(No Model.) 3 Sheets—Sheet 1.

# B. T. STEBER.

## MATCH MACHINE.

No. 589,315. Patented Aug. 31, 1897.

Fig. 1.

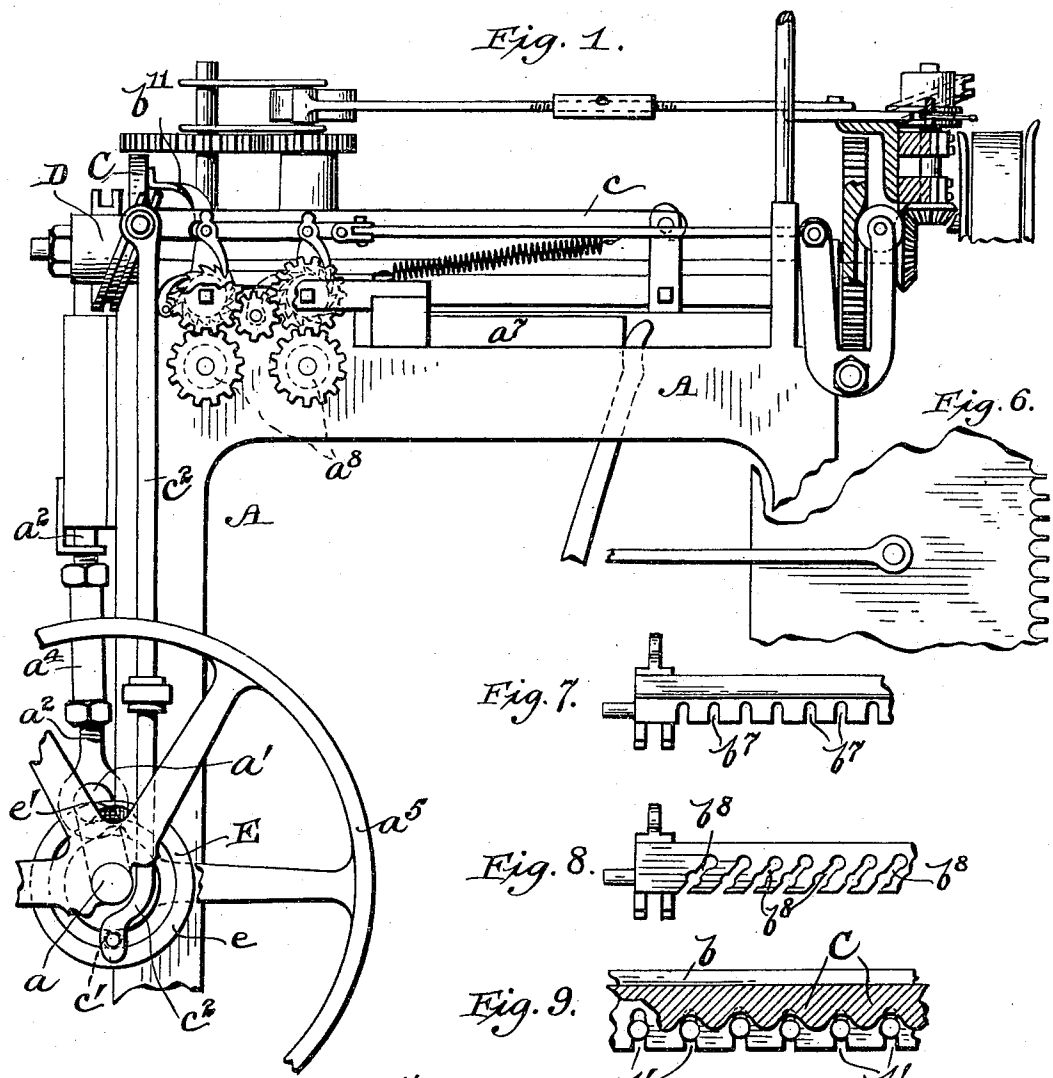



Fig. 6.



Fig. 7.



