No. 808,945. PATENTED JAN. 2, 1906.

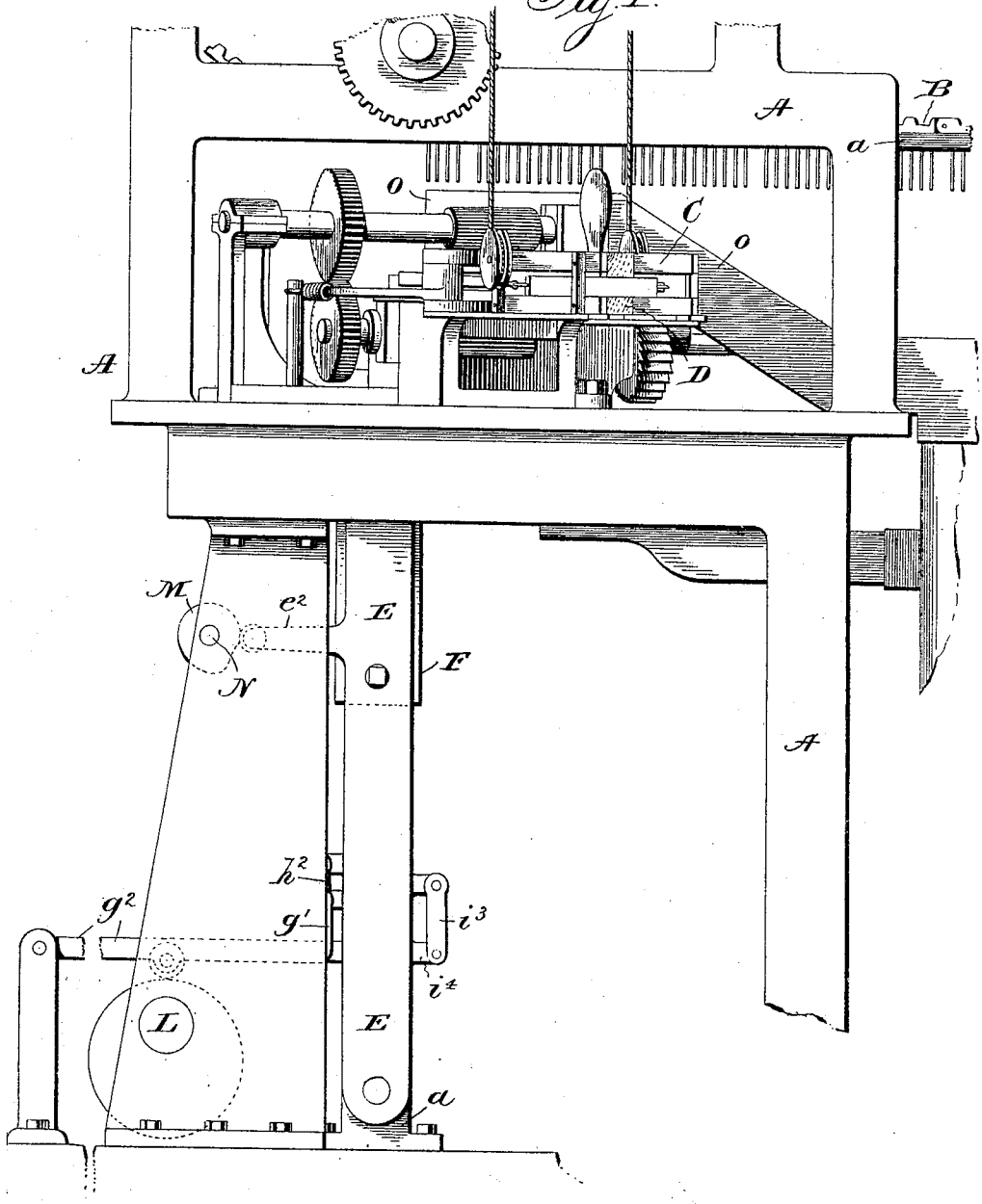
E. J. PRINDLE.

MATCH MAKING MACHINE.

APPLICATION FILED APR. 15, 1901.

