

No. 854,863.

PATENTED MAY 28, 1907.

J. S. WOODBRIDGE.
MATCH MACHINE.
APPLICATION FILED FEB. 1, 1907.

4 SHEETS—SHEET 1.

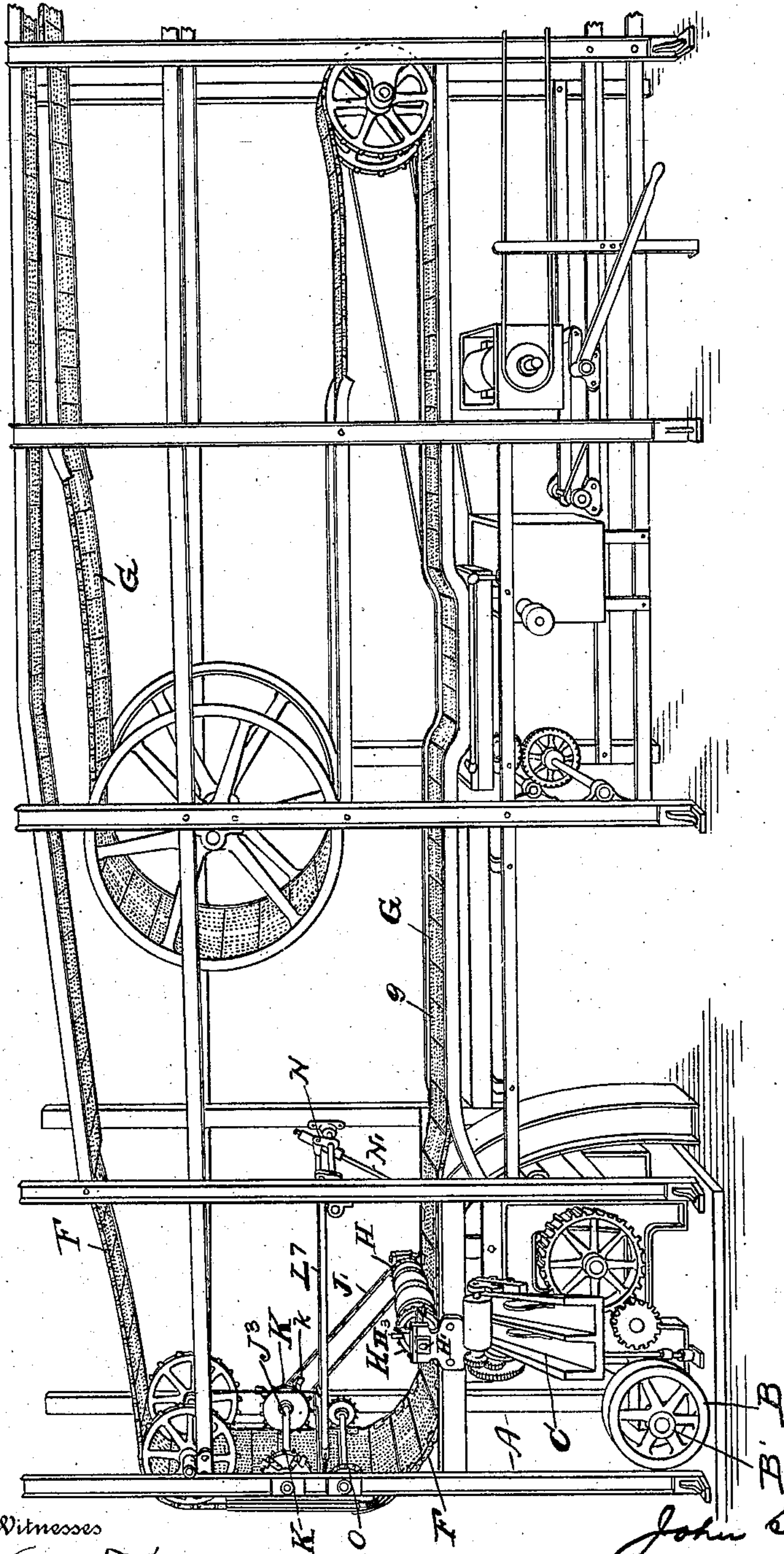


Fig. 1.

