(No Model.) 5 Sheets—Sheet 1.

# G. SEBOLD.

## MACHINE FOR MAKING MATCH SPLINTS.

No. 293,794. Patented Feb. 19, 1884.

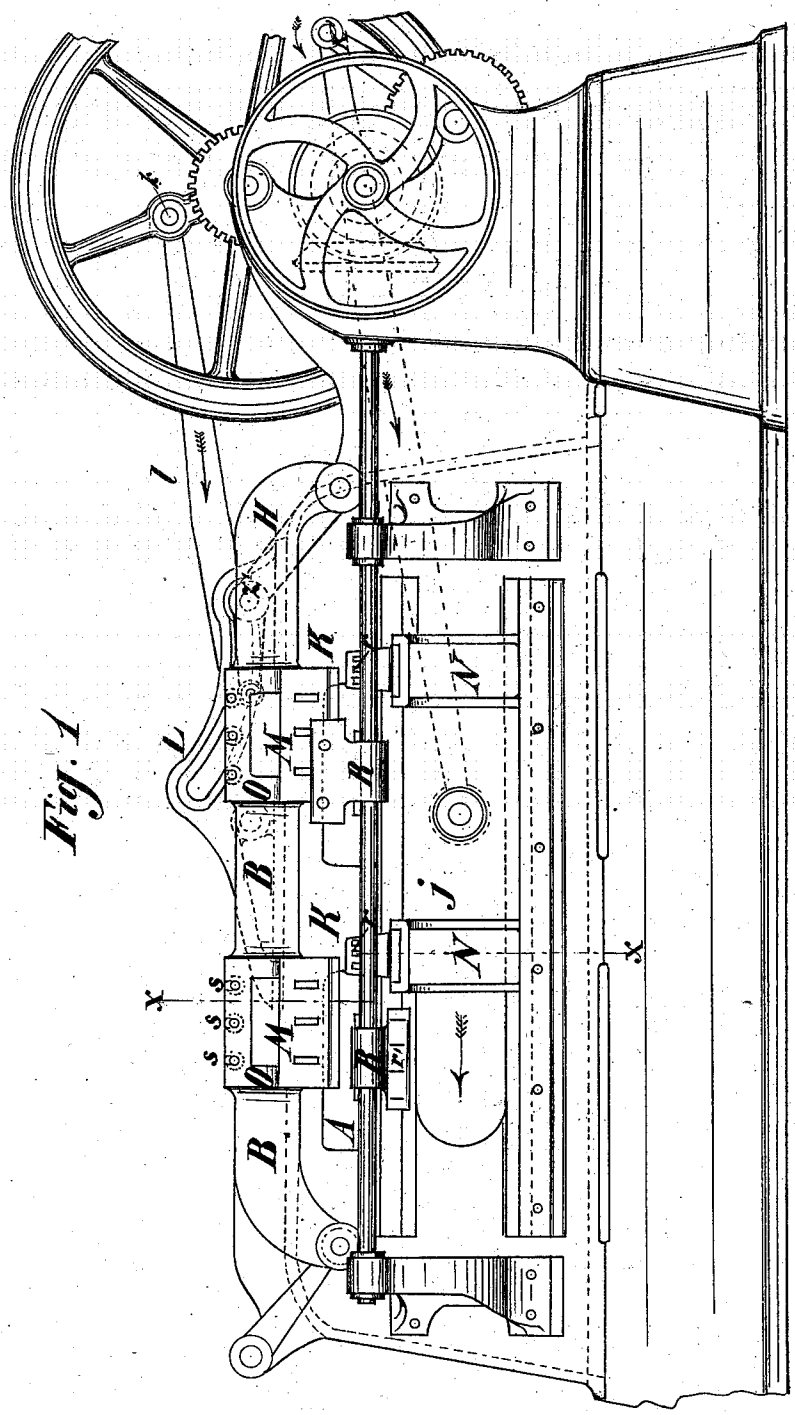



Fig. 1.

