

(No Model.)

2 Sheets—Sheet 1.

C. P. MAILLARD.

DEVICE FOR AUTOMATICALLY BREAKING DOUBLE YARNS IN
SPINNING MULES AND JACKS.

No. 304,114.

Fig: 1 Patented Aug. 26, 1884.

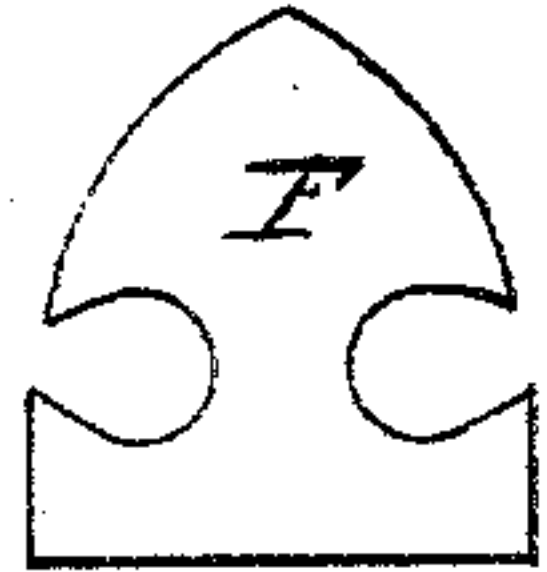


Fig: 2

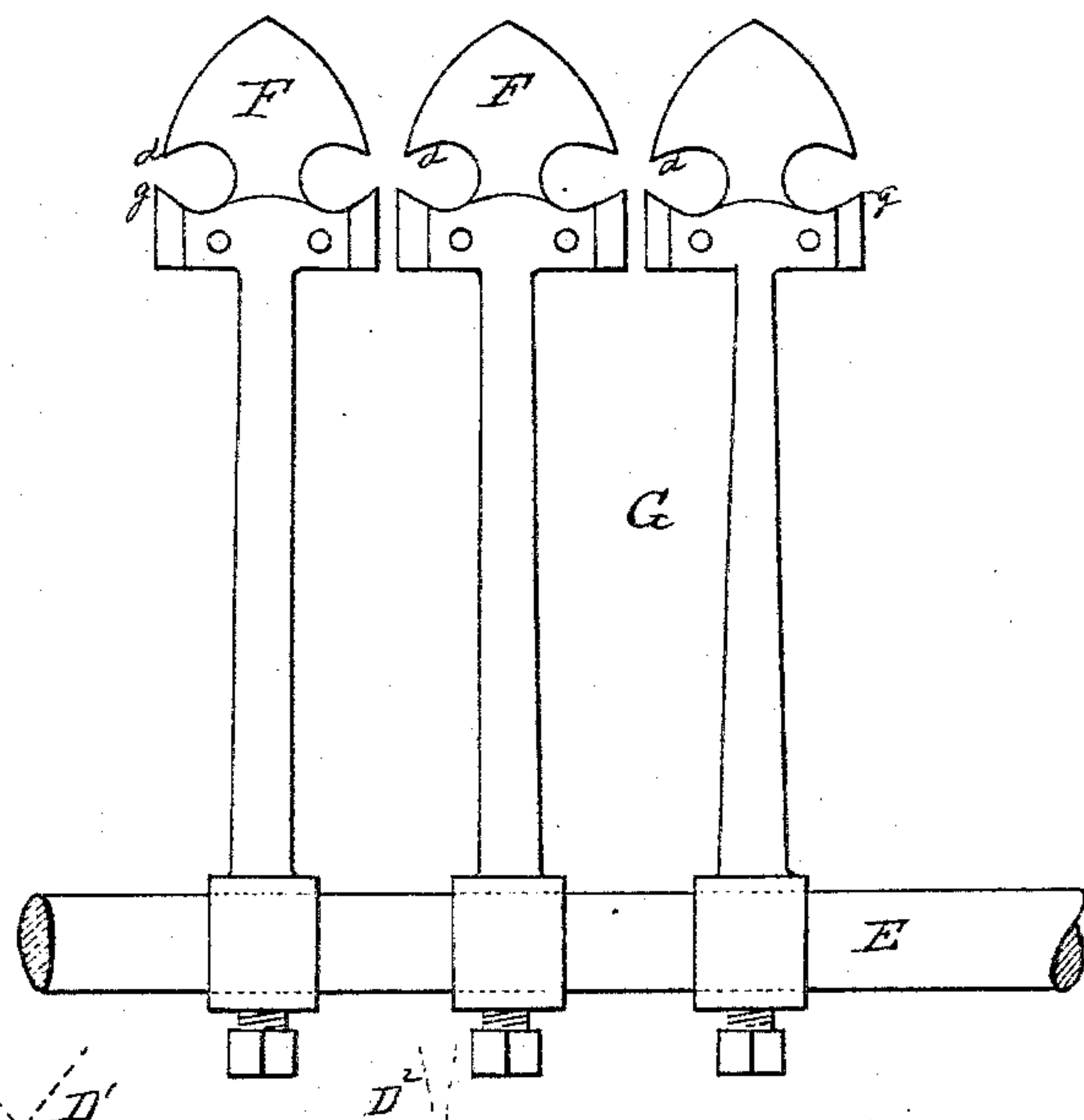


Fig: 3

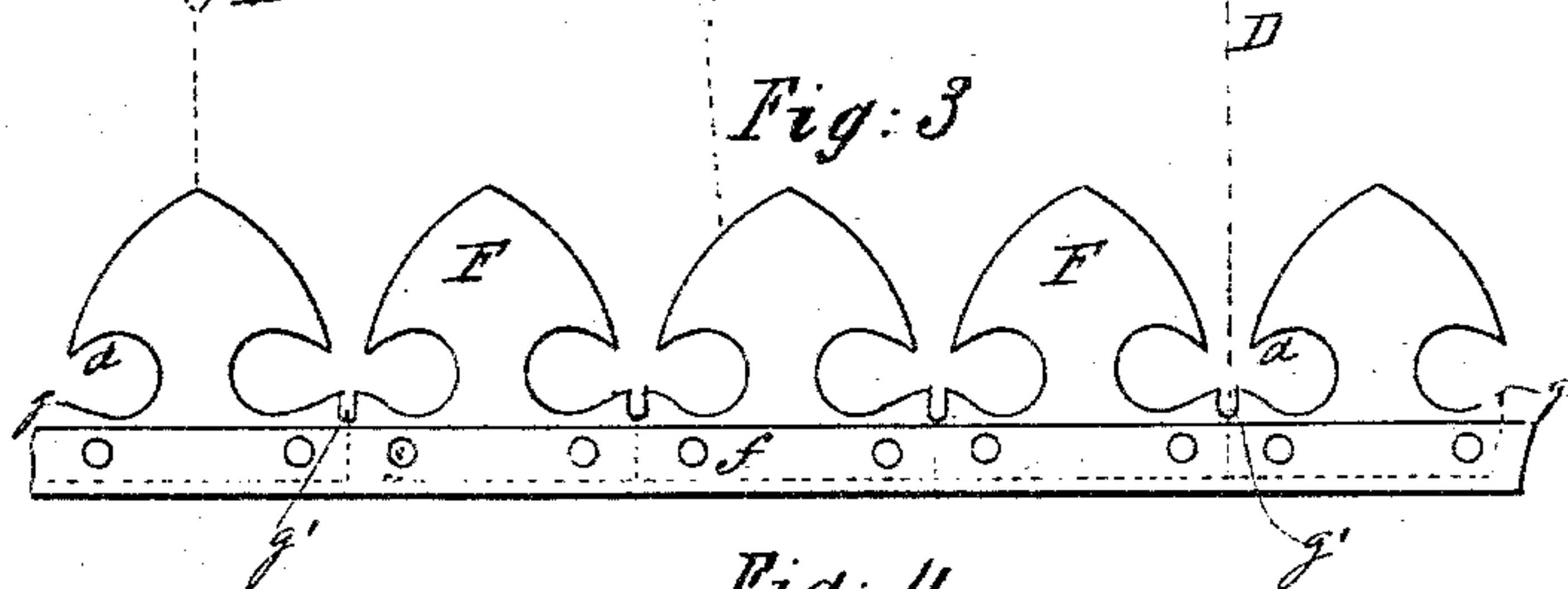
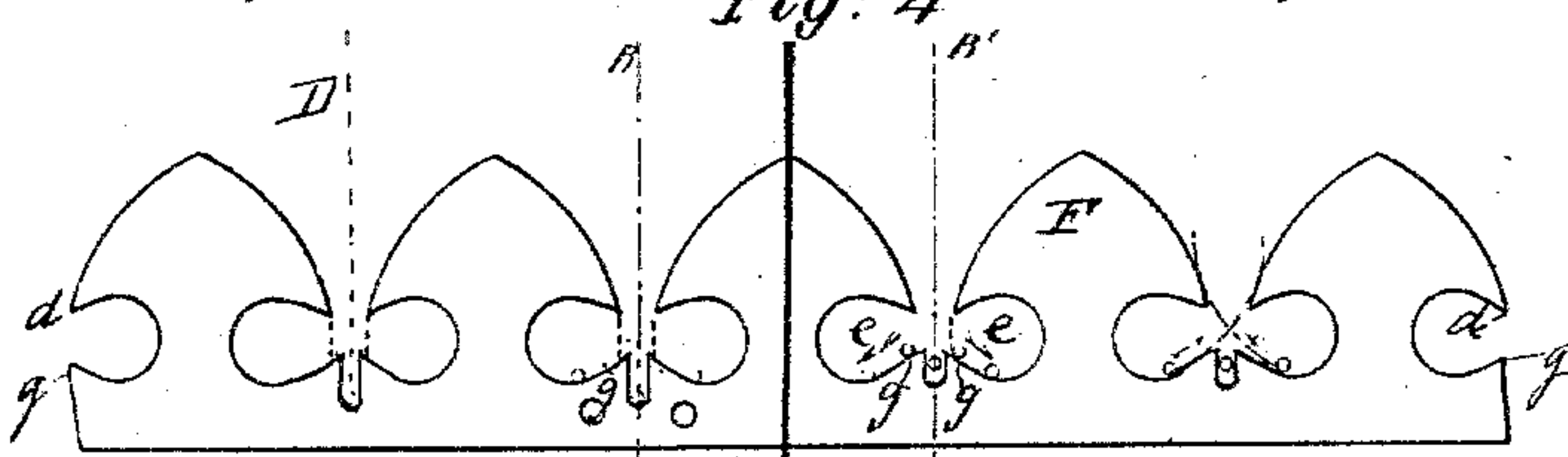