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Witnesses

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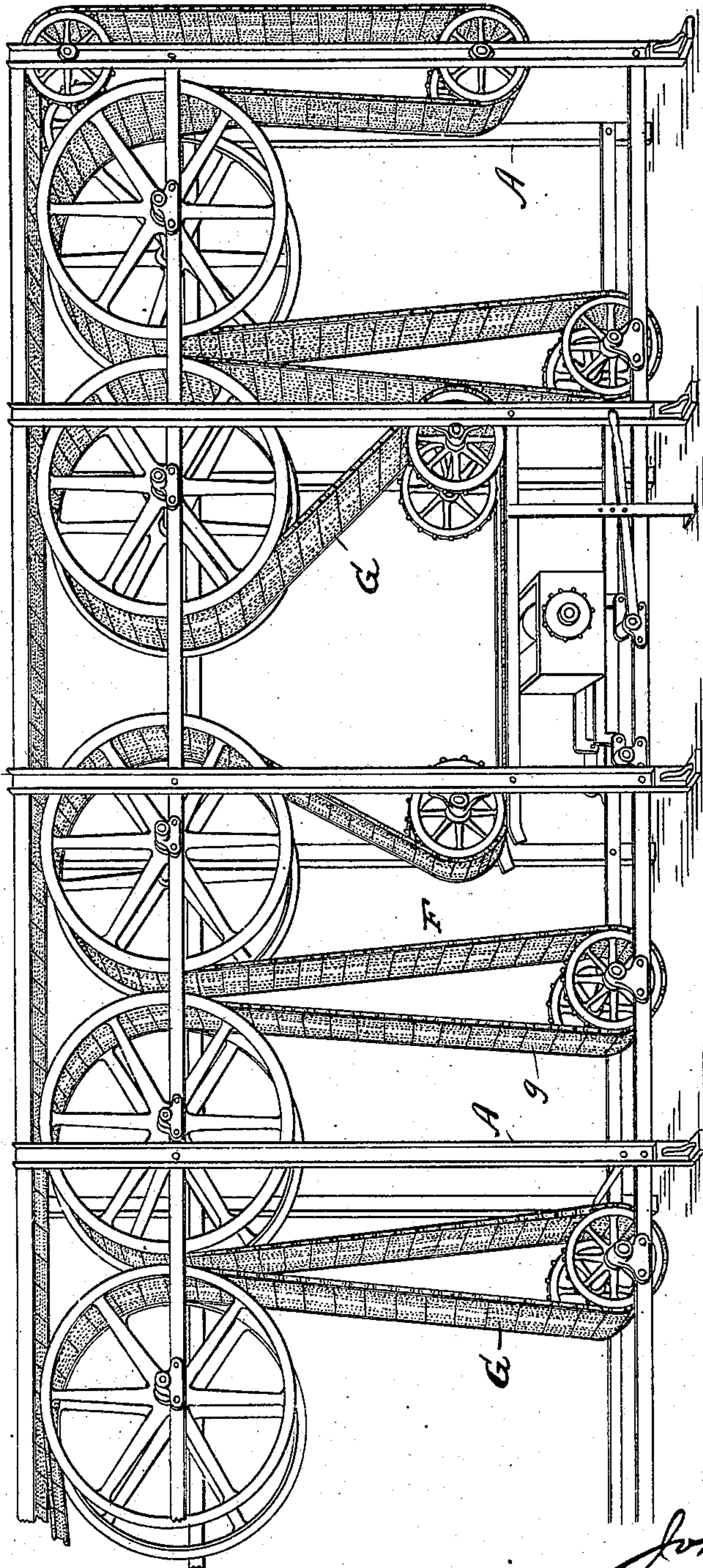


