

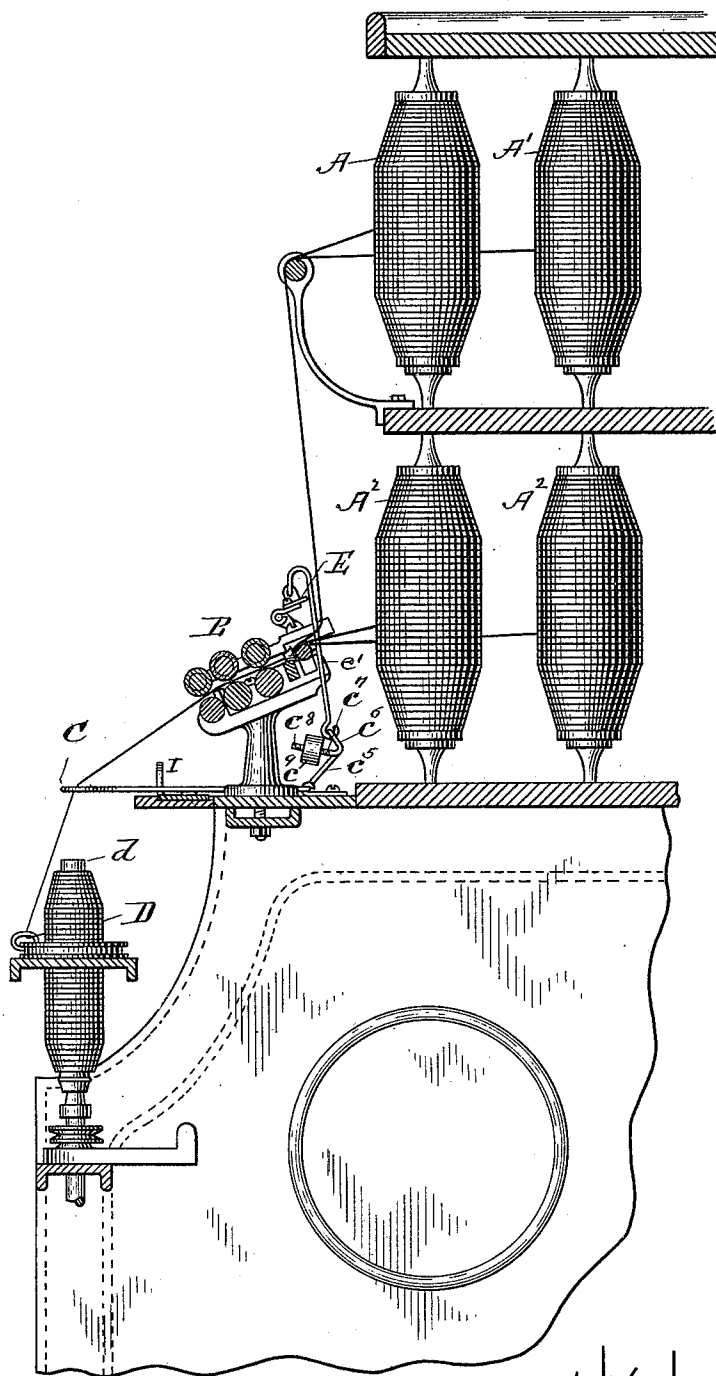
(No Model.)

3 Sheets—Sheet 1.

H. D. MARTIN & J. P. TOLMAN.
SPINNING AND TWISTING FRAME.

No. 566,204.

Patented Aug. 18, 1896.



WITNESSES

J. M. Dolan.
C. L. Ford

Fig. 1.