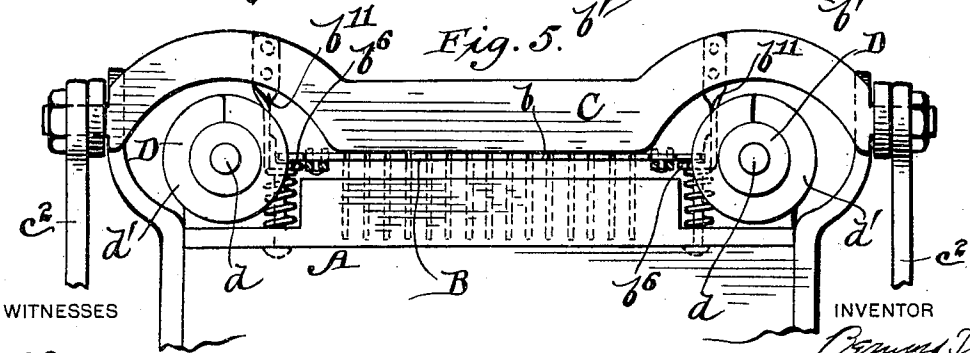

Fig. 8.




Fig. 9.




Fig. 5.




WITNESSES

Severance.

W. E. Ballard.

INVENTOR

Benjamin T. Steber
by his Attys
Mills & Fennell & Severance

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

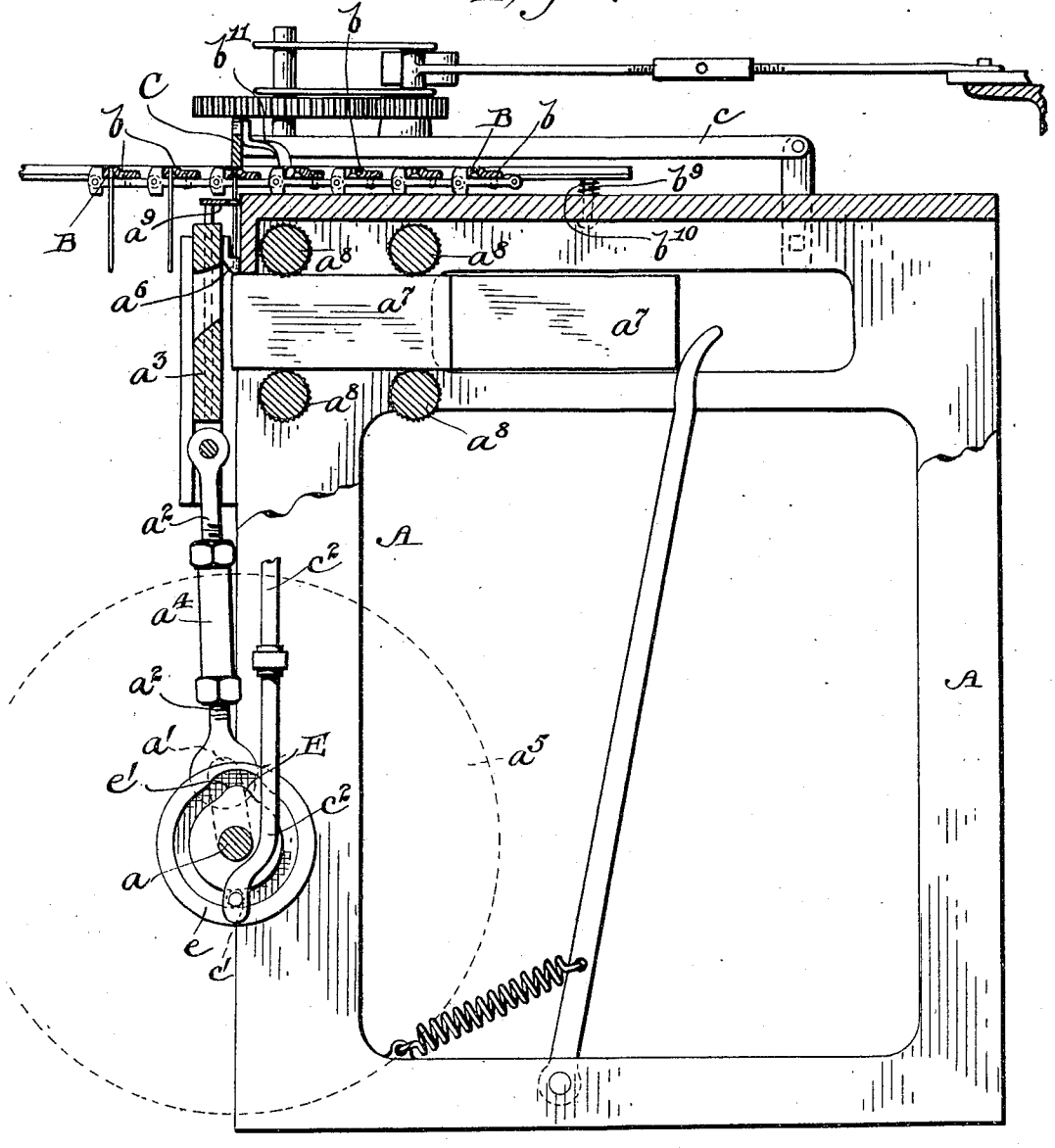
(No Model.) 3 Sheets—Sheet 2.