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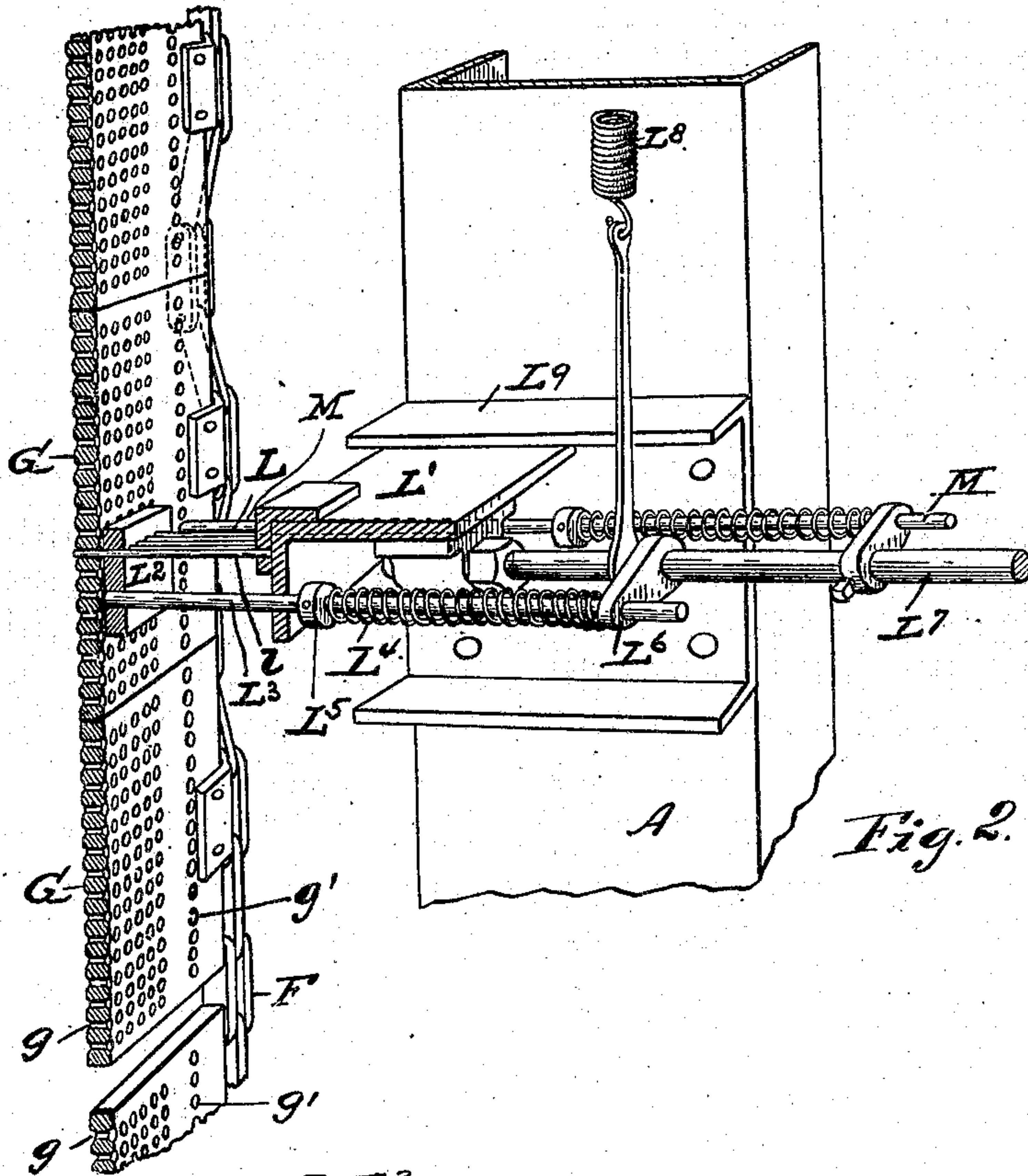


Fig. 2.

