

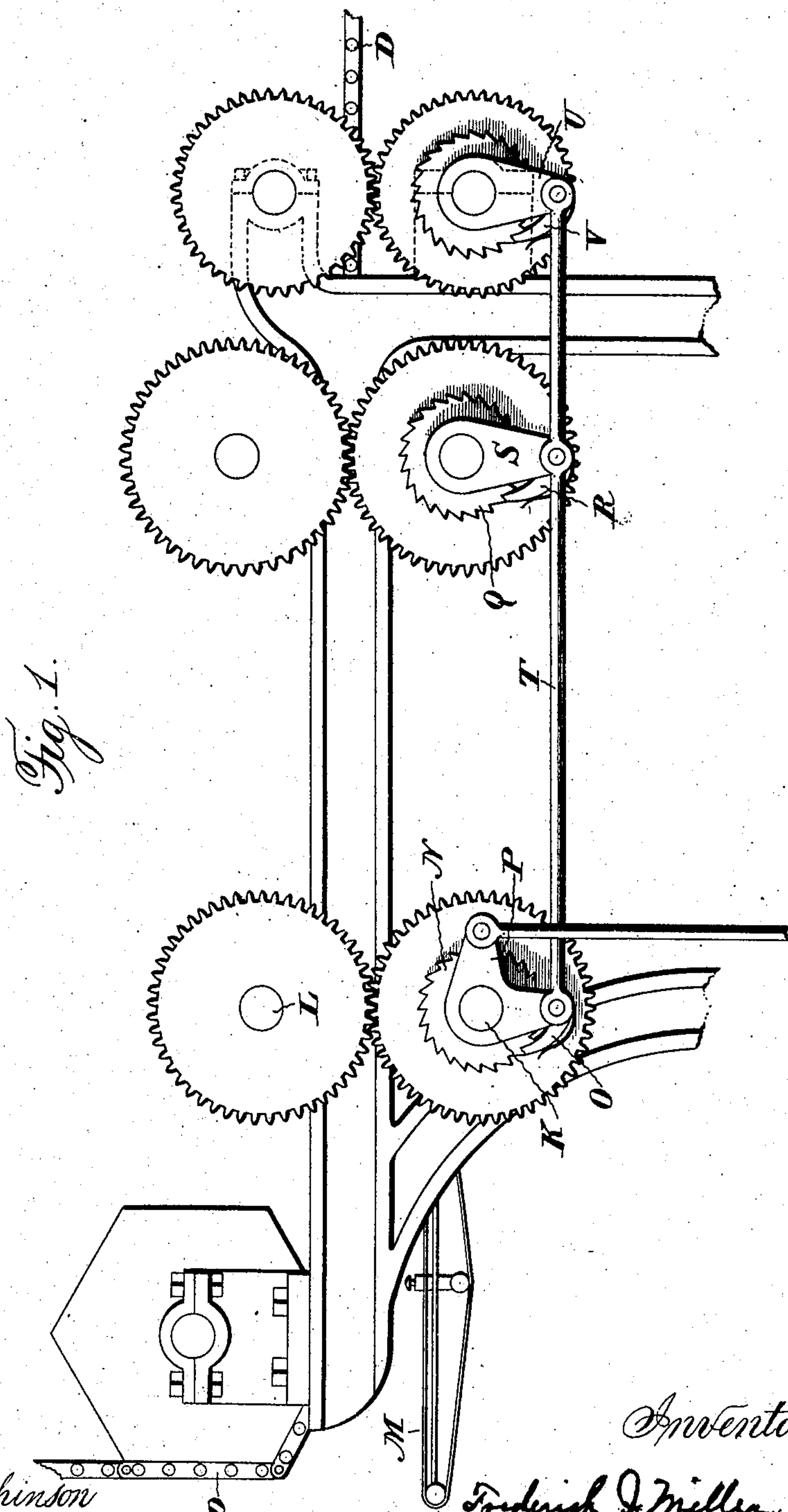
No. 781,443.

PATENTED JAN. 31. 1905.

F. J. MILLER.  
MATCH MACHINE.

APPLICATION FILED MAY 22, 1899.