Witnesses:
Ned K Wayner
Ed. L. Moran

Inventor:
George Sebold
by his Attorneys
Brown & Brown

N. PETERS, Photo-Lithographer, Washington, D. C.

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# G. SEBOLD.

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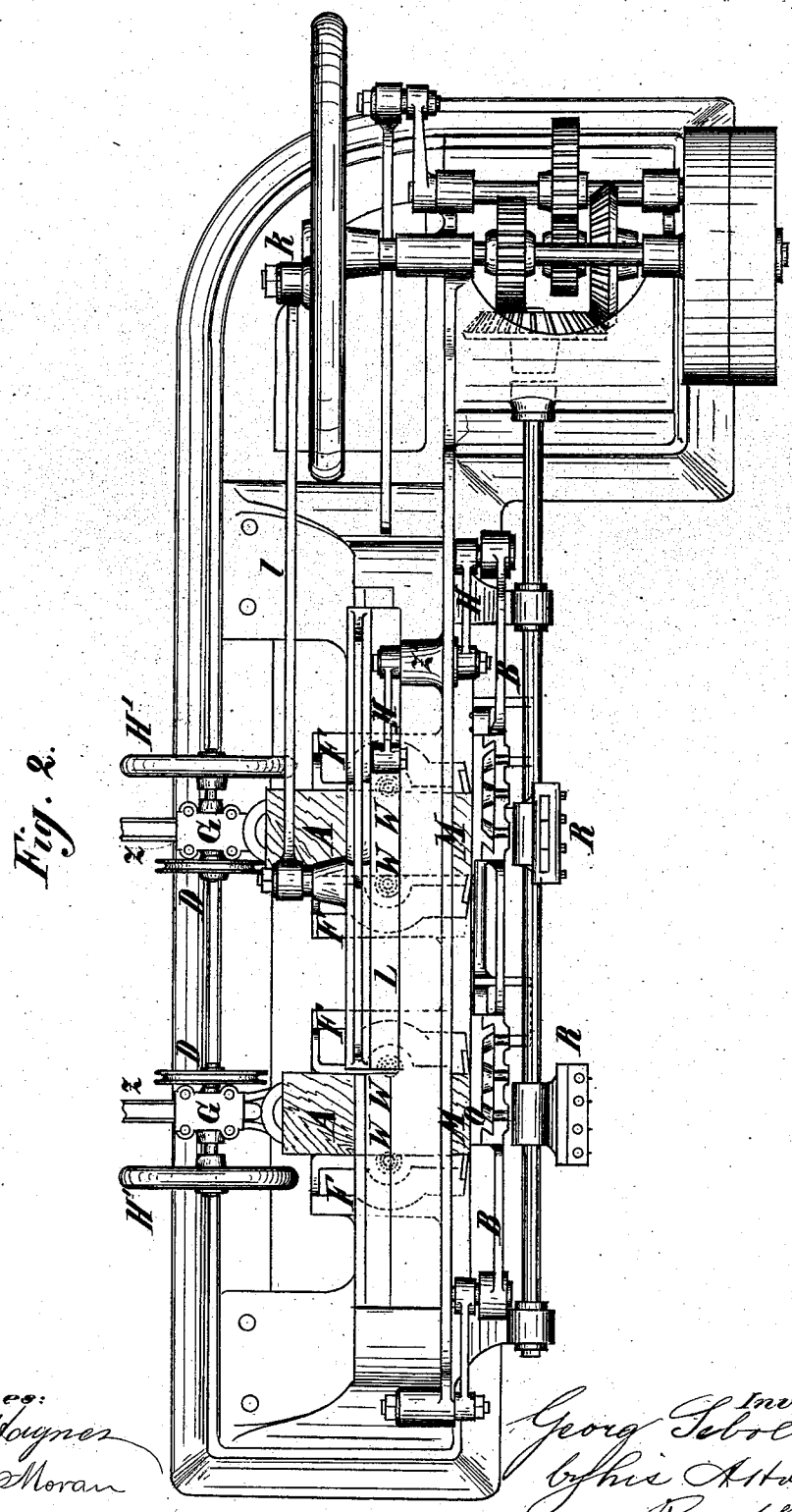



Fig. 2.