Fig: 4



Witnesses.

Inventor.

J. H. ...

J. H. ...

Fig: 5

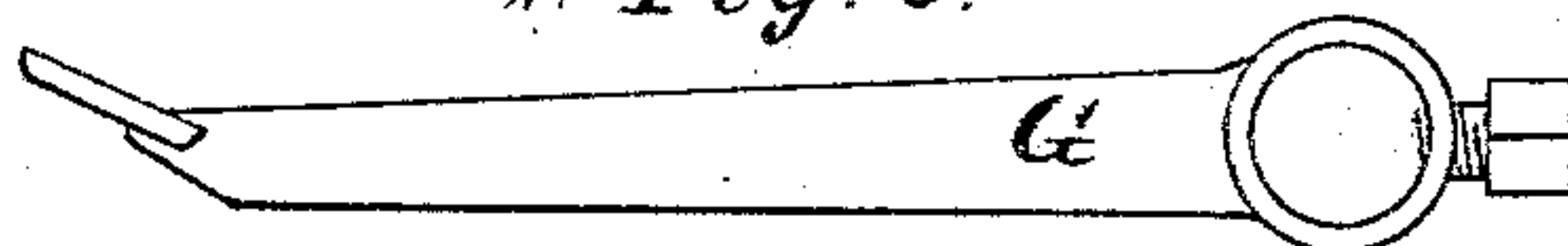
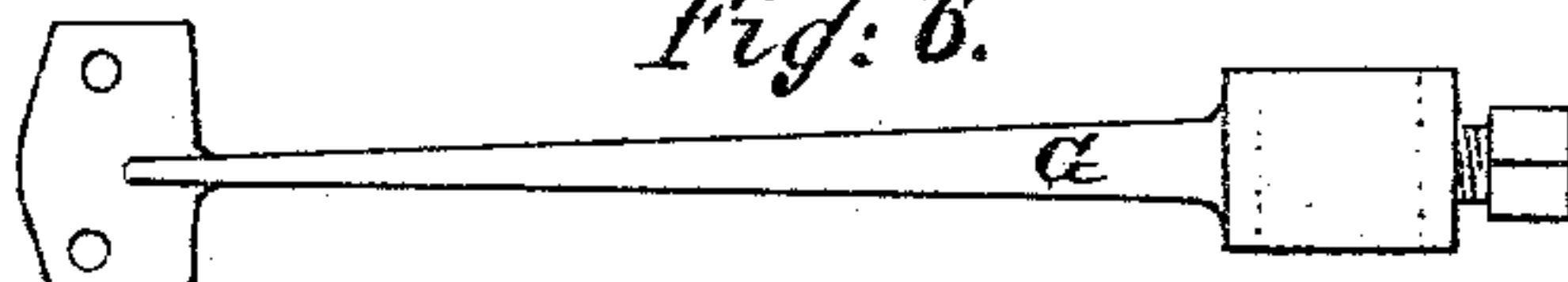