3 SHEETS—SHEET 1.



Witnesses:

James Hutchinson  
Henry C. Hazard

Inventor.

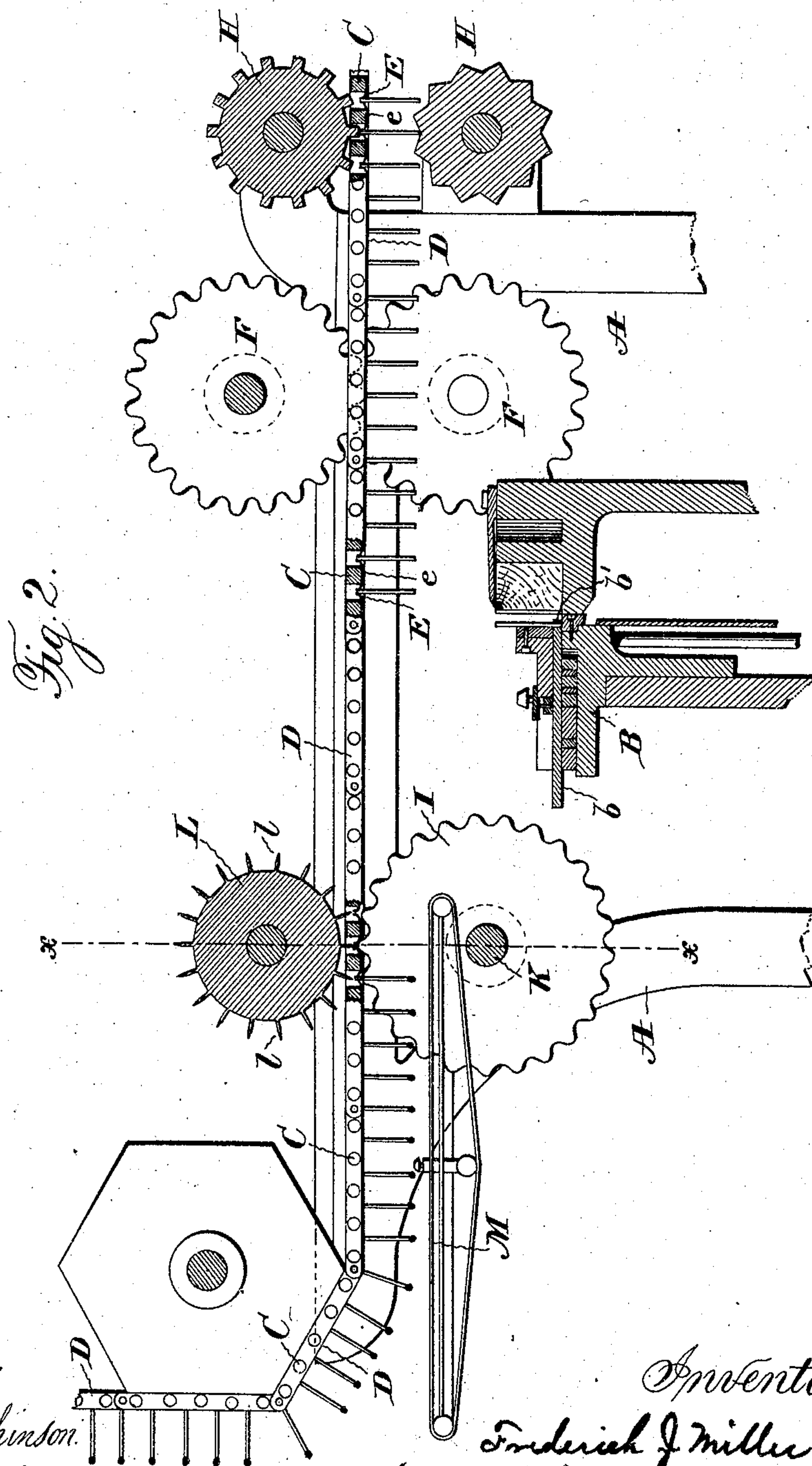
Fredrick J. Miller, by  
Prindle & Russell, his attys

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Witnesses:  
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Henry C. Hazard

