots s^4, designed to permit the peripheries of feeding rollers N, N^2 to project within the magazine. Of these, the inner N is mounted on a vertical shaft M on the frame of the machine; the other N^2 is carried by a swinging arm M^2 intermediately pivoted at N^3 to the frame and oscillated as by means of a cam L^2 mounted on a shaft B, which extends at right angles to the driving shaft and is connected therewith by bevel gears b and c^2. N is the active roller, and N^2 the idle one, rotation being imparted to N^2 by N, through the medium of an interposed slat.

The shaft of the roller N carries a sprocket wheel n about which and about a sprocket wheel q^4 on the shaft E passes a twisted sprocket chain n^2. Said shaft E is journaled parallel to but above the driving shaft C, and has a sprocket q^3, from which a chain q^5 passes downward to a sprocket q^6 carried by a counter shaft Q. The last is driven from the driving shaft by means of meshing gears b' and c.

The shafts L of a second pair of feed rollers l, which grasp the tops and bottoms of the slats, instead of the sides as do the rollers N and N^2, are journaled transversely of the frame between two adjacent twisters i. In order to give these rollers the proper grip upon the slats, as well as to accommodate them to various sizes of slats, the shaft of one of the rollers may be journaled in a slotted bearing L^4 and be engaged by a spring L^3 for giving it the proper yielding grip. These rollers are constantly driven by means of a sprocket chain l^3, which engages, as shown in Fig. 2, reversely with sprockets r^3, r^2, carried by the shafts L. An idler l^4 may be provided to insure the proper engagement of the chain with the lower sprocket r^2.

The chain l^3, as shown in Fig. 1, is driven from a sprocket q^2 mounted on the shaft E.

The mechanism so far described effects the feeding of the slats and the twisting of the wires about the latter; and in this connection it may be noted that an adjustable stop Z of any desired construction may be provided to arrest the slat when fed by the rollers to the desired point. This provision is important when slats of different lengths are to be used.

Disposed parallel to and intermediate the twisters i are pushers I, whose function it is to advance the fabric in a step by step manner. Each pusher is provided with a slot i^2 in which works an oscillating arm G^3, the several arms being carried upon a common rock shaft g disposed parallel to and above the shaft B, already referred to. The latter shaft is provided with cams F', which operate upon yokes G', said yokes being carried by the rock-shaft. As shown, the yokes G' may be formed integral with certain of the arms G^3. Delivery and pressing rolls p receive the fabric as it is pushed forward by the members I. These rolls may be mounted in slotted bearings.

The wire is supplied from reels W suitably located at the bottom and rear of the machine, and passes thence upward over a bracket or shelf S^5 to tension roll T, about which the strands may be wound one or more times. From the roll T, the pairs of strands are threaded through slots t^2 in a guide bar t, the strands then passing to the interior of the twisters i, whence they emerge through the heads j.

Mounted on one end of the tension roll T is a disk U having in its periphery a plurality of radial sockets t^3, within which are removably mounted pins u. These pins, as the roll revolves, engage the tip of a lever V, pivoted at v to the frame and adapted to be tripped at its lower end by means of a cam v' on the end of the shaft B. A spring Y serves to return the lever V after having been tripped away from the disk U.

At the commencement of operation of the machine, it will be understood that the magazine will be filled with slats and that the wires will be strung from the reel over the tension roll and through the twisters and secured to an initial slat held in the grip of the pressing and delivery rolls. Motion is now imparted to the driving shaft. The feed rollers N and N^2 are brought into feeding relation by means of the cam L^2 and swinging arm M^2 the bottom slat is gripped between their peripheries, which may be serrated to give a firmer hold, and is advanced through the slot in the end of the magazine. The remainder of this end of the magazine being closed prevents the bottom slat from dragging those above it out of the magazine. When the slat in the grip of the rollers effects its exit, the idle roller N^2 is retracted, when of course the roller N, while still rotating, is no longer capable of advancing a slat, because of the lack of coöperation with N^2 and the slats drop to fill the space left by the ejected slat. The latter has, meanwhile, been caught in the bite of the rollers l and advanced till it strikes the adjustable stop Z. At this moment the cams F' operate to advance the pushers I, and the latter force the slat from between rollers l into the shed formed by the wires converging from the twister fingers. The cam d now actuates the rack J in one direction or the other, and the twisters are given one or more rotations, thus binding the wire firmly about the slat by twisting the strands together. The pushers retire, another slat is fed into position, and the operations already described are repeated, with the exception that this time the rack moves in the reverse direction and the twisters are therefore rotated reversely. Each advance of the pushers to force a slat into the shed of the wires operates to force the fabric between the delivery and pressing rolls p.

