(No Model.) 2 Sheets—Sheet 1.

J. E. ATWOOD.

MACHINE FOR WINDING QUILLS AND BOBBINS.

No. 384,011. Patented June 5, 1888.

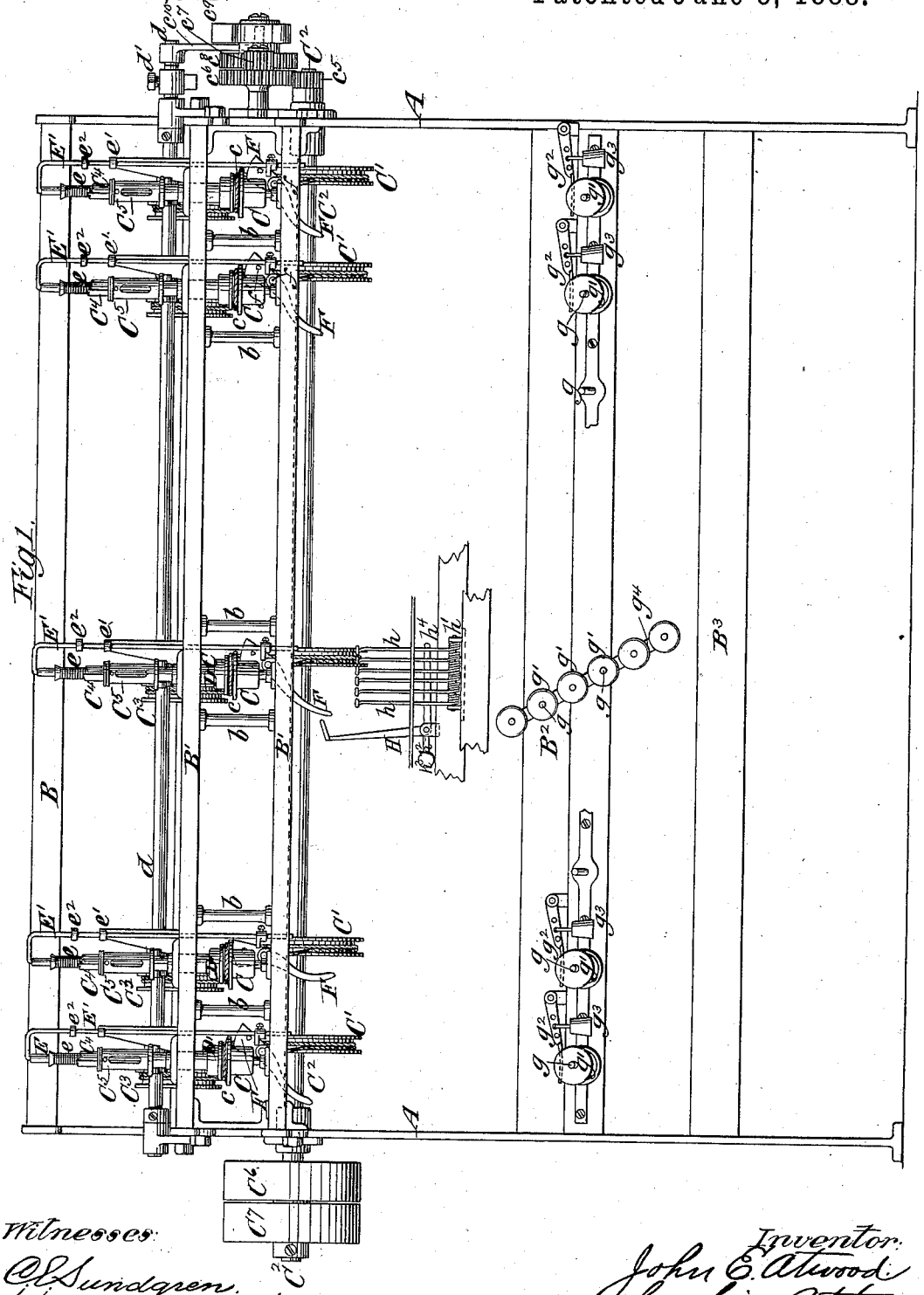

Fig 1.

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Inventor:
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(No Model.) 2 Sheets—Sheet 2.