5 SHEETS—SHEET 1.

Fig. 1.



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Henry C. Hazard.

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Edwin J. Prindle, by
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5 SHEETS—SHEET 2.

Fig. 2.

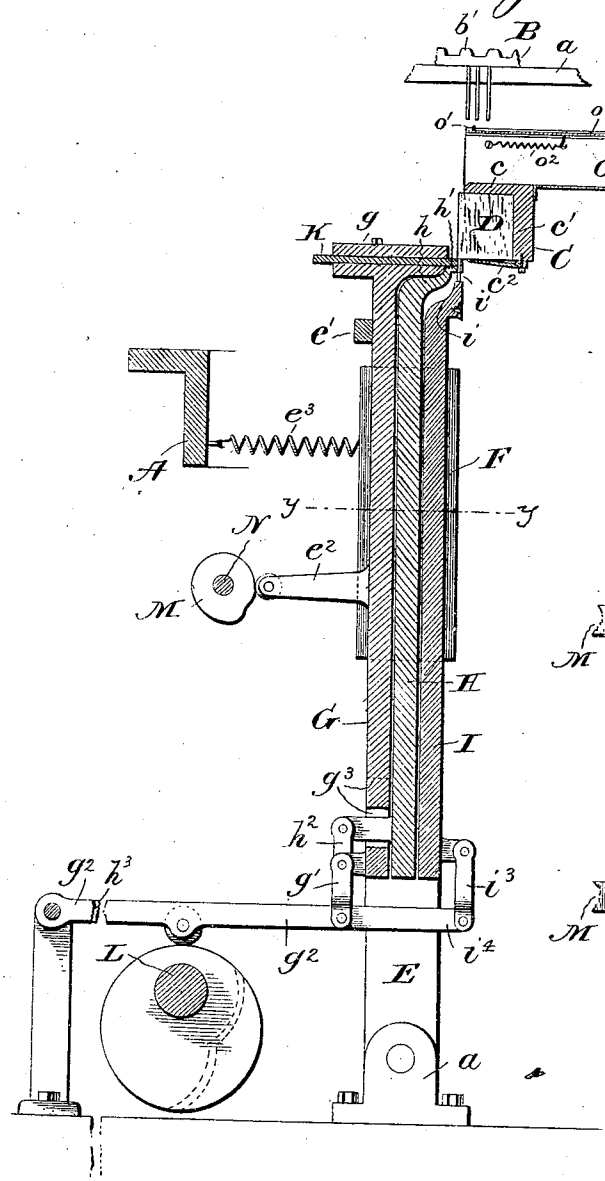
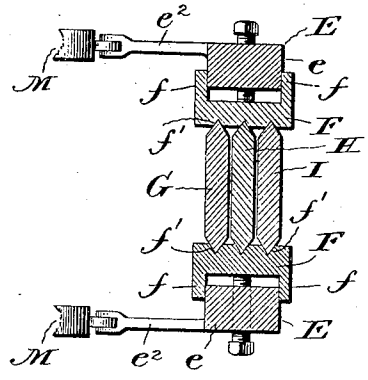


Fig. 3.