Inventor.  
F. J. Miller, by  
P. B. Russell, his atty



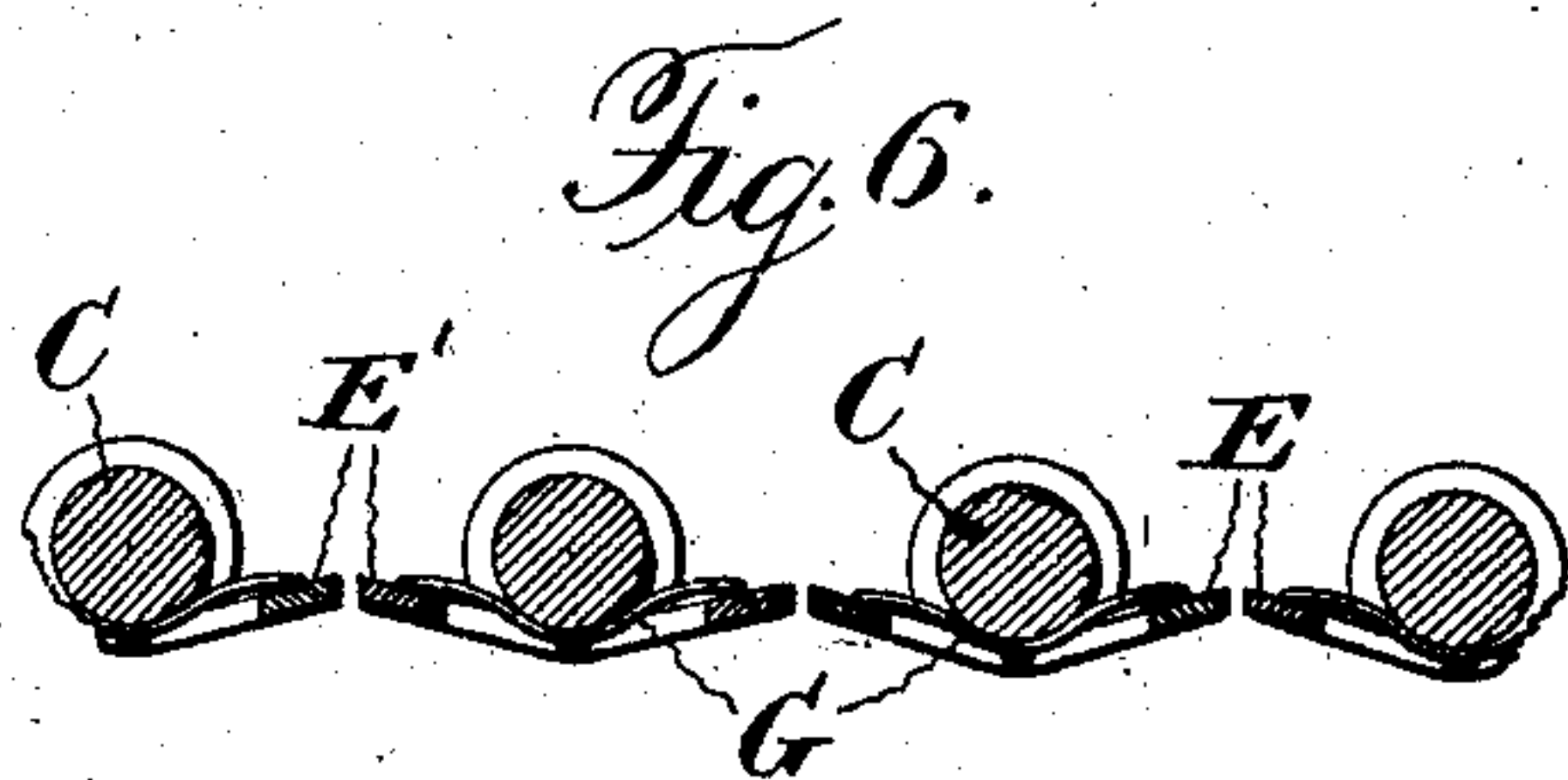
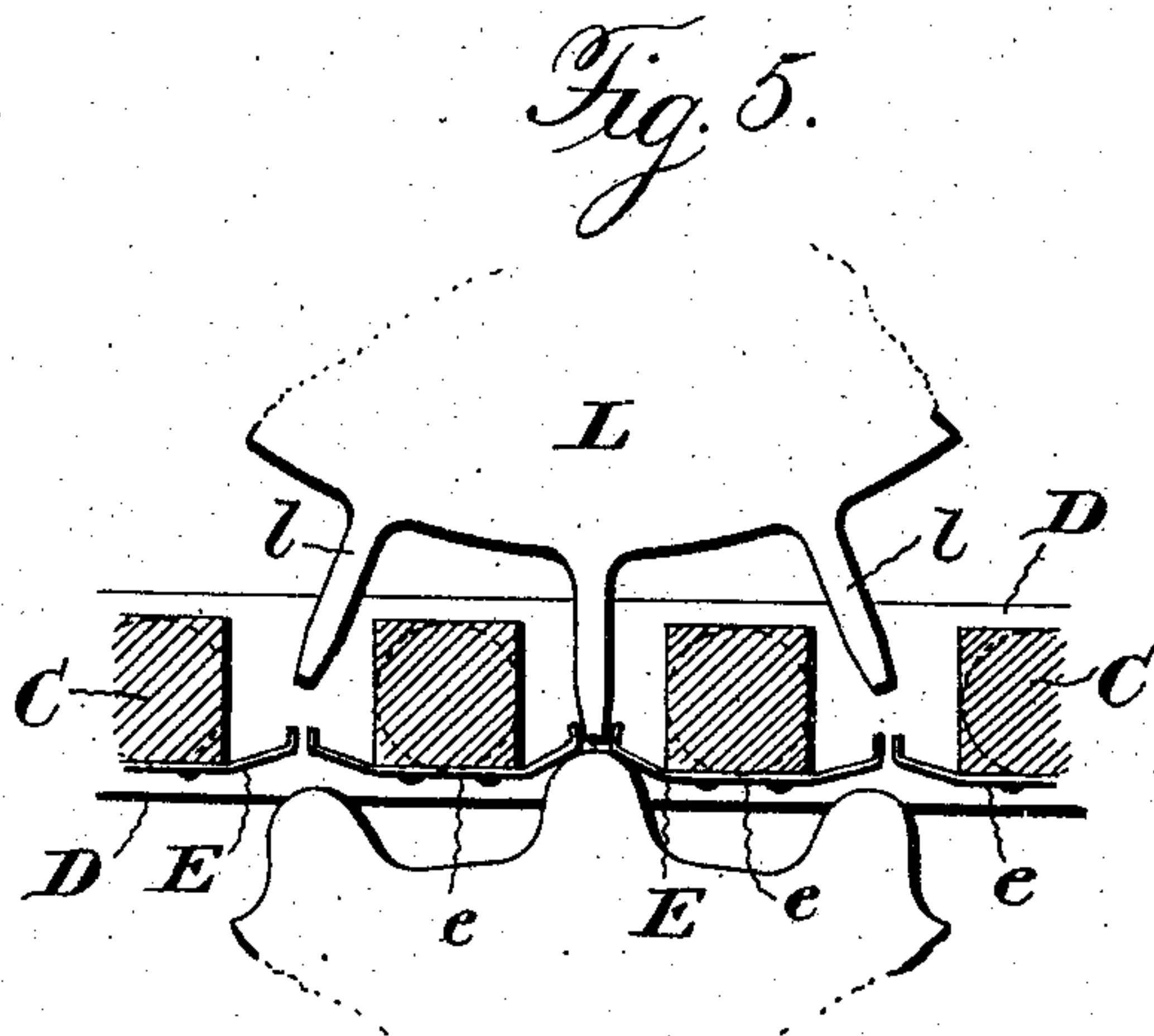