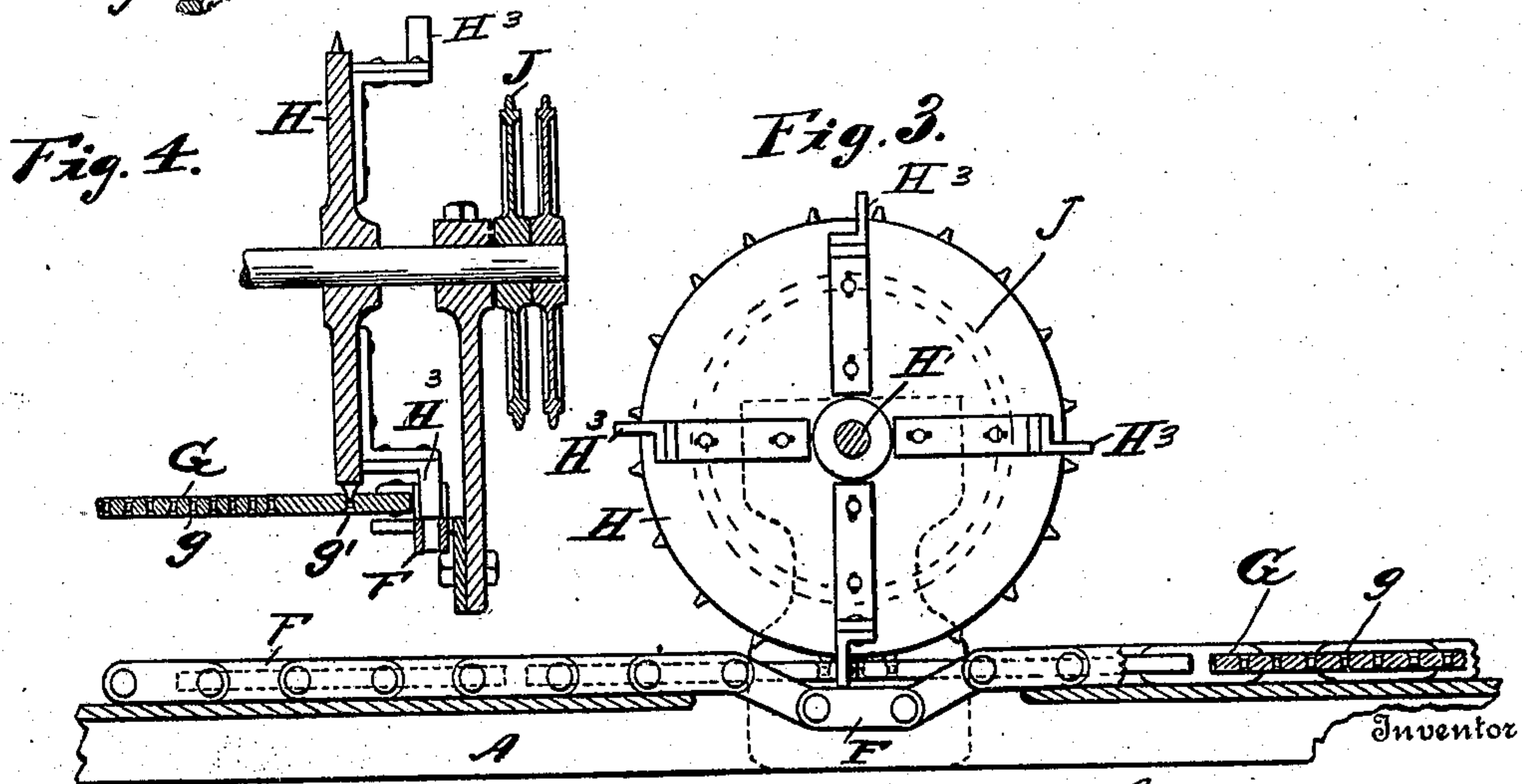


Fig. 4.

Fig. 3.