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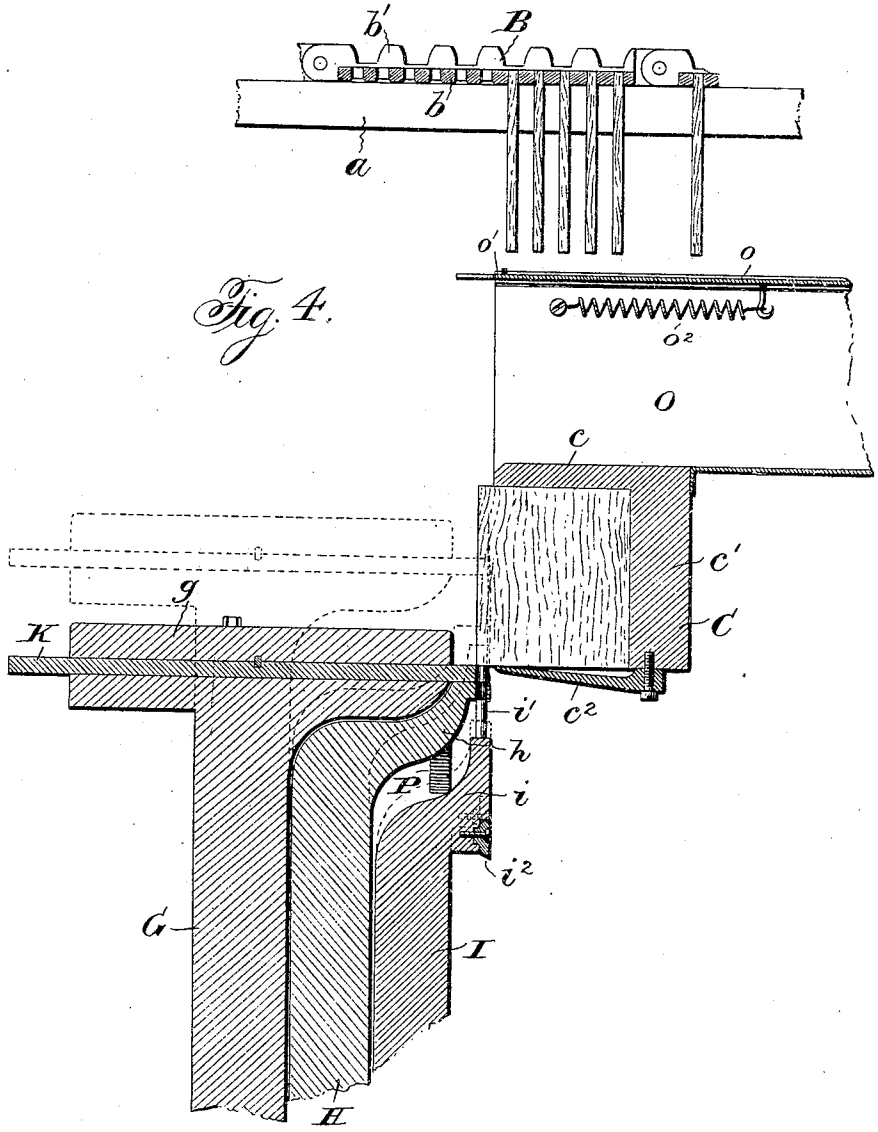
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5 SHEETS—SHEET 3.

Fig. 4.



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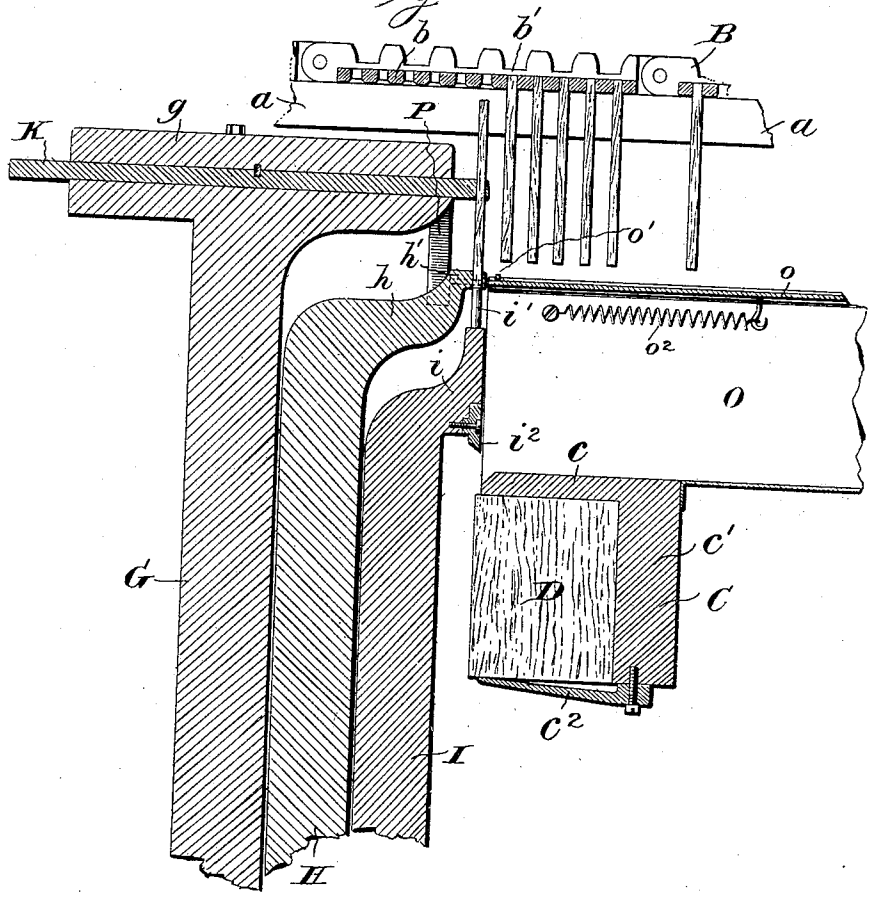
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5 SHEETS—SHEET 4.