# B. T. STEBER.

## MATCH MACHINE.

No. 589,315. Patented Aug. 31, 1897.

Fig. 2.




WITNESSES

Severance
L. P. Clift

INVENTOR

Benjamin T. Steber
by his Attys
Wilson Fenwick & Lennon

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C

(No Model.) 3 Sheets—Sheet 3.

# B. T. STEBER.

## MATCH MACHINE.

No. 589,315. Patented Aug. 31, 1897.

Fig. 3.

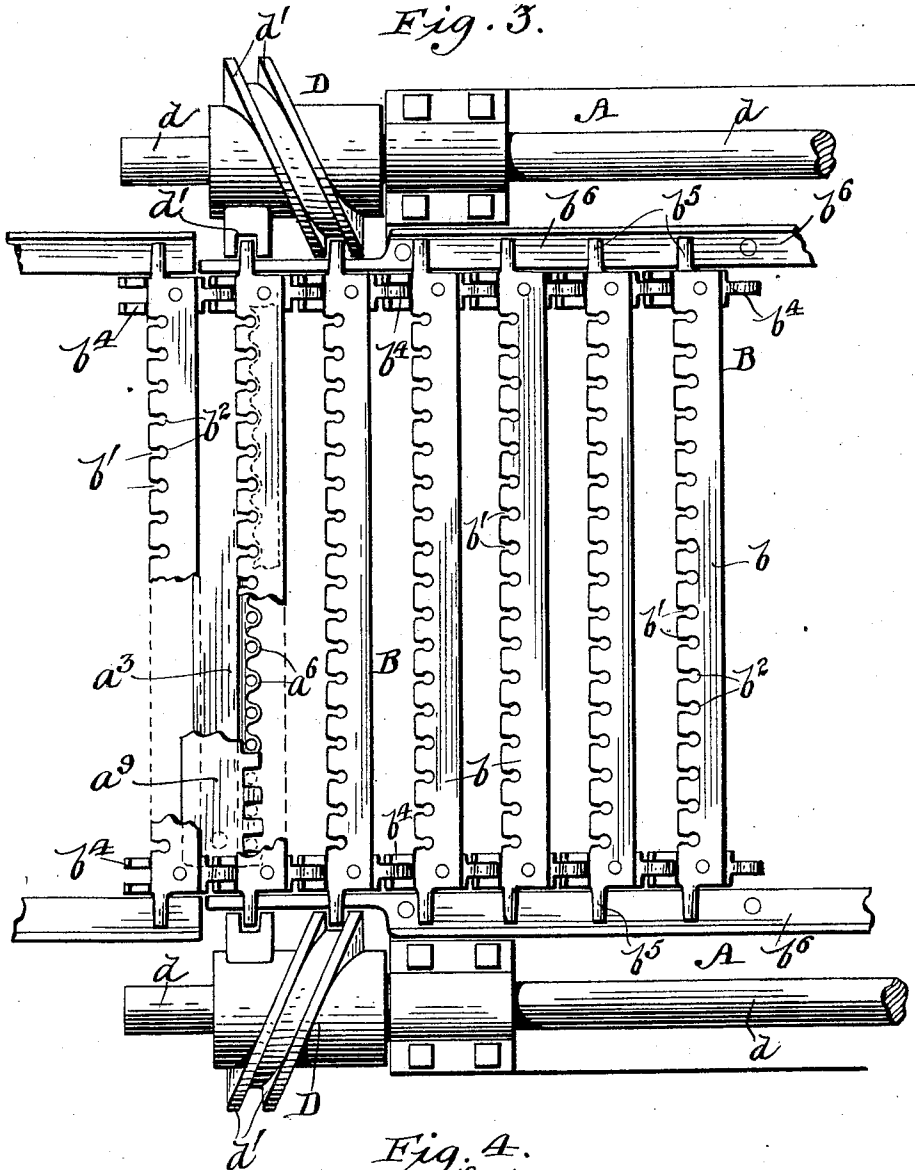
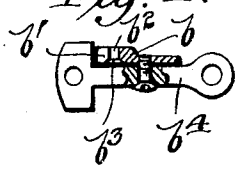