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Clarke & Raymond

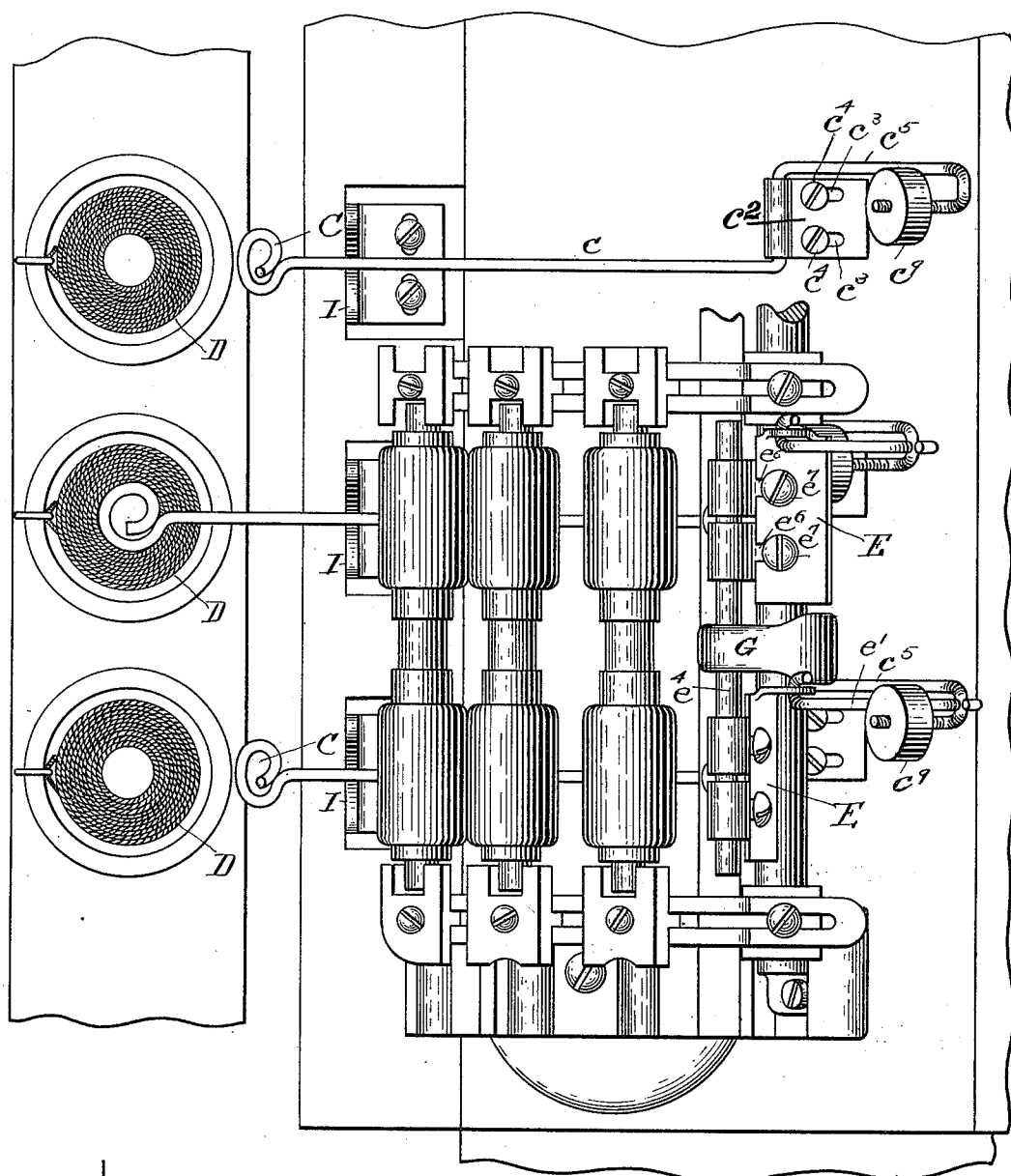
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UNITED STATES PATENT OFFICE.

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SPINNING AND TWISTING FRAME.

SPECIFICATION forming part of Letters Patent No. 566,204, dated August 18, 1896.

Application filed July 15, 1895. Serial No. 555,968. (No model.)

To all whom it may concern:

Be it known that we, HENRY D. MARTIN, residing at Shirley, and JAMES P. TOLMAN, residing at Newton, in the county of Middlesex, State of Massachusetts, citizens of the United States, have invented a new and useful Improvement in Spinning and Twisting Frames, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

The invention relates especially to means in a spinning or twisting frame for breaking back the yarn or roving delivered to the feed or drawing rolls when the thread shall be absent from or loose in the thread-guide in front of such rolls. It is desirable upon the breaking of a thread in front of the feed or drawing rolls or the breaking of a traveler or for any other reason which shall produce loose or slack thread in front of the rolls to immediately stop or prevent the further feeding of the thread, yarn, or roving. This can be done by breaking the thread, yarn, or roving back of the rolls, and then only the thread or yarn that is in the rolls can be delivered to the spindle, and this will cause no delay to the operation of the machine, whereas if it is not so broken serious inconvenience and delay often result, the thread winding on some revolving part which requires to be freed from it before the spinning thereof can again be started or causing some other delay, and this also results in considerable waste of thread.