Fig: 6



Celestin Paul Maillard

(No Model.)

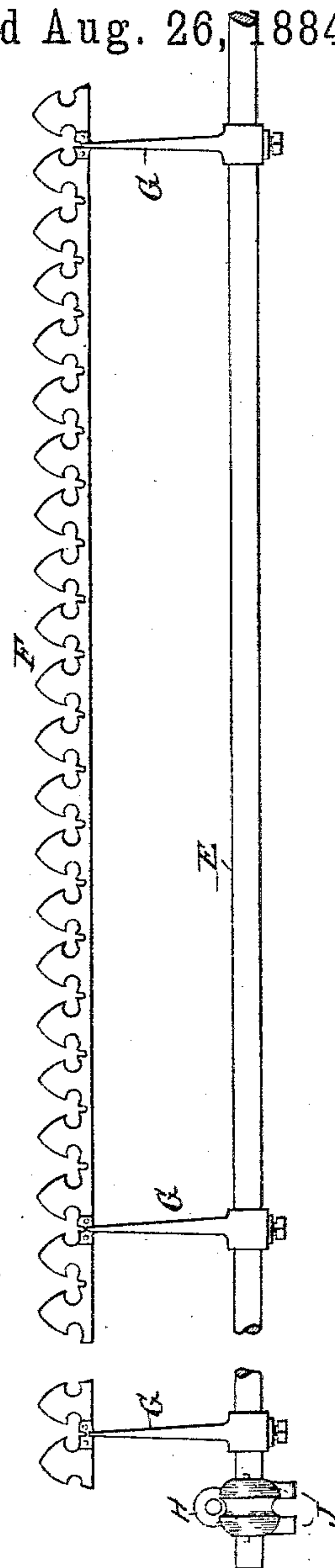
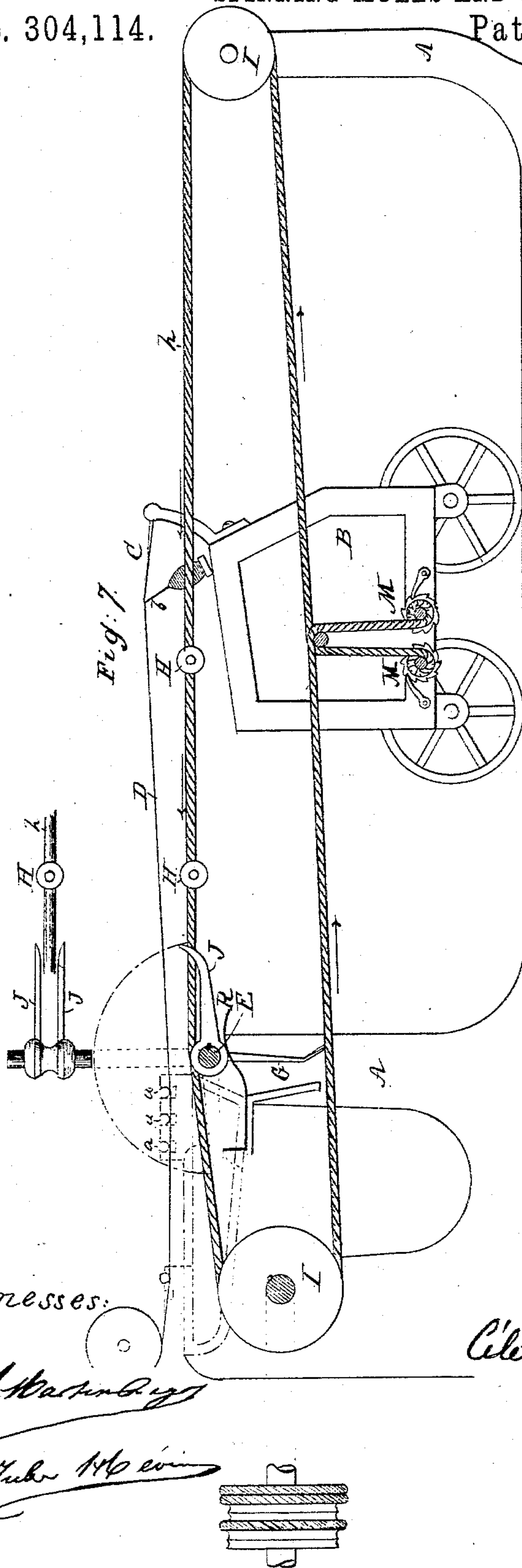
2 Sheets—Sheet 2.