Fig. 4.




WITNESSES

Geverance.
D. P. Clift

INVENTOR

Benjamin T. Steber
by his Attys
Mason Fenwick & Lawrence

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

# UNITED STATES PATENT OFFICE.

BERNARD T. STEBER, OF UTICA, NEW YORK.

## MATCH-MACHINE.

SPECIFICATION forming part of Letters Patent No. 589,315, dated August 31, 1897.

Application filed May 4, 1897. Serial No. 635,018. (No model.)

*To all whom it may concern:*

Be it known that I, BERNARD T. STEBER, a citizen of the United States, residing at Utica, in the county of Oneida and State of New York, have invented certain new and useful Improvements in Match-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in machines for making matches, and more particularly to that class of machines which are adapted to cut match-splints and place them in an endless belt or carrier.

It consists in means for cutting match-splints, in combination with holders for receiving the same, the holders being provided with slots or grooves whose walls are grooved at points opposite to each other for receiving the ends of the match-splints, the side walls of said grooves being of less distance apart than the diameter of the match-splints.

It also consists in means for cutting match-splints, in combination with an endless chain, said chain comprising holders having grooves for receiving the match-splints and means for forcing the said holders into holding contact with the said splints.

It further consists in certain other novel constructions, combinations, and arrangements of parts, as will be hereinafter fully described and claimed.

In the accompanying drawings, Figure 1 is a side elevation of my improved match-machine, portions of the frame being broken away. Fig. 2 is a central vertical longitudinal section through the same, portions of the same being shown in side elevation. Fig. 3 is a top plan view of a portion of the machine, showing part of the carrier-chain and the cams for actuating the same. Fig. 4 is a detail sectional view showing the construction of one of the holders of the said chain. Fig. 5 is a detail end elevation of a portion of the machine, showing the carrier-chain in place and the depressor for forcing the chain downward. Fig. 6 is a detail view showing the construction of the ejecting-platen. Fig. 7 is a detail showing a form of holder which I contemplate employing. Fig. 8 shows another form of holder, the splint-receiving slots being adapted to receive a double row of splints; and Fig. 9 represents a detail view showing a modified form of depressor.

A in the drawings represents a match-splint machine; B, an endless carrier or chain; C, a depressing-bar for forcing the chain downwardly; D D, cams for feeding the chain, and E cams for actuating the depressing-bar C.

At one end of the frame A a shaft $a$ is mounted transversely of the same and is provided with a crank $a'$. The crank $a'$ operates a pitman $a^2$, which carries at its upper ends a cutter-slide $a^3$. The pitman $a^2$ is provided with an adjusting-sleeve $a^4$, whereby its length may be accurately adjusted to suit the cut which it is desired to make. The shaft $a$ is provided with a belt-wheel $a^5$, by which power may be received from any suitable source and communicated to said shaft $a$, the crank $a'$ being revolved to reciprocate, by means of the pitman $a^2$, the cutter-slide $a^3$. The cutter-slide $a^3$ carries at its upper end a suitable match-splint cutter $a^6$, which is adapted to engage suitable blocks of wood $a^7$, fed to it between the feed-rollers $a^8$ $a^8$. The sharp edge of the cutter $a^6$ is at the lower edge, and the stroke of the pitman is so arranged that the cutter as it descends will engage the end of the block or blocks inserted between the feed-rollers and cut the desired match-splints. When the cutter again rises, the match-splints will be carried up thereby and deposited in the endless chain B, as will be hereinafter more fully described.