Witnesses:
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(No Model.) 5 Sheets—Sheet 3.

# G. SEBOLD.

## MACHINE FOR MAKING MATCH SPLINTS.

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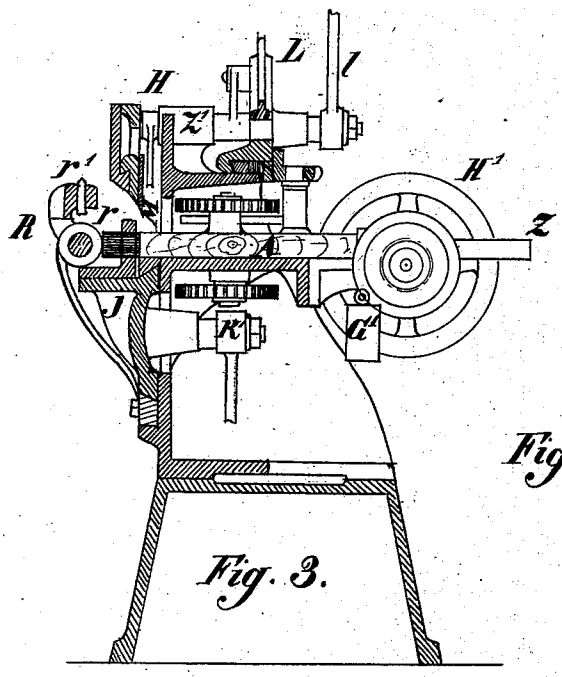



Fig. 3.

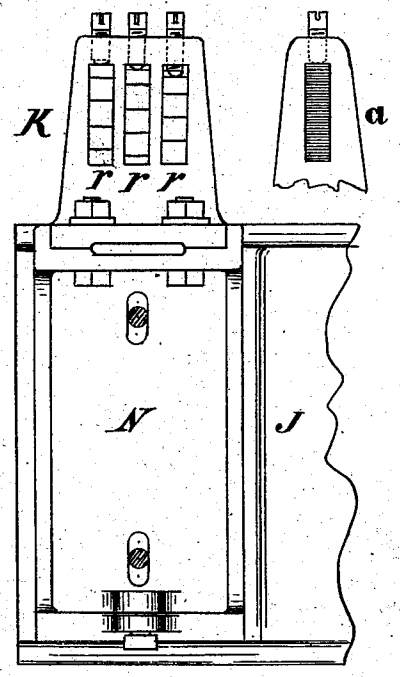



Fig. 4.

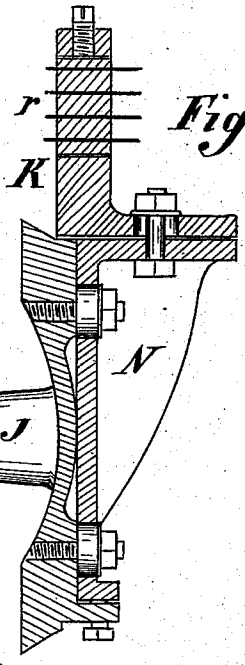



Fig. 5.

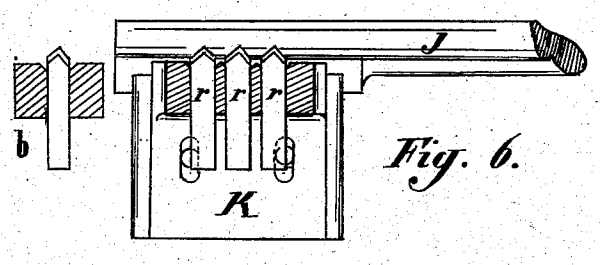



Fig. 6.