Various attempts have been made to break the yarn or roving back of the feed-rolls, but so far as we are aware they have not been practical for one reason or another. In most of the devices heretofore proposed for this purpose the breaker has not been well attached, located, or constructed, and has been operated by an independent lever taking its support upon the thread and requiring to be set anew every time the thread is pieced up. This involves such a multiplication of parts in the apparatus and so much inconvenience in its operation that no such device has come into general use and at the present time it is

not customary to use any roving-breaker whatever. In inventions of this character it is desirable that few parts be used, that they be simple to make, and that they be arranged so that they may be easily attached to machines which are in use as well as to new machines, and that they be accessible when upon the machine and that they do not interfere with other working parts of the machine; and we therefore utilize as one part of our device the thread-guide, through which the thread from the feed-rolls passes to the bobbin or spinning device, and the rod which forms a portion of the cap-bar stand of the frame to which the breaker is detachably secured, is utilized to form not only the support for one member of the breaker, but to also serve as one of the jaws or active parts of the breaker. The gate or movable part of the breaker preferably is arranged upon a pivot over the rod to have a swinging upward and downward movement in relation to it, and it is held open or away from the rod by the tension of the thread passing through the thread-guide, but on the release of such tension by the breaking or slacking of the thread it is caused to be closed or shut upon the yarn or roving which passes over the rod by an overbalancing-weight or other similar means, and if the feed or drawing rolls are then in action the yarn or roving is immediately broken. To use the thread-guide for the purposes of our invention, we form it upon the front end of an adjustable lever, the rear end of which is connected with the breaking mechanism, and the relation of the parts is such that the action of the breaker is automatic, setting itself whenever the usual tension comes upon the thread in front of the feed-roll and allowing the stopping and starting of the machine for doffing without interfering with it or requiring that any attention be paid to it.

We will now describe the invention more in detail in connection with the drawings.

In the drawings, Figure 1 is a view in vertical section and elevation of enough of a spinning or twisting frame to illustrate the features of our invention. Fig. 2 is a view, enlarged, in vertical section and elevation,

showing our improved mechanism in two positions in relation to the drawing-rolls, yarn, thread, and bobbin. Fig. 3 is a view in plan, enlarged, of the mechanism represented in Fig. 2.

In the drawings, $A A' A^2 A^3$ represent yarn or roving holding bobbins from which the yarn or roving is delivered to the drawing or feed rolls B , which are of the usual number and construction and are mounted and operated in the usual manner customary to this type of machine.

C is the thread-guide, and D is the spindle upon which the thread is wound. The thread-guide is an eye at the forward end of a lever c , pivoted above the bed C' , to which the roller-stand is secured at c' to an adjustable plate c^2 , the pivotal point preferably being back of the base of the roller-stand, whereby long leverage is given its forward part, the value of which will be seen later. The plate c^2 is horizontally adjustable upon the bed C' backward and forward in relation to the front edge of the bed by means of slots c^3 , formed therein, and screws c^4 , which extend through the slots into the bed. By loosening the screws the plate can be set forward or back, and then by the tightening of the screws be fastened in its new position. This adjustment serves to locate the eye C longitudinally centrally over the spindle d .

To prevent lateral movement of the eye, we use a centering device, which will hereinafter be described.