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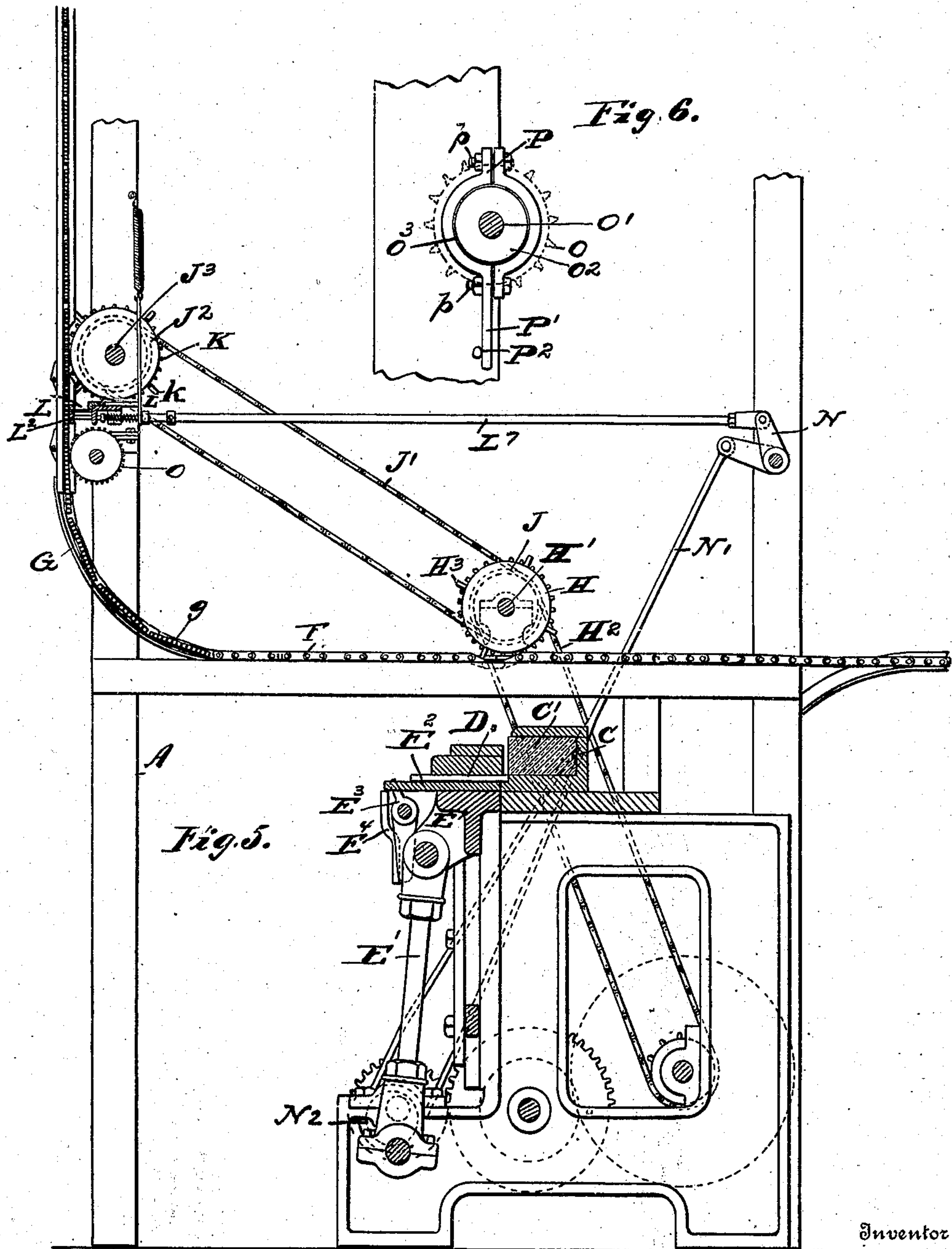
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

JOHN S. WOODBRIDGE, OF DETROIT, MICHIGAN.

MATCH-MACHINE.

No. 854,863.

Specification of Letters Patent.

Patented May 28, 1907.

Application filed February 1, 1907. Serial No. 355,193.

To all whom it may concern:

Be it known that I, JOHN S. WOODBRIDGE, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Match-Machines; and I declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to an improvement in match machines shown in the accompanying drawings and more particularly pointed out in the claims.

In the drawings: Figure 1 is a perspective view of a portion of a match machine and Fig. 1^a a continuation of the same view, the length of the machine making it necessary to divide the view in order to clearly show the relative parts. Fig. 2 is a perspective view of a detail showing the means employed for discharging the matches from their supporting plates after drying, the plates being shown in section to disclose the match discharging pins entering the holes in which the ends of the matches are inserted. Fig. 3 is a side elevation with parts in section of a detail, showing the means employed to close the space between adjacent match-supporting plates in order that the toothed feeding wheel may register with the apertures provided in the plates to force the latter along their course. Fig. 4 is a detail in cross-section of the toothed feeding wheel and metal supporting plate shown in Fig. 3. Fig. 5 is a side elevation with parts in section of a detail showing the means employed to discharge the matches from the supporting plates after drying;—also the means for feeding the plates, cutting the matches from the block, and for entering them into the plates. Fig. 6 is a detail showing the construction of a dragging brake employed in connection with the vertically disposed match-plate feeding wheels.