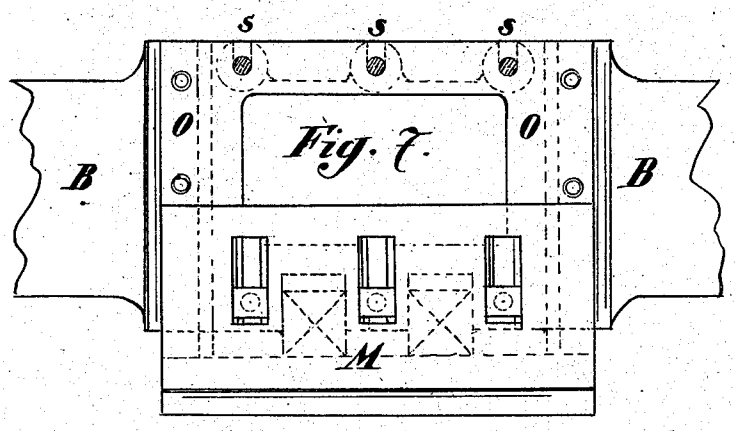



Fig. 7.

Witnesses:
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N. PETERS, Photo-Lithographer, Washington, D. C.

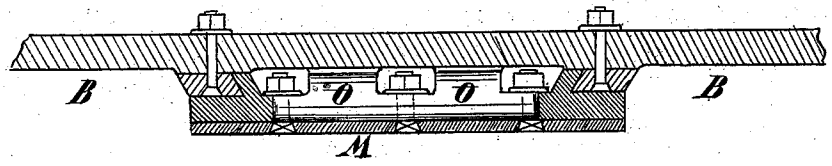
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# G. SEBOLD.

## MACHINE FOR MAKING MATCH SPLINTS.

No. 293,794. Patented Feb. 19, 1884.

Fig. 8.



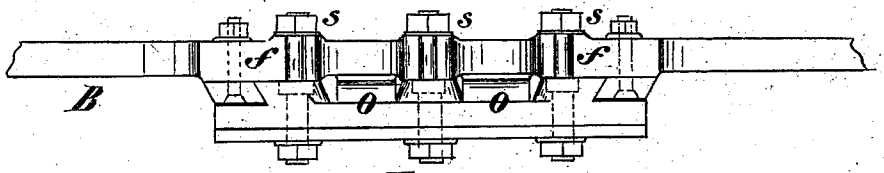
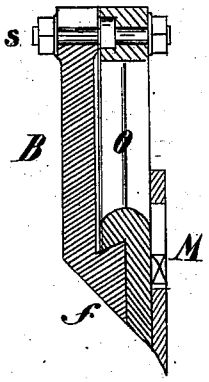




Fig. 9.

Fig. 10.



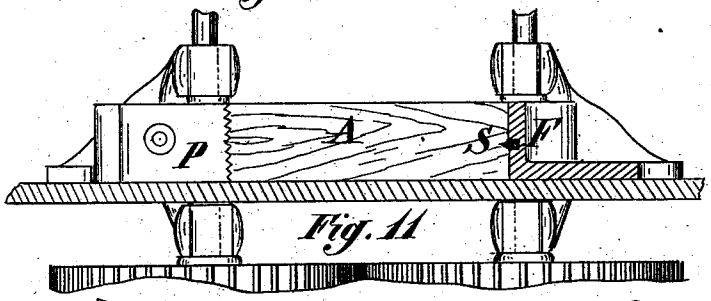




Fig. 11

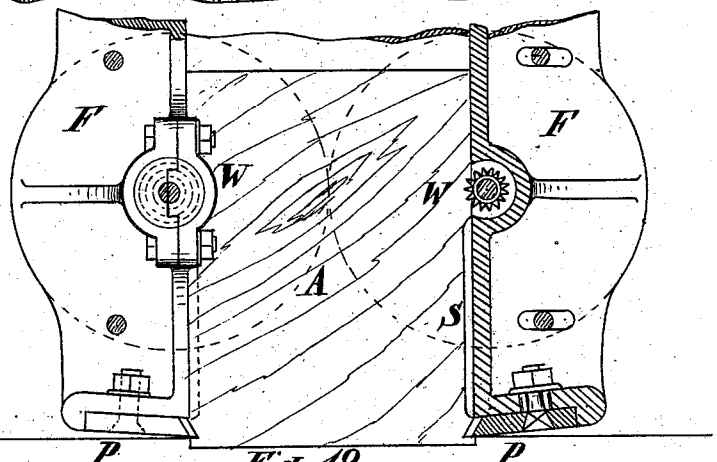



Fig. 12.