C. P. MAILLARD.

DEVICE FOR AUTOMATICALLY BREAKING DOUBLE YARNS IN
SPINNING MULES AND JACKS.

No. 304,114.

Patented Aug. 26, 1884.



Witnesses:

J. Washburn

John H. Coon

Inventor:

Celestin Paul Maillart

UNITED STATES PATENT OFFICE.

CÉLESTIN P. MAILLARD, OF FISMES, ASSIGNOR TO THE SOCIÉTÉ DAUPHINOT,
MARTIN ET DESQUILBET, OF REIMS, FRANCE.

DEVICE FOR AUTOMATICALLY BREAKING DOUBLED YARNS IN SPINNING MULES AND JACKS.

SPECIFICATION forming part of Letters Patent No. 304,114, dated August 26, 1884.

Application filed April 7, 1881. (No model.) Patented in France March 5, 1881, No. 141,518; in England March 11, 1881, No. 1,067,
and in Germany March 24, 1881, No. 15,990.

To all whom it may concern:

Be it known that I, CÉLESTIN PAUL MAILLARD, of Fismes, in the Republic of France, have invented a new and useful Device for Automatically Breaking Doubled Yarn in Spinning Mules and Jacks, of which the following is a specification.

In any mechanical process of spinning thread or yarn, the threads being spun frequently break, and the broken ends become entangled with and twisted upon adjacent sound threads, forming what is called "doubled threads," thus damaging both threads. To remedy this it is usual to break the double threads and reunite them properly while the machine is running.

My invention embraces certain improvements adapted to self-acting spinning-mules, to break all the doubled threads at each drawing; and it consists in the construction and combination of parts hereinafter described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 represents one blade of one style of my thread-breakers. Fig. 2 represents a modification of my breakers, in which each blade is attached to an independent arm, and all these arms are secured to one rock-shaft. Fig. 3 shows a series of blades united by one common back strip, to which they are all attached. Fig. 4 shows a series of blades in one continuous sheet of metal; it also shows something of the manner of their action on the threads. Figs. 5 and 6 are respectively side and top views of an arm for supporting blades. Fig. 7 is a sectional elevation of part of a spinning-mule, showing my breaking device attached thereto, certain details being shown both in plan and in elevation. Fig. 8 is an elevation of my thread-breaking blades made as one continuous piece, the supporting-arms, rock-shaft, and means for rocking it.

A represents a portion of the stationary frame of a thread or yarn spinning-mule having the usual carriage, B, carrying spindles *b* and faller C.

a represents the drawing-rolls, journaled in the frame A, and D is the thread being spun.