I have shown a machine in which matches are cut from a block and the splints forced into plates supported by an endless chain which conveys the splints to the usual paraffining, dipping and heading devices, the plates being forced along their way by toothed wheels entering apertures near the edge of the plates provided for the purpose. The matches supported in the respective

plates after leaving the paraffining and heading devices are conducted over an extended course in order that they may thoroughly dry before being discharged from the supporting plates. In order to do this and to economize room, the plates are conveyed over a devious course;—thus the plates must of necessity be spaced a sufficient distance apart to admit of their passing around the idlers or drums shown in Fig. 1 and Fig. 1^a. The plates being forced along their way by the toothed wheels entering the apertures in the plates, it is, therefore, essential that the plates closely abut upon reaching the toothed wheel in order that the apertures may register with the teeth of the feeding wheels.

Therefore, one of the objects of this invention is to provide means whereby the plates as they come in line with the toothed feeding wheels shall be forced to abut so that the adjacent openings at the edge of the abutting plates shall register with the teeth of the feeding wheels.

Another object is the improved means employed for discharging the matches from the plates after drying.

Other improvements and advantages will hereafter appear.

Referring to the letters of reference shown in the drawings, A represents the frame of the machine and B is the driving pulley mounted on the driving shaft B'.

C are guides to conduct the block C' to the knife D for cutting the splints.

E is a reciprocating platform supporting the knives D, said platform being actuated by the pitman E' operated by the crank arm formed in the driving shaft B'.

E² is a sliding platform on which the cutter knife is mounted actuated by a rocker arm E³ under control of the cam shaped way E⁴.

F is an endless chain carrying perforated plates G designed to receive the ends of the splints cut from the blocks C'. The means employed for cutting the splints and the manner in which the splints are forced into the plates form no feature of this invention and are referred to here only in a general way in order that an understanding may be had of the features which constitute this invention.

After cutting a row of splints, the upward movement of the pitman E' engaging the reciprocating platform E carries with it the row of splints, the ends of which are thrust into the perforations g formed in the plates

G. These plates are filled with splints as they are successively presented in line with the cutter and are first fed to the paraffining pan, then to the header, and so on until the matches are properly formed when they are conducted over and along a somewhat devious course in order to economize space until the matches have had an opportunity to dry;— by this time they reach the forward end of the machine at which point the matches are discharged.

Referring now to the means employed for conveying the match or splint-supporting plates, H is a toothed wheel mounted on the shaft H' and driven by the sprocket-chain H² from a sprocket-wheel on the main driving shaft. g' are a series of perforations located adjacent to the edge of the plates G adapted to receive the toothed wheel H. H³ are tripping plates mounted on the toothed wheel H,—which may be adjustable if desired,—adapted to contact with the links of the chain F supporting the plates G. It will be seen that when the tripping plates H³ contact with the chain links, it will have a tendency to force the links downward below the plane of the adjacent links and in doing so will draw together and cause to abut the contiguous match-supporting plates at this point,—closing the spaces between the same so that they may register with the teeth of the wheel H, which in rotating enters the perforations near the side of the plates and forces them forward.

It will be readily apparent that a space between the plates must necessarily occur in order to admit of the plates flexing with respect to each other while passing around the drums and other curves necessarily given to the chain-way. The plates must, however, be brought into abutting contact when in line with the toothed driving or feeding wheel, in order that the perforations in the plates may register with the space between the teeth of the wheel H.