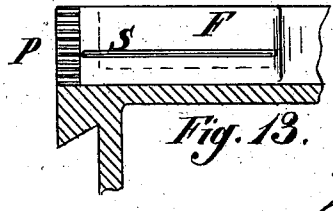



Fig. 13.

Witnesses:
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(No Model.) 5 Sheets—Sheet 5.

# G. SEBOLD.

## MACHINE FOR MAKING MATCH SPLINTS.

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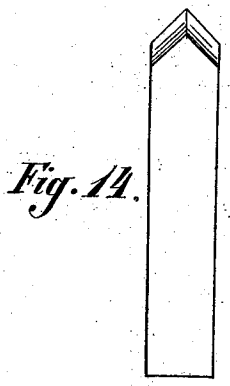


Fig. 14.

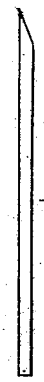


Fig. 15.

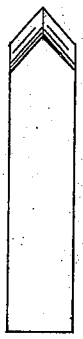


Fig. 16.

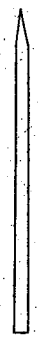


Fig. 17.

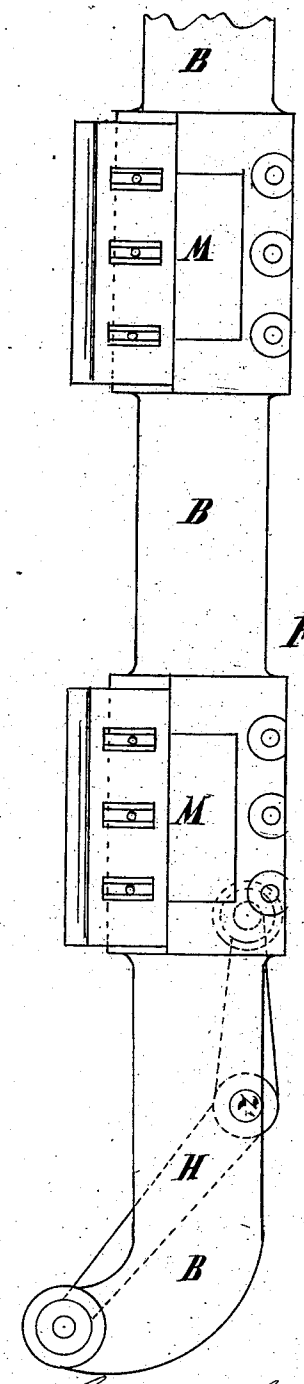



Fig. 18.

Witnesses:
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# UNITED STATES PATENT OFFICE.

GEORG SEBOLD, OF CARLSRUHE, GERMANY.

## MACHINE FOR MAKING MATCH-SPLINTS.

SPECIFICATION forming part of Letters Patent No. 293,794, dated February 19, 1884.

Application filed June 6, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, GEORG SEBOLD, a subject of the Emperor of Germany, and residing at Carlsruhe, Germany, have invented new and useful Improvements in Machines for Cutting Wood Blocks into Sticks for the Manufacture of Matches, of which the following is a specification, reference being had to the accompanying drawings.

The object of this invention is to obtain a machine for cutting match-sticks of very simple construction with great capacity of production. The machines now commonly used for the purpose only allow of blocks of special shape and size being used on them; but by my improvements I am enabled to use all sorts of blocks, and thus I provide for using up the fag ends of all sorts without any especial preparation.