Fig. 5.



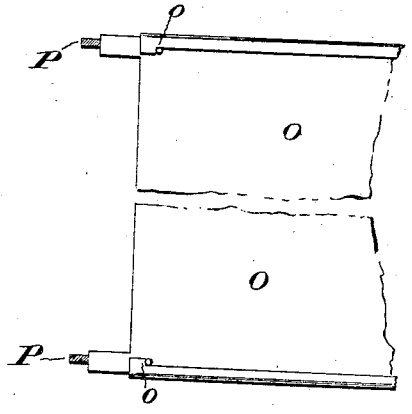


Fig. 7.

Witnesses:
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5 SHEETS—SHEET 5.

Fig. 6.

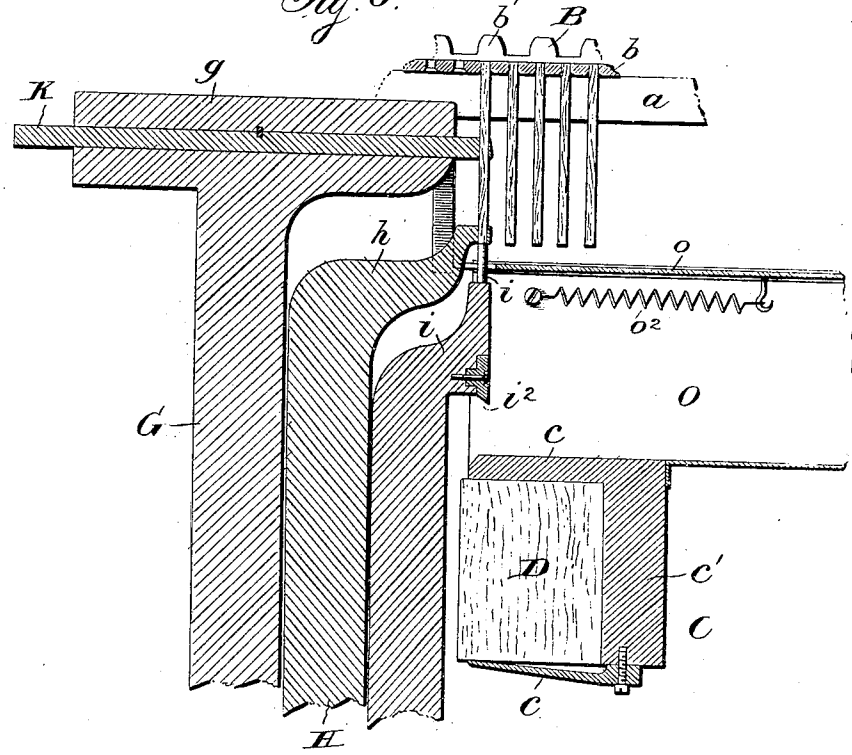


Fig. 8.