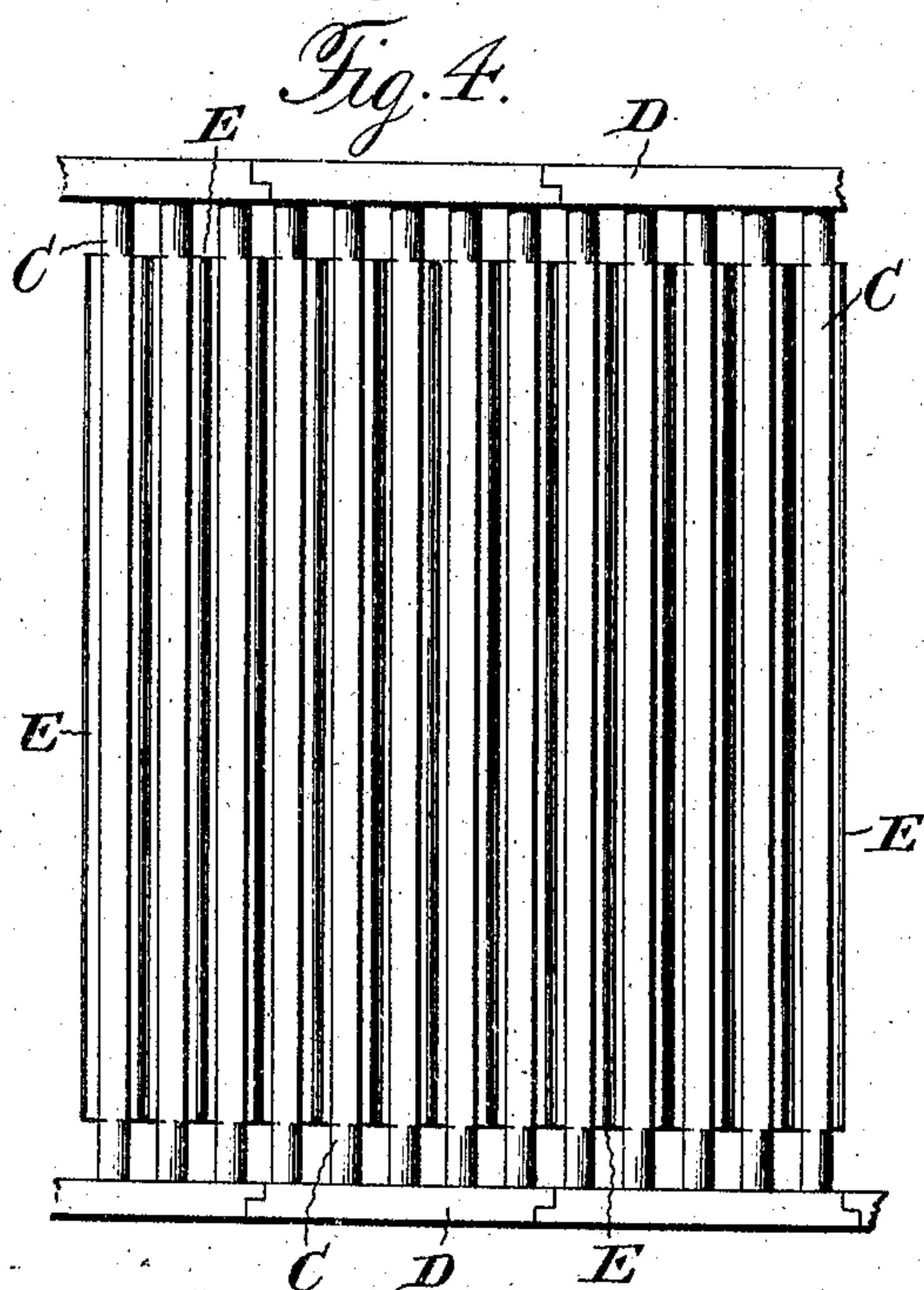
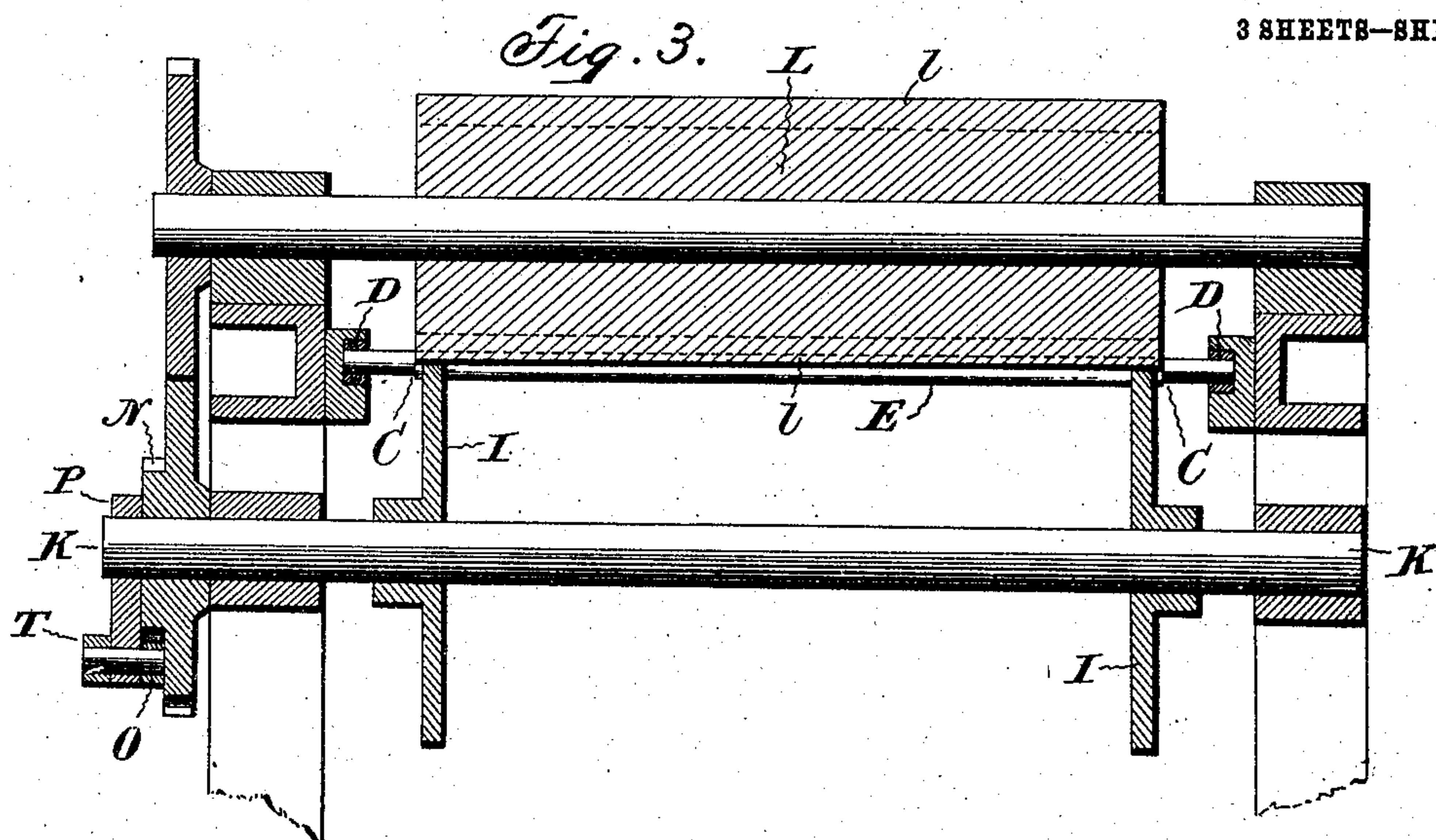
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3 SHEETS—SHEET 3.