In the accompanying drawings, Figure 1 represents a front view of a machine constructed according to my invention. Fig. 2 is a plan of the same. Fig. 3 is a vertical section through the line X X. Figs. 4, 5, and 6 represent the means of setting and regulating the small slitting-knives. Figs. 7, 8, 9, and 10 represent the method of attaching the flat knives to the knife-bar. Figs. 11, 12, and 13 represent the method of holding and guiding the wood block while being manipulated. Figs. 14 and 15 represent the long and cross cutting knives. Figs. 16 and 17 represent knives as formerly used. Fig. 18 represents a knife-bar provided with two knife-heads.

The wood block A is placed between the guides F, Figs. 2, 3, 11, and 12. It is then pressed in between the rollers W, which are grooved lengthwise by the hand-wheel H′, ratchet-bar Z, and pinion G, this latter being attached to the shaft of the hand-wheel H′. The wood blocks can be two, three, or more match lengths long. The rollers W are grooved in order to give them a better hold of the wood block. In order that the block may move on when the rollers from any cause do not bite, a pulley, D, keyed onto the shaft of the pinion G of the ratchet-bar Z and provided with a counter-weight, G′, serves to give a constant and regular pressure. (See Fig. 3.) The weight G′, being suspended from the pulley D, tends to move the shaft and the pinion thereon in a direction to press the ratchet-bar Z inward and against the wood block A. The wood block A is fed forward normally by the rollers W, and the ratchet-bar Z is caused to follow the block inward by the action of the weight G′. If from any cause the rollers W fail to bite and feed the block, the feeding will be performed by the weight G′ impelling the ratchet-bar Z forward.

In order to avoid waste as much as possible, and to allow of the block of wood being worked up to the last, so that the end of three to four millimeters thickness stands against the knives, I have made the following construction, namely: At the ends of the guides next to the knives I attach two claw-bars, P, (see Figs. 11 and 12,) which, with their toothed ends, bite firmly into the wood block and hold it tight. Further, in order that the wood block cannot move vertically, two knife-edges, S, are let into the inner sides of the guides F. (See Figs. 11, 12, and 13.) As soon as the wood has been moved on toward the knives the thickness of a match, this being effected by the rollers intermittently set in motion by any of the well-known mechanism, the knives begin to operate.

The mechanism of the machine being in the position, as shown in Fig. 1, the sliding carriage J is moved toward the wood blocks in the direction shown by the arrow. Upon the carriage the knife-heads K, with their small long slitting-knives *r*, are attached. (See Figs. 1, 3, 4, 5, and 6.) These knives carried by the carriage cut the wood block lengthwise—that is to say, across its face with the grain—the spaces between the knives being the width of the match. The cuts produced by these knives are horizontal. These knives *r* are situated vertically one below the other, the spaces between them being equal to the width of a match horizontally. However, they are placed alternately in three vertical tiers at different heights in such a manner that they do not all enter the wood at once, as formerly. By this all pressure upon the wood already cut is avoided, the travel of the carriage is more equal, and requires less power. (See Figs. 1, 3, 4, 5, and 6.)

The former knife-head K, which was used with the old machines, was only provided with one slot. Into this all the knives were placed, only divided by a piece of metal as thick as the matches were to be wide. (See Fig. 4ª.) By this arrangement all the knives came in contact with wood at once, thus causing a jerk and strong sudden strain. Further, it took

great force to drive the twenty or more knives through the wood to be worked, as the knives were seven-tenths of a millimeter thick, and this had to be made up by compressing the wood between the knives. By this pressure the match-sticks were injured, their porosity being considerably affected, so that afterward they did not take up paraffine or sulphur, as they would otherwise have done. The knife-head K, together with the knives *r*, can be adjusted horizontally as well as vertically by means of the foot-piece N. (See Figs. 4 and 5.) This allows of the small knives *r* to be quickly regulated and fixed level with the lowest edge of the wood block, thus avoiding all splinters, &c. As soon as these knives *r* have passed through the wood block, the cross-cutting apparatus R, with its knives *r'*, comes against the block and cuts it down in sections as they continue turning. In this manner the match-sticks are given the required length, this cross-cutting apparatus continues rotating, and the carriage J still advances. The motion of the carriage J is not only connected with that of the cross-cutting apparatus R, but also, by gearing and crank *k*, with the connecting-rod *l* and slide L. With this slide L is connected the short arm of the lever H, the longer arm of which is connected with the bar B, the said lever H being pivoted at Z'. By this mechanism the lever-arm H is given a swinging movement. (See Figs. 1, 2, and 18.)