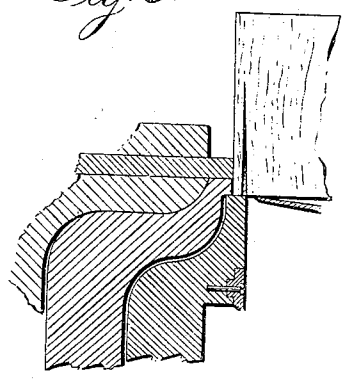
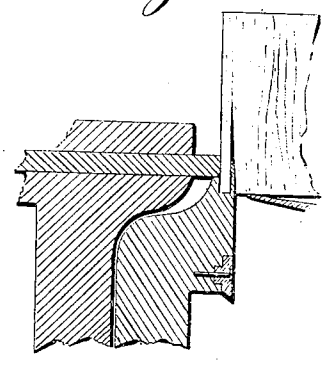


Fig. 9.



Witnesses:

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UNITED STATES PATENT OFFICE.

EDWIN J. PRINDLE, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO THE DIAMOND MATCH COMPANY, OF NEW YORK, N. Y., A CORPORATION OF ILLINOIS.

MATCH-MAKING MACHINE.

No. 808,945. Specification of Letters Patent. Patented Jan. 2, 1906.

Application filed April 15, 1901. Serial No. 55,948.

To all whom it may concern:

Be it known that I, EDWIN J. PRINDLE, of the city of Washington, in the District of Columbia, have invented certain new and useful Improvements in Match-Making Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a match-machine embodying my invention. Fig. 2 is a vertical transverse sectional view. Fig. 3 is a horizontal sectional view on the line *y y* of Fig. 2. Figs. 4, 5, and 6 are longitudinal sectional views of the splint forming and inserting parts, illustrating their various positions. Fig. 7 is a detail view of the movable top of the air-trunk. Figs. 8 and 9 are views similar to Fig. 6 of other embodiment of my invention.

Letters of like name and kind refer to like parts in each of the figures.

The object of my invention has been to provide mechanism for cutting match-splints and for accurately and positively inserting them into a carrier by which they can be presented for subsequent treatment; and to such ends my invention consists in the improvement in match-machines hereinafter specified.

In the embodiment of my invention chosen for illustration I provide a frame A, having ways *a* and *a* for supporting a carrier B. The latter may be of any desired form, and its special construction is not material to my invention. I have shown a carrier consisting of plates *b* and *b*, having perforations which are adapted to receive and hold match-splints, the plates being attached to and supported by rack-bars *b'* and *b'*, which are linked together to form an endless chain.

Beneath the carrier, and preferably extending obliquely thereto, is a guide and holder C for the blocks D from which the splints are to be cut. Such guide is open on one side, has a rigid top *c* and one rigid side *c'* and a bottom that preferably consists of a spring-plate c^2, which is secured to the side *c'* and that supports and yieldingly clamps the blocks D. A guide-frame E, consisting of parallel side bars *e* and *e*, connected by a cross-bar *e'*, is pivoted to lugs *a'* and *a'* at the sides of the base of the frame and is thus adapted to swing in a plane parallel to the plane of movement of the carrier. Guide-blocks F and F are mounted on the side bars *e* and *e*, and each block has wings *f* and *f*, which are adapted to bear upon the sides of its respective guide-bar. In the opposed faces of the guide-blocks are formed three pairs of ways *f'* and *f'*, in which are mounted three slides G, H, and I, which carry the splint cutting and inserting parts. The guide-blocks are adjusted toward each other by set-screws for the purpose of taking up wear. The slide G, which is farthest from the guide C, has a head which is provided with a preferably horizontal upper face upon which are mounted splint-cutting knives K and K, the latter consisting of bars having one end rounded and having a vertical hole formed concentric with such rounded portion. The portion of the bar around the upper edge of the hole is sharpened, and the lower end of the hole is preferably made slightly flaring. The knives are clamped to the head in any convenient manner, as by a plate *g*, resting on the knives and bolted to the head. The middle slide H has an overhanging portion *h* at its upper end on which are formed or to which are attached a row of holders *h'* and *h'*, which are in shape substantially like the ends of the knives, except that they are not sharpened. The holders are in axial alinement with the cutting portions of the knives. The slide I, which is nearest to the guide C, has an overhanging portion *i* on whose upper surface is formed or attached a series of ejectors in the form of pins *i'* and *i'*, which are in axial alinement with the holders and the knives. On the lower edge of the overhanging portion *i* is a knife i^2 for trimming the face of the block D. The slides G, H, and I are connected by links *g'*, h^2, and i^3, respectively, to levers g^2, h^3, and i^4, the latter being fulcrumed on blocks secured to the frame-base. A shaft L is journaled on the base and is provided with cams which by engagement with antifriction-rollers on the levers reciprocate the slides G, H, and I. The link h^2 is pivoted between ears formed on the back of the plate H, and an opening g^3 is formed in the slide G, through which such ears extend for connection with their link. The links *h'* and i^3 are pivoted