The pivot of the lever c is formed by bending it at a right angle to its main length, (see Fig. 3,) and it is then further bent to form the extension c^5 at an obtuse angle to the portion c , at the end of which extension it is again bent to form a loop c^6 , and from one end of this loop projects forward the end c^7 , which is provided with a screw-thread c^8 , upon which a weight c^9 , preferably circular in shape, screws, the threaded hole in the weight being eccentric, so that the weight will not have a tendency to change its position upon the thread or work off it. This threaded end of the rod extends forward toward the front of the machine and holds the weight in a position where it can easily be reached or turned from the front of the machine, and it also holds the weight in a desirable position in relation to the pivotal point c' of the lever. The loop c^6 receives the eye e at the end of a link e' , which connects the lever c with the movable section or gate E of the breaker, the upper end of the link being bent downward and forward and engaging by a short laterally-extending stud an ear e^2 , projecting from the back or upper side of the gate and preferably integral therewith. The breaker has in addition to the movable section or gate E , which is hinged or pivoted to the rod e^4 , the upper surface f of the rod F , preferably forming a portion of the cap-bar stand of the frame, which forms a stationary jaw. This rod F also serves to support the member E

of the breaker, the member being secured thereto by means of an arm or bracket G , having at its lower end an extension g in the nature of a yoke, which partially surrounds the rod and through the lower end of which extends a screw g' , which is adapted to be screwed hard against the rod to clamp the arm or bracket G rigidly to it, the arm having within the yoke a circular bearing g^2 to rest on the rod F beyond a line drawn through the center of the rod from the clamping-screw. This bracket G has a hole at its upper end through which the rod e^4 , which forms the gate-pivot, extends. It will be understood of course that this rod e^4 may be supported by as many brackets or arms G as may be desired to give it suitable firmness, and that it may receive as many movable gates or members of as many independent breakers as may be desirable.

It will be seen that each of the brackets G is common to two breaker-plates in the form of my device illustrated in the drawings, or, in other words, form the sole means whereby two breaker-plates are attached or secured to the rod F , and this result is obtained by extending the pivot or rod e^4 , carried by the bracket, from each side thereof sufficiently to hold a breaker-plate on each side. This simplifies and cheapens the construction and the application of the breakers to the machine.

The movable member E of the breaker may be pivoted or hinged directly to the pivot or rod e^4 , or it may be secured by an intermediate hinged piece in a manner to permit its breaking edge e^5 to be adjusted or moved inward or outward in relation thereto to compensate for wear and also to bring it into proper relation with the stationary surface f of the other member of the breaker, and this adjustment is represented as obtained by forming in the section E the elongated recesses or slots e^6 , through which clamping-screws e^7 extend, securing it to the hinged plate e^8 , which connects the member with the pivot or rod, the screws and slots or recesses affording means for the adjustment of the member.

It will be understood that the roving or yarn passes over the surface f of the rod F from the bobbin to the guide or tunnel H , and from thence to the drawing or feeding rolls, and that the rod F is behind the tunnel and close to it.

It will also be understood that normally the movable member E of the breaker is held in an elevated or raised position away from the rod F or its surface f , so that there is a relatively wide space for the passage of the yarn or roving between the two members. In case, however, the thread in front of the rolls is broken or becomes slack the lever c is no longer held in the horizontal position shown in Fig. 2, but being freed from the tension of the thread is released and permits the overbalancing-weight c^9 to lift it to the inclined position represented in Fig. 2 and at the same time the movable member E of the breaker

to be closed against the surface f of the stationary member, thereby shutting upon the roving or yarn which is beneath the edge e^5 and tightly binding or clamping it against the surface f , so that the movement of the roving or yarn back of the breaker is immediately stopped and the continued draft of the rolls in front of the breaker upon the yarn or roving causes it to break. It is essential for the proper working of this breaker that the working edge e^5 of the movable member should be somewhat eccentric to a line drawn between the center of the rod F and the pivot e^4 . Otherwise the proper clamping action between the said edge and the surface f will not be obtained.

It will be seen that by supporting the movable member E above the stationary member f of the breaker it is also in an accessible position where it can be easily adjusted, that it tends to close by its own weight when released, and that it closes with the movement of the passing yarn or roving.

It will also be seen that by utilizing the rod F as one of the parts of the breaker and as a support for the other part the breaking-point is brought very near the tunnel and the rolls, which is of a material advantage in the operation of the device.

It will also be seen that by utilizing the rod F as a breaker-holding device it becomes possible to easily attach the breaker to machines now in use and a saving in construction is effected. We would here say, however, that while we prefer to use this rod as we have specified we would not have it understood that our invention is limited to its employment, as, of course, an additional or auxiliary rod can be employed in lieu of the rod F , when desired.