The endless carrier-chain B, which is adapted to receive the match-splints after they are cut, is composed of holders or slats $b$ $b$. The holders $b$ $b$ may be made of metal or other suitable substance, as wood fiber or hard fiber, and are provided with match-receiving slots $b'$ $b'$, which extend inwardly from one edge of the said holders. The holders are preferably in the form of flat bars, and I have found that in addition to using iron or steel for making these bars wood fiber, being very hard and tough, is also a good material of which to make these bars. These slots $b$ $b$ are preferably provided with enlarged portions, as $b^2$ $b^2$, to receive the ends of the match-splints. The under edges of the openings of the apertures $b^2$ $b^2$ are preferably beveled, as

seen at $b^3$ in Fig. 4 of the drawings. This helps to guide the end of the match-splint into the end of the opening which is to hold it. The ends of the holders are provided with connecting-links, as $b^4$ $b^4$, by which each holder is linked to the next holder upon either side, all the holders being linked together to form an endless chain. The holders $b$ $b$ are provided with end projections $b^5$ $b^5$, which engage guideways, as $b^6$ $b^6$, upon the top of the frame A and also serve as means by which the belt may be fed forward. Horizontal shafts $d$ $d$, journaled upon the top of the frame A, carry actuating-cams D D. The cams D D are provided with grooved flanges $d'$ $d'$, a portion of which are spiral and a portion straight for engaging the end projections $b^5$ $b^5$ of the holders $b$ $b$. When the cams are revolved by any suitable mechanism, (not shown,) the grooves in the flanges $d'$ $d'$ engage the end projections $b^5$ $b^5$, and when the spiral portion is bearing against them serve to move the chain forward, and when the straight portion of the flanges $d'$ $d'$ engages the said projections no motion is imparted to the said belt. The intervals of rest caused by this straight portion of the flanges $d'$ $d'$ are timed so as to permit a holder of the chain B to rest above the cutter $a^6$ long enough to receive its charge of match-splints.

As shown in Fig. 7 of the drawings, the holders composing the endless chain B may be provided with grooves, as $b^7$ $b^7$, which have no enlargements similar to the apertures $b^2$ $b^2$, but are merely provided with straight sides the proper distance apart to receive the ends of the match-splints. As shown in Fig. 8 of the drawings, the holders composing the endless chain may also be provided with diagonal slots, as $b^8$ $b^8$. These slots may also be provided with enlargements to receive the match-splints, similar to the enlargements $b^2$ $b^2$ of the holders $b$ $b$. The diagonal slots may be made long enough to receive a double row of splints, as illustrated in said Fig. 8 of the drawings.

In using a match-splint machine of this character I find that it is advantageous to provide a means for forcing the holders $b$ $b$ downwardly upon the ends of the match-splints to assist in inserting them in the holders. For this purpose I have devised the bar C, which extends transversely with relation to the machine and is carried by links $c$ $c$, pivotally connected at their rear ends to the frame A. This construction enables the bar to be raised and lowered as desired. The bar C is preferably arranged so as to be just above the holder $b$, which is in position over the cutter to receive the match-splints, so that when the said bar descends it will force that holder downwardly. If it is desired to allow the upper ends of the match-splints to project a little above the upper surface of the holders, the bar C may be so arranged as to strike the holder to one side of the rows of splints, or the holder may be made with vertical corrugations, as shown in Fig. 9, so as not to extend over the end of the splints, all without departing in the least from the spirit of my invention. In order to impart the downward motion to the bar C at the proper time, cams E E are secured to the shaft $a$ upon each side of the machine. These cams E E are preferably formed by making grooves in the outer faces of the disks or wheels $e$. The grooves in these disks are concentric except at one point, as at $e'$, where they are provided with offsets to draw the bar C downwardly. In these grooves travel friction-wheels $c'$ $c'$, carried by the lower ends of the links $c^2$ $c^2$, which are pivotally connected to the ends of the bar C. The offsets in each groove of the cams are so located as to depress the arm C just after the splints have been raised to the carrier above them.