between ears formed on the outer faces of the slides G and I, respectively. The frame E has rearwardly-extending arms e^2 and e^2, which are provided with antifriction-rolls that are adapted for engagement with cams M and M, which are mounted on a shaft N, the latter having bearing in boxes secured to the side bars of the frame. A spring e^3, connecting the frame E and the machine-frame, holds the arms e^2 and e^2 in contact with the cams M and M. An air-trunk O is formed above the guide C, and the top *o* of such trunk is preferably mounted in guides extending parallel to the carrier. Such top is yieldingly held against stops *o'* and *o'* on the trunk by a spring o^2, that is secured to the top and to the body of the trunk. Arms P and P depend from the head of the slide G, and such arms are adapted to bear against the rear edge of the top *o* and to force said top back when the cams M and M move the frame E forward.

In the operation of my machine the carrier is preferably moved continuously at a uniform rate of motion, air is exhausted from the air-trunk, blocks from which the match-splints are to be formed are fed through the guide C until they project over the path of the cutters, and the shafts L and N are rotated. Supposing the cutters, holders, and ejectors to be below the blocks D and D, the cutters are preferably immediately above the holders and the holders are immediately above the level of the tops of the ejectors. While maintaining the same relative positions, the cutters, holders, and ejectors rise until the cutters and the ejectors have entered the blocks D and D and the upper ends of the ejectors are at the level of the lower surfaces of such blocks. In this position the lower ends of the splints being formed rest on the ejectors and are embraced by the holders. The cutters now rise until the splints have been completely severed from the blocks, while the holders and ejectors remain stationary. In order to completely sever the splints from the blocks, it is not absolutely necessary that the cutters shall rise to the level of the top of the blocks D and D. The cutters now preferably remain stationary and the holders and ejectors advance, carrying with them the splints until the latter project a considerable distance above the cutters. The cutters, holders, and ejectors while maintaining the same relative positions now rise with the splints toward the carrier, and as the trimming-knife passes above the level of the bottom of the air-trunk the cams M and M give the frame E a motion such that the upper ends of the splints travel with and at the same rate of motion as the carrier. The cutters, holders, and ejectors now insert the splints into the openings in the carrier-plates, such parts meanwhile moving with the latter. During the travel of the splint-inserting parts with the carrier the arms P and P bear against and push forward the top of the air-trunk. When the splints are fully inserted into the carrier, the ejectors cease their vertical movement, but continue their travel with the carrier, and the holders and cutters, also traveling with the splints, move downward along the splints until they pass below them and over the ejectors. The splints are now inserted in the carrier and are free from the forming and inserting parts. The cams M and M now permit the spring e^3 to draw the frame E to the vertical position, and the cutters, holders, and ejectors return by straight paths to their original positions, the trimming-knife dressing the face of the blocks D and D during such movement. The said blocks are then fed over the cutters preparatory to the formation of a new row of splints, and the parts begin again to perform the operations before described.

It will be observed that the splints are at all times positively held, so that no accidental displacement is possible, and that they can be directed with great accuracy into the holders in the carrier.

Various changes can be made within the scope of my invention. For instance, the carrier can be given a step-by-step motion, and the entire splint inserting and disengaging operations can be performed during a period of rest, so that the cutters, holders, and ejectors will not have to move with the carrier, and the frame E and its operating parts can thus be dispensed with. The ejector-pins can be dispensed with, and the upper face of the block I can be used to drive the splints into the carrier. Such construction is shown in Fig. 8; or the holders can be provided with bottoms against which the splints will rest while being driven into the carrier. In such case the trimming-knife can be conveniently attached to the slide G, on which the holders are formed. Such construction is illustrated in Fig. 9. The holders can be made of slightly larger diameter than the cutters, so that they will offer no resistance to their withdrawal from the splints.