Witnesses:  
Jas. E. Hutchinson.  
Henry C. Hazard.

Inventor.  
Frederick J. Miller, by  
Prindle & Russell, his Attys



# UNITED STATES PATENT OFFICE.

FREDERICK J. MILLER, OF WILMINGTON, DELAWARE, ASSIGNOR TO THE  
DIAMOND MATCH COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION  
OF ILLINOIS.

## MATCH-MACHINE.

SPECIFICATION forming part of Letters Patent No. 781,443, dated January 31, 1905.

Application filed May 22, 1899. Serial No. 717,757.

*To all whom it may concern:*

Be it known that I, FREDERICK J. MILLER, of Wilmington, in the county of Newcastle, and in the State of Delaware, have invented  
5 certain new and useful Improvements in Match-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—

10 Figure 1 is a view in elevation of a portion of a match-machine embodying my invention; Fig. 2, a view of the same in vertical section; Fig. 3, a cross-section on the line *xx* of Fig. 2; Fig. 4, a detail top plan view of a portion  
15 of the carrier; Fig. 5, a detail section, on an enlarged scale, of a portion of the carrier and the match-ejecting mechanism; and Fig. 6, a detail view in cross-section, showing a different form of carrier.

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

The object of my invention is to provide a construction of splint-carrier for match-machines which will receive and hold all of the  
25 splints intended to be delivered to it by the cutting or other feeding mechanism, and thus remedy a serious defect in other carriers in this regard; and to such end said invention consists in the carrier and in the parts of the  
30 machine to coöperate therewith, constructed and combined substantially as hereinafter specified.

In the embodiment of my invention as shown in the accompanying drawings wooden  
35 splints are used in making the matches and a splint-cutting mechanism is illustrated as a part of the machine; but it is to be understood that this is merely one adaptation of my improvements, as the latter can be employed  
40 when the cutting mechanism is not a part of the organized machine and also when other material than wood is used for the splints.

The splint-cutting mechanism shown is of a well-known type, comprising a reciprocating  
45 head moving in guides in a suitable frame A, which head, B, carries a series of cutters each in the form of a bar *b*, having at one end a tubular cutter *b'*, the splints after being cut on the descent of the head being on its ascent car-

ried thereby to place their upper ends in the  
carrier that travels horizontally above the cut- 50  
ting mechanism. As the splints are com-  
monly supported only by the small portions at  
their lower ends which are in the cutters, it is  
frequently the case that they do not stand per- 55  
fectly vertical, but lean or stand awry, so  
that their upper ends do not aline with the  
openings in the carrier intended for their re-  
ception, and hence said ends strike the solid  
portions of the carrier and the splints are not 60  
placed therein, but are lost. I have devised  
a carrier which is free from this defect and  
insures the entry into and the secure holding  
by the carrier of the splints whether they are  
straight or crooked. My carrier in its pre- 65  
ferred form is composed of parallel bars C and  
C, that extend crosswise of the machine or  
parallel with a row of splints carried by the  
head B and are secured at their opposite ends  
to bars D and D in line with each other and 70  
linked together to form a flexible or chain-  
like continuous or endless structure. Project-  
ing from each side of each bar C into the space  
between said bar and its neighbor is a flexible  
flange or lip E, that inclines from the side of 75  
the bar. The two lips of adjacent bars together  
present surfaces that converge to a space be-  
tween their free edges sufficiently less in width  
than the thickness of a splint as to insure the  
tight gripping of the latter between the two 80  
when it is thrust between them. Speaking  
from the standpoint of the relative position of  
the bars and lips when in place to receive the  
splints, the lips are at each of the lower corners  
of the bar, and each inclines laterally and up- 85  
wardly directly from the bar corner, so that  
by the two inclined surfaces of a coöperating  
pair of lips a splint that is considerably out of  
vertical position will have its end fairly en-  
gaged and straightened and guided into the 90  
surface between the lips. At its free end  
each lip is bent so that it will have not a mere  
edge to bite into the splints, but a somewhat  
extended surface to grip them. Preferably  
the two lips of each bar are constructed in a 95  
single piece, with an intervening part *e* that  
is riveted or otherwise fastened to one side  
of the bar, said piece being of some suitable



spring metal that will render the lips sufficiently flexible to enable them to yield under the thrusts of the splints, and yet stiff enough to firmly hold the splints. The length of the lips is sufficiently less than the distance between the two lines of side bars or links D and D so that there is a portion of each of the bars C and C between each end of the lip and side bar D adjacent thereto for engagement by the teeth of drive-wheels F and F to move the carrier along. Preferably the end portions of the bars C and C are round, while the remainder thereof is angular.

Instead of the spring-lips E and E the construction shown in Fig. 6 may be used, which consists of bars E' and E', pivoted at their ends to bars C and C and pressed toward each other in pairs to clamp the splints by springs G and G, attached to the bars C and C.

A pair of evening-rolls H and H, similar to those shown in my application, Serial No. 698,284, filed December 5, 1898, is preferably employed, but any other means for evening the splints after being thrust in the carrier may be used.