It will be seen that our breaker setting and operating as closely as it does to the tunnel and rolls can be used on frames where the roving-bobbins are close behind the roller-stand.

The operation of the apparatus is as follows: The tension of the thread passing over the thread-guide C depresses the forward end of the thread-guide lever and causes its rear end to be elevated, raising with it the link e' and swinging upward and open the breaker gate or section E . This allows the roving to pass unobstructed between the breaker and the rod F . If, now, for any cause the thread becomes broken, or if it becomes slackened so that it ceases to hold down the thread-guide, the breaker-gate E immediately swings down and grips the roving securely between its edge and the rod, as shown in Fig. 2, the forward movement of the feed-rolls then breaking the roving off and preventing the waste of material and the clogging of the feed-rolls, which ordinarily follows where no roving-breaker is used. When the attendant desires to piece up the thread, it is only necessary to depress the thread-guide C by the use of the finger, and the breaker-gate E is

lifted, and the roving is passed into the tunnel and between the rolls in the ordinary way. When the frame is stopped for doffing, the tension upon the threads is released and the thread-guides are automatically lifted and removed out of the way of the operator, and when the frame is again started the tension of the threads upon the thread-guide levers causes the breaker-gates to be lifted before any strain is brought by the feed-rolls upon the roving. The use of our device permits the entire abolition of hinged thread-boards and permits also the operation of spinning-frames without the usual kink-catchers, under-clearers, and other devices for preventing laps on the feed-rolls. It also enables the same operator to attend a larger number of spindles and permits them to be operated at a higher speed.

It will be understood that we do not broadly claim the abolition of hinged thread-boards, as means for accomplishing this result are shown in the patent to Stell, No. 133,065, dated November 12, 1872.

It is desirable that the center of the thread-guide C at the end of the thread-guide lever should be maintained in a central position over the end of the spindle, and to permit this to be done we have provided the lever with longitudinal movement by means of the plate c^2 , as above specified. We have also fixed its lateral movement by means of the open V-shaped guide I , into which the lever near its front end closes or registers and by the sides of which when at the bottom of the notch it is prevented from being moved laterally from a central position. The V-notch may be formed in the edge of an angle-plate which may be attached to the upper surface of the bed C' or any extension therefrom, so as to extend upwardly or to a position to receive and hold the lever when in its lowest position and yet not impede its upward movement.

The angle-plate preferably is laterally adjustable by means of slots formed therein and clamping-screws passing through the plate.

We would say that to save machining and expense and also to permit the breaker to be applied to machines already out, it is desirable that the lip or section e^5 of the breaker E be extensible not only as a whole, but at times one end more than the other, and this is accomplished by the construction above specified.

It will be understood that the rod F and the yoke-seat of the bracket are castings and not machined, and consequently when the parts are assembled it often happens that the pivot holding the breaker is not parallel or in line with the rod, and by providing means for the extending of the breaker the machine-work otherwise necessary to obtain a proper relation between its edge and the edge of the rod is avoided.

It will be understood that in spinning-

frames the tunnel has a reciprocating movement, and that it is desirable that the breaker E have as long a surface or edge to bear upon the rod F, as can be provided in view of the fact that it is also desirable to leave a space between one end thereof and the next bracket through which the roving or yarn may run for a short time after the piecing up of a broken end.

It will be understood that when a thread breaks the thread-guide lifts and the breaker drops upon the roving, and in order to piece it up it is necessary to depress the thread-guide and raise the breaker. The operator then introduces the roving through the tunnel and rolls, releases the thread-guide, permitting the breaker to drop upon the rod, and at the same time hold the roving at one side of the breaker or in the space between the edge above spoken of and the bracket. The operator then has both hands at liberty to piece up the broken end in the ordinary way. The thread or yarn is then inserted in the thread-guide C and the action of the spindle causes the thread or yarn to automatically draw down the thread-guide and lift the breaker, permitting the roving at one side thereof to be automatically drawn beneath it.

It will also be understood that the breaker is not moved backwardly or away from the rod F until after the piecing up has been accomplished and the spindle is in operation, and that in order to piece up it is necessary to draw the roving or thread around the side of the breaker until the rolls have fed enough to enable the piecing to be done.