Having thus described my invention, what I claim is—

1. In a match-machine, the combination with a carrier, of a splint-cutter, an air-trunk, and a splint-holder that engages the splint on the side next the inlet to the air-trunk and prevents the splint being carried toward the inlet said cutter being situated between the holder and the carrier.

2. In a match-machine, the combination with a carrier, of a splint-cutter, and a splint-holder supplemental to and separate from the cutter that surrounds the splint and holds it from lateral movement in any direction, the splint-cutter being situated between the carrier and the holder.

3. In a match-machine, the combination with a carrier, of a splint-cutter, means for reciprocating the same toward and from the carrier, a holder for the splints, means for reciprocating said holder toward and from the carrier, means for inserting the splints into the carrier while the carrier is in motion, and means for moving the said holder with the carrier during the insertion of the splints.

4. In a match-machine, the combination with a carrier, of a splint-cutter, and a holder for the splint, means for inserting the splint into the carrier while the splint is held both by said cutter and such holder, and means for moving said cutter and such holder with the carrier during the insertion of the splint, substantially as and for the purpose described.

5. In a match-machine, the combination with a continuously-moving carrier, of a splint-cutter, and a holder for the splint, means for inserting the splint into the carrier while the splint is held both by said cutter and such holder, and means for moving said cutter and such holder with the carrier during the insertion of the splint, substantially as and for the purpose described.

6. In a match-machine, the combination with a carrier constructed to hold and transport splints, of a splint-cutter, and a holder for the splint supplemental to and separate from the cutter, said cutter being located between the holder and the carrier means for inserting the splint into the carrier while the splint is held both by said cutter and such holder, and means for preventing the withdrawal of the splint from the carrier during the disengagement of the cutter and the holder from the splint, substantially as and for the purpose described.

7. In a match-machine, the combination with a carrier constructed to hold and transport splints, of a splint-cutter, and a holder supplemental to and separate from the cutter that surrounds the splint, said cutter being located between the holder and the carrier, means for inserting the splint into the carrier while the splint is held both by said cutter and such holder, and means for preventing the withdrawal of the splint from the carrier during the disengagement of the cutter and the holder from the splint, substantially as and for the purpose described.

8. In a match-machine, the combination with a carrier constructed to hold and transport splints, of a splint-cutter that surrounds the splint, a holder that surrounds the splint, supplemental to and separate from the cutter, said cutter being located between the holder and the carrier, means for inserting the splint into the carrier while the splint is held both by said cutter and by such holder, and means for preventing the withdrawal of the splint from the carrier during the disengagement of the cutter and the holder from the splint, substantially as and for the purpose described.

9. In a match-machine, the combination with a carrier constructed to hold and transport splints, of a splint-cutter that surrounds the splint, a holder that surrounds the splint supplemental to and separate from the cutter, said cutter being located between the holder and the carrier, means for inserting the splint into the carrier while the splint is held both by said cutter and by such holder, and for withdrawing said cutter and holder from the splint longitudinally thereof, and means for preventing the withdrawal of the splint from the carrier during the disengagement of the cutter and the holder from the splint, substantially as and for the purpose described.

10. In a match-machine, the combination with a carrier constructed to hold and transport splints, of a splint-cutter, and a holder supplemental to and separate from the cutter that surrounds the splint and is laterally immovable with relation to the cutter, said cutter being located between the holder and the carrier, means for inserting the splint into the carrier while the splint is held both by said cutter and by such holder, and means for preventing the withdrawal of the splint from the carrier during the disengagement of the cutter and the holder from the splint, substantially as and for the purpose described.

11. In a match-machine, the combination with a carrier, of a splint-cutter and a holder for the splint, means for inserting the splint into the carrier while the splint is held both by said cutter and such holder, means for moving said cutter and such holder with the carrier during the insertion of the splint, and means for preventing the withdrawal of the splint from the carrier during the disengagement of the cutter and the holder from the splint, substantially as and for the purpose described.