In order to enable the bars $b$ $b$ to move downwardly when actuated by the depressor C, the ways or tracks $b^6$, which support them, are mounted upon screw-bolts, as $b^9$, which extend upwardly through the top of the frame A and engage the said ways or tracks $b^6$ above the said frame. Springs, as $b^{10}$, are interposed between the said ways $b^6$ and the top of the frame A, so that the said ways $b^6$ are normally raised to the extent allowed by the bolts $b^9$ above the top of the frame A. I do not rely on the springs alone to raise the ways $b^6$ $b^6$ to their normal height, as the forward ends of the said ways $b^6$ $b^6$ are preferably connected with and supported by the depressing-bar C by means of bars or links $b^{11}$ $b^{11}$, so that when the depressor moves downwardly the ways $b^6$ $b^6$ will be also carried downwardly against the action of the springs $b^{10}$ $b^{10}$, and when it is raised the ways will be raised again.

In cutting the splints the cutter is so regulated as to extend a short distance above the block from which the splints are being cut, so as to completely clear the same and give an opportunity for it to be fed forward for the next cut. As the cutter descends it cuts the splints from the end of the block, the cutting edge thereof coming just to the lower edge of the block. Upon ascending the splints are carried upwardly by the cutter and are guided by means of a comb, as $a^9$, which directs them into the holder $b$ which is just above the same. When the cutter reaches its highest point, the tops of the match-splints touch or nearly touch and partly enter the bell-mouthed slots of the holding-bars $b$. At this moment the chain-depressor C is actuated to pull the bar $b$ downwardly at the same speed as the cutter descends, but it continues on downward a short distance after the cutter touches the block and has again started upon the operation of cutting the next row of splints. The match-splints of the first cut are thus resting on the block and they cannot go down any farther, and the grooved bar $b$ is pushed downward over the splints and causes them to enter into its grooves and become firmly

held therein. The depressor C is moved upwardly immediately after the match-cutters have released themselves from this lot of splints by reason of the new lot which is being cut pushing them out. The chain is now moved forward to the next bar by means of the cams D and the next row of splints is cut and brought upwardly in the same manner as above.

It will be observed that my improved machine is constructed in a simple manner and yet in a way which is particularly well adapted for the purpose for which it is used. There is a decided advantage in having slots for receiving match-splints instead of holes, for when the mechanism for moving the chain becomes worn considerably the slots will make an allowance to some extent for the wear and prevent trouble in the operation of the machine.

It will be apparent that great advantage is gained by the use of holders having deep slots in their edges, for in the constant use of the machinery the parts are apt to wear and if slots were not used the platen which ejects the matches would in case of such wear strike and bend the plates, but the slots used in accordance with my invention prevent any such difficulty. Moreover, the use of the slots makes it certain that the splint will be received and held by the said holder. The modification shown in Fig. 8 of the drawings illustrates a holder adapted to receive a double row of splints cut by a double cutter.

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

1. In a match-splint machine, the combination with a splint-cutter, of an endless chain consisting of holders linked together, each of said holders being composed of a single bar adapted to extend longitudinally with respect to the cutter, said holders being provided with deep slots in their lateral edges adapted to receive and hold the splints after they are cut, substantially as described.

2. In a match-splint machine, the combination with a suitable cutter, of holders each composed of a single bar adapted to extend longitudinally with respect to the cutter, and provided with deep slots extending inwardly from the lateral edges of the same for receiving and holding the match-splints after they are cut, substantially as described.

3. In a match-machine, the combination with a splint-cutter, of holders having slots in their edges, the said slots being provided with groove portions opposite each other in the walls of said slots adapted to receive and hold the match-splints after they are cut, substantially as described.

4. In a match-machine, the combination with a splint-cutter, of an endless chain comprising holders linked together, the said holders being provided with slots in their edges having grooves opposite each other in the walls of the said slots for receiving and holding the match-splints after they are cut, substantially as described.

5. In a match-machine, the combination with a cutter, of an endless chain consisting of holders linked together having slots in their edges to receive the match-splints, ways for supporting and guiding said chain, springs constituting a yielding support for said ways, means for depressing the holders of the chain for forcing them upon the match-splints, said ways being connected to said depressing means whereby they are depressed to correspond to the downward movement of the chain, substantially as described.

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

BERNARD T. STEBER.

Witnesses:
LEONARD VAN BOOSTEN,
GEO. M. RABENSTEIN.