Mounted on the shaft H' is a sprocket-wheel J connected by a sprocket-chain J' with the sprocket-wheel J² on the shaft J³. Mounted on the shaft J³ is a toothed feeding wheel K similar to the wheel H. This wheel is also provided with tripping devices k similar to the tripping devices H³ on the wheel H, the purpose being to throw the links out of line with the main body of the chain at this point in order to draw the match supporting plates together that the perforations g' may register with the teeth of the feeding wheel as before explained, the feeding wheels at this point assisting in moving the match supporting plates along and serving to relieve the load that would otherwise be borne entirely by the feeding wheel H.

Directly below the wheel K is the match discharging device L for forcing the matches out of the supporting plates G, the assump-

tion being that the matches are dry and ready for packing when they have reached this point. The discharging device L consists of a plate L' which has both a vertical and longitudinal movement and in which are set a series of pins l corresponding in number with the perforations in one or more rows of the match supporting plates.

L² is a guide for the pins l and is supported by one or more shafts L³ on which are mounted springs L⁴, a collar with a suitable set-screw L⁵ being provided on the shaft L³ whereby the tension of the spring may be increased or diminished as required, it being noted that the spring at one end bears against an arm L⁶ supported on a shaft or push-rod L⁷, in turn secured to a suitable hanger engaged with the movable plate L'. The action of the spring forces the guide L² to the limit of its movement or directly in contact with the match supporting plates.

L⁸ is a spring attached at one end to the frame and at the other engaging the push-bar L⁷, the purpose of this spring being to raise the movable plate with its pins l to the limit of its upward movement.

L⁹ is a stop preferably formed of channel iron suitably secured to the frame of the machine between the side walls of which the vertical movement of the sliding plate L' is limited.

M is a spring actuated rod, one end of which is supported in a bearing formed in the movable plate L', the other end supported from the push-bar L⁷, the forward end of the rod M being adapted to enter the perforations g' at the side of the match-supporting plates, the purpose of the rods M being to maintain the discharge pins l in line with the perforations in the match supporting plates. The push bar L⁷ is operated by the bell crank N pivoted in the frame of the machine, which in turn is actuated by the pitman N' operated by the cam N² shown in dotted lines in Fig. 5.

O is a toothed wheel mounted in suitable bearings in the frame of the machine directly below the match discharging device L, the teeth of the feeding wheel O entering the perforations g' in the side of the match supporting plates.

As shown in the detail in Fig. 6, the shaft O' on which the toothed wheel is mounted is provided with a drum O² preferably covered with leather, as indicated at O³. Embracing the drum O² is a collar P formed in two parts, one portion of the collar having a depending arm P', the parts of the collar being drawn together by bolts p. P² is a pin projecting from the frame of the machine, against which the depending arm P' of the collar bears. The purpose of the toothed wheel O is to retard the downward movement of the plates after leaving the feeding wheels K, the object being in a measure to support the

weight of the plate and thus relieve the match discharging pins l of the weight of the plate. It will, therefore, be seen that the collar P embracing the drum O^2 will serve as a dragging brake and by adjusting the nuts p the tension may be increased or reduced as required. The depending arm P' contacting as it does with the pin p^2 checks the rotation of the drum O^2 mounted on the shaft of the wheel O and thus serves to check the downward movement of the match supporting plates.

It will be seen that the downward movement of the match supporting plates is continuous and in order to provide for the downward movement of the match discharging pins l while forcing the matches from the plate during the interval they are in the apertures formed in the plates, the plate L' is capable of a vertical movement which permits it to travel downward with the match supporting plates while the matches are being discharged. As soon as the pins are withdrawn from the plate, the action of the spring L^8 serves to lift the plate L' with its bank of match discharging pins back to their initial position.

Having thus described my invention, what I claim is:—

1. In a match machine, a series of match holding plates supported in an endless chain designed to conduct them to suitable paraffining, and heading mechanism and afterward to convey them over a somewhat devious course in order to give the matches sufficient time to dry before being discharged from the plates, said plates provided with an auxiliary set of perforations to receive the teeth of suitable driving wheels, means for forcing the plates over their course consisting of toothed driving wheels adapted to enter the auxiliary perforations in the plates, said wheels having suitable connection with the driving shaft of the machine to actuate them, and means for throwing the links of the chain out of line with the plane of the adjacent links whereby the plates are brought into abutting contact in order that the perforations in the several plates may register with the teeth of the driving wheel, substantially as described.