The flat knives M are attached to the before-named bar B in a manner that allows of them being easily changed, and at the same time is a firm attachment. The method is as follows: The knife M is firmly attached by screws to the frame O, which latter is provided on three sides with prismatic guide-bars, which fit exactly into the corresponding guides of the knife-bar B. (See Figs. 7, 8, 9, and 10.) Screws *s* are further attached to the top side of a frame, O, fitting into corresponding spaces in the knife-bar B. If the frame O, with the knife M, is slid into the prismatic guides and the screws *s* drawn tight, the knives M will be firmly attached to the knife-bar B. The carriage J having moved from its former position to the end of its stroke, the slide L has already begun to return, and by its bend has set the lever H in motion. This in its turn moves the knife-bar B downward. The flat knife M thus describes a flat curve approximating to a parallelogram, and cuts off the match-sticks, which have been already cut lengthwise and crosswise by the knives *r* and *r'*. The carriage J now moves backward and at the same time the slide L forward, by which the bar B, with knives M, is lifted at once and remains in the same position during the rest of the stroke, as the lower part of the slide L is horizontal. The cross and long cutting knives *r* and *r'* now commence their work again, and the whole operations and movements repeat themselves again, as before described. As the small long-cutting knives *r*, attached to the carriage J, cut at the return-stroke as well as at the advance-stroke, the slide L and cross-cutting apparatus R are worked by suitable gearing at twice the speed of the carriage J.

In the drawings the machine is represented as working double—that is to say, with two flat knives M, two cross-cutting apparatus R, and two sets of long-cutting knives. It will be understood, however, that machines can be built any size and provided with any suitable number of the before-named apparatus. In making machines with several cross-cutting apparatus R, I prefer to dispose them in such a manner on the shaft that all the knives do not come in contact with the wood at one time. This insures a more even working of the machine. This is shown in Figs. 1 and 2.

The arrangement of two or more flat knives, M, on one knife-bar, B, is clearly shown in Fig. 18.

The small long and cross cutting knives *r* and *r'* are only ground on one side. (See Figs. 14 and 15.) This insures an equal length and width of match-sticks, which is not the case with knives ground upon both sides, as the grinding was always more or less unequal. (See Figs. 16 and 17.)

Having thus described my invention and the manner of operating the same, I claim—

1. In a machine for cutting match-sticks, the sliding carriage J, provided with slitting-knives *r*, the swinging knife-bar B, and shearing-knife M, the slide L, provided with a cam-slot, the lever H, fulcrumed at Z', and having one arm connected with said knife-bar B and the other engaging with the cam-slot in the slide L, the cranks *k k'*, connected by gearing, and rods connecting the crank *k* with the slide L and the crank *k'* with the sliding carriage J, substantially as herein described, whereby the shearing-knife M is caused to cut at each movement of the carriage J and its slitting-knives.

2. In a machine for cutting match-sticks, the combination of the sliding carriage J, the knife-head K, and the slitting-knives *r*, arranged in two or more vertical tiers, the knives in each vertical tier being set opposite the spaces between the knives in the other tier or tiers, substantially as and for the purpose herein described.

3. The combination, with the sliding carriage J and slitting-knives *r*, and the shearing-knife M, of the adjustable guides F, between which the blocks are fed to said knives, the sharp-toothed plates arranged vertically at the inner ends of said guides, and the horizontal knife-edges S S, secured in the inner faces of said guides F, all substantially as and for the purpose herein described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORG SEBOLD.

Witnesses:
FRIEDRICH NEFF,
EMIL GERBER.