Having thus fully described our invention, we claim and desire to secure by Letters Patent of the United States—

1. In a spinning or twisting frame, the combination with the drawing or feeding rolls, of a series of breaker-brackets, breaker-plates pivoted to said brackets, means for actuating said breaker-plates, and a rod back of said rolls common to and supporting the said breaker-brackets and sections of which serve as stationary beds or jaws coöperating with said breaker-plates which latter serve as the movable jaws of the breakers, substantially as and for the purposes described.

2. In a spinning or twisting frame, the combination of a rod common to and supporting a number of breaker-brackets sections of which rod serve as stationary beds or jaws in connection with breaker-plates, the said breaker-brackets attached to said rod, breaker-plates pivoted to said brackets and supported by them upon said rod, and means for adjusting the lower edges of said breaker-plates to the said jaw or bed sections of the said rod, whereby the lower edge of each breaker-plate may be independently adjusted and set to its companion working section or bed of the rod, and whereby the fitting of the breaker-pivots and rod-surfaces, otherwise required for securing a proper relation between the lower edges of the breaker-plates and the upper surfaces of

the rod is rendered unnecessary, as and for the purposes described.

3. In a spinning or twisting frame, the combination of the rod F, a swinging breaker attached thereto to coöperate therewith, the thread-guide C, its lever *c* pivoted at its inner end to the table or bed which supports the cap-bar stand, to provide the thread-guide with a large range of movement between the spindle *d* and the drawing and feed rolls B, and which moves the thread-guide out of line with the said spindle *d* when at its highest position, the said spindle *d* and drawing or feed rolls B, a connection between the said lever and the swinging breaker, and an overbalancing-weight, as and for the purposes described.

4. In a machine of the character specified, the combination of the rod F and the bracket G having the yoke *g* and fastening-screw *g*⁶ and the pivot-rod *e*⁴ supported thereby, and the swinging gate or plate of the breaker carried by said pivot-rod, as and for the purposes described.

5. The combination of the rod F, the swinging gate or plate E suspended above the rod, the thread-guide lever *c* pivoted as described and bent to form a pivot, the integral extension *c*³, the loop *c*⁶ and weight-bearing end *c*⁸, with the said weight adjustable on said end, and the link *e*⁷ engaging at its lower end the said loop and being connected at its upper end with the swinging plate by a laterally-extending stud on its curved end, the stud entering a hole in the ear upon the plate and permitting the ear to turn thereon as the plate is swung from a horizontal to a vertical position, as and for the purposes described.

6. The combination in a spinning or twisting frame of the roller-stand, the tunnel, the rod F extending lengthwise of the frame back of the roller-stand and close to the tunnel and adapted to support a number of brackets and to form a part of the yarn or roving breaker, the said brackets, a pivot rod or rods carried or supported by the brackets, breaker-plates suspended from said pivot-rods and moving from a raised to a vertical position, the thread-guide lever *c*, one for each swinging breaker-plate, pivoted above the bed C', as specified, and connected by links *e*⁷ with the said breaker-plates, and overbalancing-weights, as and for the purposes described.

7. The combination of the thread-guide lever *c* and a centering device comprising a plate having an open V-shaped notch attached to the bed C' or an extension therefrom, and into which the thread-guide lever is adapted to be drawn and held by the tension of the thread thereon and which when so held is prevented from lateral movement from a central position over the spindle, substantially as described.

8. In a spinning or twisting frame, the combination of a rod or support, a bracket attached thereto and having a pivot extending from each side thereof, and a breaker-plate

carried by each pivot, the lower edge of each of which plates comes in contact with the surface of said rod or support, whereby said rod or support furnishes a bed or section of the breaker, and whereby also two breaker-plates are simultaneously attachable to the rod or support by a common holding-bracket, as and for the purposes described.

9. In a spinning or twisting frame, as a means of mounting breaker-plates in pairs, a

bracket adapted to be secured to a support, and having extended from each side thereof a pivot or supporting rod, upon each of which a breaker-plate is mounted, as and for the purposes described.

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In presence of—

F. F. RAYMOND, 2d,
J. M. DOLAN.