2. In a match machine, a series of perforated plates for holding the matches, an endless chain for supporting the match plates designed to conduct the plates to suitable heading and dipping mechanisms and afterward to convey them around a devious course in order that the matches may dry before being discharged, said plates provided with perforations adjacent to their edges, toothed driving wheels, the teeth of which are adapted to enter said last named perforations to force the plates and chain along their course, said wheels provided with projecting lugs designed to engage the links of the

chain to force the latter below the plane of adjacent links whereby the match-plates as they reach the toothed driving wheels are drawn together into abutting contact in order that the perforations in the plates provided for the reception of the teeth in the driving wheel may register with said teeth, substantially as described.

3. In a match machine, a plurality of plates provided with perforations to receive the splints, said plates mounted in an endless chain adapted to convey the splints to suitable dipping and heading appliances, said plates also provided with perforations for the reception of the teeth of suitable driving wheels, said toothed wheels provided with adjustably arranged projecting lugs designed to engage the links of the chain as they successively pass said wheel to force the links out of plane with adjacent links, whereby the splint supporting plates are drawn together into abutting contact in order that the perforations in the plates may register with the teeth of the driving wheels, substantially as described.

4. In a match machine, a plurality of perforated plates designed to receive the match splints, said plates mounted in an endless chain traveling around suitable guides, a plurality of match discharging pins designed to enter the perforations in the plates and force the matches therefrom, said pins mounted in a movable frame adapted to move with the plates when the pins have entered the perforations in the same, said plates provided with an auxiliary set of perforations designed to receive a plunger, and a spring actuated plunger mounted in the movable frame carrying the discharge pins being adapted to enter the auxiliary perforations in the match plates whereby the match discharge pins are guided into each series of perforations in the plates as they are successively presented, substantially as described.

5. In a match machine, a plurality of perforated plates designed to receive the ends of the match splints, said plates mounted in an endless chain traveling over suitable guides to deliver the splints to the paraffining, heading and other mechanism, means for discharging the matches after drying consisting of a plurality of discharge pins mounted in a frame having a vertical and horizontal movement, said plates also provided with an auxiliary set of perforations designed to receive the teeth of a driving wheel and also a spring actuated plunger mounted in the movable frame carrying the match discharge pins, means for forcing the pins into the perforations of the plates successively to discharge the matches, the construction being such that when the pins have entered the plates they will travel with the plates during the interval required to discharge the matches, and means for returning the mov-

able frame carrying the discharge pins back to its initial position when the pins are withdrawn from the plates, substantially as described.

5 6. In a match machine, a plurality of perforated splint-supporting plates mounted in an endless chain designed to convey the splints to suitable heading and dipping mechanism, a plurality of match discharging pins
10 mounted in a movable frame, means for forcing the pins into the perforations in the plates in successive order and for withdrawing the pins when the matches are discharged, the construction being such that
15 the pins are adapted to move with the plates during the interval required to discharge the matches, and a spring actuated guide for the pins adapted to contact with the plates, the construction being such as to afford support
20 for the forward ends of the pins to keep them in perfect alinement in order that they may freely enter the perforations in the plates, substantially as described.

25 7. In a match machine, a plurality of perforated splint-supporting plates mounted in

an endless chain adapted to convey the splints to suitable heading and dipping mechanism, a plurality of match-discharging pins mounted in a movable frame and provided with means for actuating the pins to force
30 the matches out of the plates, said plates also provided with an auxiliary set of perforations adapted to receive the teeth of a driving wheel, said perforations also designed to receive the teeth of a braking wheel, the
35 toothed braking wheel mounted on a shaft supported in suitable bearings in the frame, a drum mounted on said shaft, a split-sleeve embracing said drum provided with bolts for increasing the tension of the sleeve on the
40 drum, said sleeve having an arm adapted to contact with a projecting lug in the frame to retard its rotation, said lug, and the toothed driving wheel, substantially as described.

In testimony whereof, I sign this specification in the presence of two witnesses. 45

JOHN S. WOODBRIDGE.

Witnesses:

SAMUEL E. THOMAS,
ARTHUR WOODBRIDGE.