12. In a match-machine, the combination with a continuously-moving carrier, of a splint-cutter, and a holder for the splint, means for inserting the splint into the carrier while the splint is held both by said cutter and such holder, means for giving said cutter and such holder a movement with the carrier during the insertion of the splint, and means for preventing the withdrawal of the splint from the carrier during the disengagement of the cutter and the holder from the splint, substantially as and for the purpose described.

13. In a match-machine, the combination with a carrier constructed to hold and transport splints, of a tubular splint-cutter, and a tubular holder for the splint supplemental to and separate from the cutter, said cutter being located between the holder and the carrier, means for inserting the splint into the carrier while the splint is held both by said cutter and such holder, and means for pre-

venting the withdrawal of the splint from the carrier during the disengagament of the cutter and the holder from the splint, substantially as and for the purpose described.

14. In a match-machine, the combination with a carrier, of a tubular splint-cutter, and a tubular holder for the splint supplemental to and separate from the cutter, means for inserting the splint into the carrier while the splint is held both by said cutter and such holder, and a pin which is adapted to bear upon the end of the splint while the cutter and the holder are disengaged from the splint, substantially as and for the purpose described.

15. In a match-machine, the combination with a carrier, of a tubular splint-cutter, and a tubular holder for the splint supplemental to and separate from the cutter, means for inserting the splint into the carrier while the splint is held both by said cutter and such holder, a pin which is adapted to bear upon the end of the splint, and means for moving said cutter and such holder along the splint and over such pin, substantially as and for the purpose described.

16. In a match-machine, the combination with a carrier, of a tubular splint-cutter, and a tubular holder for the splint, means for inserting the splint into the carrier while the splint is held both by said cutter and such holder, and means for giving said cutter and such holder a movement with the carrier during the insertion of the splint, substantially as and for the purpose described.

17. In a match-machine, the combination with a carrier, of a tubular splint-cutter, and a tubular holder for the splint, means for inserting the splint into the carrier while the splint is held both by said cutter and such holder, a pin which is adapted to bear upon the end of the splint, means for moving said cutter and such holder along the splint and over such pin, and means for giving said cutter, holder, and pin a movement with the carrier during the insertion of the splint, substantially as and for the purpose described.

18. In a match-machine, the combination with a carrier, of means movable in the direction of motion of the carrier for inserting a splint into such carrier, and an air-conduit adjacent thereto, said conduit having a portion in the path of the inserting means that is movable in the direction of travel of the carrier.

19. In a match-machine, the combination with a carrier, of a guide for the material from which the splint is formed, an air-conduit between said carrier and such guide, and means movable in the direction of motion of the carrier for inserting the splint into the carrier, said conduit having a portion yielding in the direction of movement of the carrier to permit movement of such means, substantially as and for the purpose described.

20. In a match-machine, the combination with a carrier, of a guide for the material from which the splint is formed, an air-conduit between said carrier and such guide, and means movable in the direction of motion of the carrier for forming the splint and inserting it into the carrier, said conduit having a portion yielding in the direction of movement of the carrier to permit movement of such means, substantially as and for the purpose described.

21. In a match-machine, the combination with a continuously-moving carrier, of a guide for the material from which the splint is formed, an air-conduit between such carrier and said guide, means for inserting the splint into the carrier, and means for moving such inserting means with the carrier during the insertion of the splint into the carrier, said conduit having a portion yielding in the direction of movement of the carrier to permit movement of such splint-inserting means, substantially as and for the purpose described.

22. In a match-machine, the combination with a carrier, of means for inserting splints into the carrier, means for moving such inserting means with the carrier during the insertion of the splints therein, and an air-conduit having a portion in the path of the inserting means that is movable in the direction of travel of the carrier.

In testimony that I claim the foregoing I have hereunto set my hand this 23d day of March, A. D. 1901.

EDWIN J. PRINDLE.

Witnesses:

HENRY C. HAZARD,

GEORGE B. PRINDLE.