For discharging the matches from the carrier I employ means for opening the lips E and E to release the splints and an ejecting device to press or thrust the splints from the carrier when the lips have been opened. The lip-opening means consists of several toothed wheels I and I, mounted on a shaft K in bearings on the frame A beneath the carrier, the teeth of the wheels being brought into engagement with the under sides of the lips and acting to press them upward and apart, and thus causing them to free their grip on the splints. Any desired number of the lip-opening wheels may be employed. Mounted directly above the shaft K and over the carrier is a roller or cylinder L, having a number of longitudinal radial ribs l and l, each of which by the revolution of the roller in turn comes into position over the pair of lips opened by the wheels I and I and presses the splints downward, forcing them from the carrier, where they are received by a suitable delivery device M. The roller L is geared to the shaft K, from which it receives its motion, and said shaft has a ratchet-wheel N, that is operated by a pawl O, carried by a lever P, which is driven by suitable connections with the main shaft of the machine. The wheels I and I and the roller L are thus given a step-by-step or intermittent motion to agree with the like motion which is given the carrier at this part of the machine to permit the proper insertion of the splints into the carrier. The carrier is given its intermittent motion by placing upon the shaft of the lower drive-wheel F a ratchet-wheel Q, which is driven by a pawl R on a crank-arm S, hung on the shaft of the wheel F and connected by a rod or pitman T with the lever P. The shafts of the drive-wheels F and F are geared together

so that all of said wheels are driven by the ratchet-wheel Q and its pawl R. The rod or pitman T is extended to connect with a crank-arm U on the lower evening-roll shaft, which arm carries a pawl V, that engages a ratchet-wheel on said shaft, and as the two evening-rolls are geared together they are thus also given a step-by-step motion in common with the carrier-moving and the match-discharging mechanisms.

It is not deemed necessary to show and describe any other portions of the match-machine, as they can be of well-known or other constructions and have nothing to do with my invention.

It will be observed that a row of splints is clamped on both sides by the flexible lips and that because of the use of a pair of flexible or yielding lips for each row the splints whether leaning forward or backward have a yielding surface to strike against and not a rigid one, which might break them.

The purpose of the cross-bars C and C is to add stiffness or rigidity to the carrier and to support the lips, as well as to afford engaging parts for the drive-wheels. They do not engage and hold the splints, but the latter are wholly held by the flexible lips.

Having thus described my invention, what I claim is—

1. A carrier for match-machines, having splint-holding devices that consist wholly of cooperating pairs of flexible lips, such holding devices being exposed at both ends of the splint-holding portion, whereby splints may be passed between the same from one end, and means for opening said lips that engage the same at the other exposed end.

2. A carrier for match-machines, having splint-holding devices that consist wholly of cooperating pairs of flexible lips having inclined converging splint-end-engaging surfaces, such holding devices being exposed at both ends of the splint-holding portion, whereby splints may be passed between the same from one end, and means for opening said lips that engage the same at the other exposed end.

3. In a match-machine, the combination of a carrier having splint-holding devices that consist of cooperating pairs of flexible lips, a device that has a movement in the same direction as the carrier having parts to open said lips, and a device for removing the splints or matches from the open lips.

4. In a match-machine, the combination of a carrier having splint-holding devices that consist of cooperating pairs of flexible lips, and a toothed wheel or wheels for opening said lips, substantially as and for the purpose described.

5. In a match-machine, the combination of a carrier having splint-holding devices that consist of cooperating pairs of flexible lips, a toothed wheel or wheels for opening said lips,



and means for pushing matches therefrom, substantially as and for the purpose described.

6. In a match-machine, the combination of a carrier having parallel transverse bars, side  
5 bars connecting said first-mentioned bars, and splint-holding flexible lips secured to said first-mentioned bars, said lips extending for a portion only of the length of said transverse bars, leaving a portion of such bars exposed,  
10 and drive-wheels that engage exposed por-

tions of the transverse bars, substantially as and for the purpose described.

In testimony that I claim the foregoing I have hereunto set my hand this 26th day of April, 1899.

FREDERICK J. MILLER.

Witnesses:

CHAS. J. WILLIAMSON,  
JAS. E. HUTCHINSON.