E is a horizontal shaft journaled in the

main frame A, and adapted to rock about a half a circle. Upon this shaft two or more arms, G, are secured, carrying at their outer ends my breaking-blades. These blades may be one continuous sheet of metal, as shown at F, Fig. 8, or they may be sections containing several blades in one piece, as in Fig. 4, or but one blade in a piece, as shown in Figs. 1 and 3. In the latter case each blade may be supported on an independent arm G, as in Fig. 2, or a number of blades may be secured by their shanks upon a uniting-strip, *f*, Fig. 3, and then be secured upon arms G, like the one piece shown in Fig. 8. In all these styles each blade is lancet-pointed, and has in each edge a loop-shaped opening, smallest at the edges of the blade, whereby each blade is provided with hooks at each edge, facing to the point and to the rear, and further provided with notches at *g'*, Figs. 3 and 4, or spaces, as in Fig. 2, corresponding to such notches. These blades are mounted on the rock-shaft E, in spaces centrally between the normal positions of the threads being spun, and at every advance of the spindle-carriage this shaft E is rocked, to thrust the blades up between the threads, and at a given point the blades are allowed to swing down by their own weight. When the threads all remain separate, they will be kept in line D, Fig. 3, so as to fall between the blades into spaces or notches *g'*, when the blades rise, and to rise therefrom without being caught by the hooking-edges of the blades when they fall; but when one thread becomes attached to another this latter will be drawn out of line by the first and assume a position to one side, as at D' or D², Fig. 3, and when the blades rise these threads will slide down the lancet ends thereof and spring under the hooks *d*, or as the shoulders *g* of the blades come in contact with said threads the threads will be crowded under the hooks *d*, as at *e*, Fig. 4, and as the spinning continues the two strands of the doubled thread will have been united and fixed relatively to their present tensions, so that the united portion remains in nearly the same vertical plane until the blades fall, when the hooks *d* of the falling blades will engage said united portion of the

doubled threads and break them. This breaking is caused by the downward action of the hooks on the threads, which also tends to carry the broken ends down out of the plane of the whole threads, to prevent a second entanglement, and to further prevent a second entanglement the breaking is timed to take place while the fallers still remain elevated. Thus the broken ends will be directed by the fallers C to be wound upon the ends of the spindles rather than upon the cop. This is a point of especial importance, for when the broken ends wind upon the cop it takes time for the attendant to search for the end, when a few seconds are of great importance, and the form of the cop is also liable to be injured by such search, thus damaging it for subsequent use. Therefore I time the falling of my breaking-blades to the latest practicable instant, when there will yet be enough revolutions of the spindles to wind up broken threads on them before the fallers drop, and before the spinning and drawing stop.

I represent two pulleys journaled on the main frame A. Upon these pulleys runs a rope, *h*, in a vertical plane parallel to the path of the carriage B. The two ends of this rope are secured to the carriage by means of winches M M. By loosening one of the winches and winding the rope upon the other the rope may be set along either way, as desired. This rope *h* moves with the carriage B as it travels to and fro in spinning.

H H represent balls or knots in the rope *h* for actuating the breakers to rise by means of lever J.

J is a forked two-armed lever secured upon the rock-shaft E. In its normal position, (shown in Fig. 7,) this lever J is horizontal, with its turned-up bifurcated end located each side of the rope *h*, and the breaking-blades F hang down. When the carriage moves out, the rope *h* is revolved in the direction of the arrows. One of the stops H engages lever J and turns it over to the position shown in dotted lines, and elevates the breaking-blades F with their arms G to nearly a vertical posi-

tion. So long as the stop H is over lever J the breaker will be held elevated, and succeeding stops H to any required number will so hold the lever and breaker until the proper time for the latter to fall, which is just long enough before the stretch of thread is completed to wind the broken threads upon the end of the spindles, as previously stated. When the last stop H passes over the lever J, the arms G, being no longer held up, will drop by gravity, breaking all the threads which are engaged by the blade-hooks. The stops H may be arranged to raise the breakers at any desired time and to allow them to fall after the passage of each stop, or at the point which experience in spinning any particular kind of yarn shows to be most advantageous.

R represents a spring secured to the frame of the machine to act on the hub of finger J, to steady its fall and to receive the finger when it falls to prevent shock, and to prevent the arms G from striking the frame.

I am aware that hooks for breaking doubled yarn on spinning-mules have before been used, and I do not claim the same, broadly; but

What I claim is—

1. A series of lancet-pointed blades, F, each having the hooks *d*, inwardly-inclined shoulders *g*, and shaped or located to form the notches or spaces *g'* between them, as shown and described.

2. The combination, with the frame A, the carriage B, the rope *h*, and the stops H thereon, of the blades F, the arms G, the shaft E, the finger J, and the spring R, substantially as and for the purpose specified.

3. The combination, with the frame A, carriage B, rope *h*, and the stops H thereon, of the rock-shaft E, journaled in the stationary frame A, the arms G, secured on shaft E, and carrying breaking blades or hooks F, and the bifurcated arm J, as and for the purpose specified.

CÉLESTIN PAUL MAILLARD.

Witnesses:

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JULES H. CÉVIN.