When it is desired to alter the degree of pressure of the wires about the slats, in other words to regulate the tension of the wires, the pins u in the periphery of the disk U are suitably adjusted. It is obvious that the sooner the rotation of the tension roll T is checked the greater will be the tension of the wires as they are advanced by the pushers and twisted by the twisters. It will be understood that the cam v' operates to trip the lever V at the commencement of each forward movement of the pushers, so as to permit free travel of the wires for practically the entire operation of such pushers, the tip of the lever engaging with one of the pins u to stop the roll only toward the end of the advance of the fabric.

What is claimed as new is:

1. In a slat weaving machine, the combination of a plurality of parallel rotatable twisters each constructed to carry a plurality of wires, gears carried by said twisters, a reciprocable rack with which said gears mesh, a rotating shaft, a cam thereon, and a pivotally mounted cam-yoke coöperating with the cam and connected with the rack to effect reciprocation thereof.

2. In a slat weaving machine, the combination of a plurality of parallel rotatable twisters constructed each to carry a plurality of wires, means for rotating said twisters intermittingly to twist the wires together and about a slat therebetween, reciprocable slat-pushers disposed parallel to the twisters, a rotating shaft, having a cam thereon, a rock shaft parallel to the first-named shaft, an arm coöperating with the cam and carried by the rock shaft, and a plurality of oscillating arms carried by the rock shaft and engaging the pushers.

3. In a slat weaving machine, the combination of a magazine of a depth to accommodate a plurality of slats constructed to accommodate a plurality of slats and having its exit end closed with the exception of a slat-proportioned slot adjacent its bottom, said magazine having also oppositely disposed slots formed through its sides adjacent the bottom, a pair of feed rollers arranged to project through said slots from without, means for continuously rotating one of said rollers, and means for automatically advancing and retracting one of the rollers with reference to its slot.

4. In a slat weaving machine, the combination of a magazine having upright parallel sides spaced at a distance corresponding to the width of a slat and of a depth to accommodate a plurality of superposed slats, opposed horizontal feed rollers operating at the bottom of the magazine, means whereby one of the rollers is rotated, means whereby one of the rollers is automatically shifted toward and from the other, and means for weaving wire in with the slats fed from the magazine by said rollers.

5. In a slat weaving machine, the combination of a deep, narrow, horizontally-elongated magazine having vertical side walls spaced apart at a distance corresponding to the width of the slats and provided at their bottoms with opposed horizontal slots, said magazine having further an upright end wall formed with a slot at its bottom corresponding to the cross-section of a slat, opposed feed rollers mounted on vertical axes and operating in the slots in said side walls, and means disposed adjacent the slotted end wall for weaving wire in with the slats fed from the magazine therethrough.

6. In a slat weaving machine, the combination of wiring devices, a tension roll around which the wires are led to the wiring devices, slat-pushers disposed to advance the fabric after each actuation of the wiring devices, and means whereby the rotation of the tension roll may be arrested at different points toward the conclusion of the forward travel of the pushers.

7. In a slat weaving machine, the combination of wiring devices, means for supplying strands of wire to said devices, slat-pushers disposed to advance the fabric after the actuation of the wiring devices, and means for regulating the tension of the wires produced by the forward travel of the pushers.

8. In a slat weaving machine, the combination of wiring devices, a tension roll about which the wires are led to the wiring devices, slat-pushers disposed to advance the fabric after each actuation of the wiring devices, means whereby the rotation of the tension roll may be checked at variable points toward the end of the forward travel of the pushers, and pressing and delivery rolls between which the fabric is held while tension is developed by such checking of the tension roll.

9. In a slat weaving machine, the combination of wiring devices, a tension roll about which the wires are led to the wiring devices, slat-pushers disposed to advance the fabric after each actuation of the wiring devices, removable radial pins carried by the tension roll, a detent adapted to engage with said pins to arrest the rotation of the roll, and means for moving the detent out of engagement.

10. In a slat weaving machine, the combination of wiring devices, a tension roll about which the wires are led to the wiring devices, a device constructed to advance the fabric between actuations of the wiring devices, removable radial pins carried by the tension roll, a detent lever positioned to engage with the pins, a rotating shaft, and a cam carried thereby and positioned to engage with said lever to trip it away from the engaged pin.

11. In a slat weaving machine, the combination of a plurality of parallel rotatable twisters constructed each to carry a plurality of wires, means for rotating said twisters intermittingly to twist the wires together and about a slat therebetween, reciprocable slat-pushers disposed parallel to the twisters, a rotating shaft having a cam thereon, a rock shaft parallel to the first-named shaft, and a plurality of oscillating arms carried by the rock shaft and engaging the pushers, one of said arms being extended beyond the rock shaft to engage said cam.

In testimony whereof I affix my signature in presence of two witnesses.

THOMAS F. HAGERTY.

Witnesses:
EDWARD W. GILBERT,
A. T. SMITH.