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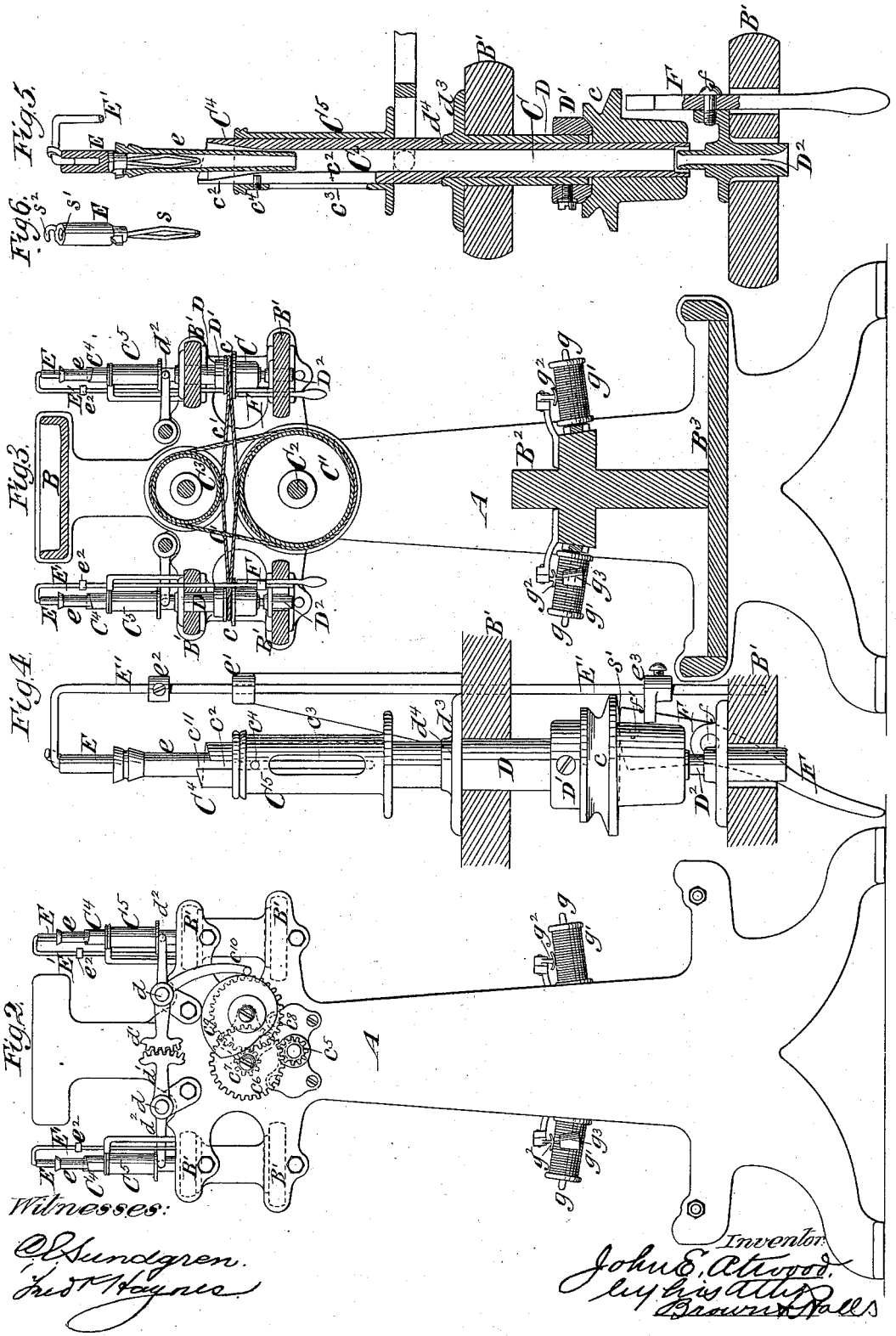

Witnesses:
C. L. Sundgren.
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UNITED STATES PATENT OFFICE.

JOHN E. ATWOOD, OF STONINGTON, CONNECTICUT.

MACHINE FOR WINDING QUILLS AND BOBBINS.

SPECIFICATION forming part of Letters Patent No. 384,011, dated June 5, 1888.

Application filed August 8, 1887. Serial No. 246,393. (No model.)

To all whom it may concern:

Be it known that I, JOHN E. ATWOOD, of Stonington, in the county of New London and State of Connecticut, have invented a new and useful Improvement in Machines for Winding Quills and Bobbins, of which the following is a specification.

My invention relates, generally, to machines for winding quills and analogous bobbins with threads or filaments, and is more particularly intended for machines for winding shuttle quills or bobbins for silk-weaving. In such machines it is necessary to provide, in addition to the spindle and flier for winding the quill, a traverse-guide for producing the traverse of the silk upon the quill, which is commonly built in conical form, and a stop-motion for arresting the rotary motion automatically when the quill is filled with silk. In such machines there are commonly two rows of spindles and fliers, one upon each side of the machine, and the two rows are driven by bands from a common driving-shaft extending lengthwise of the machine midway between the rows of spindles.

The important objects of my invention have been to simplify the construction and consequent expense of the several parts of the machine, and to provide a machine which will produce comparatively excellent work, and yet which may be supplied at a small cost as compared with the majority of the quilling-machines for a similar purpose.

My machine possesses several features which I believe to be entire novelties in the art. In a certain class of quilling-machines heretofore in use a rotary spindle has had a quill mounted upon it, and the silk or thread has been laid by a flier rotating around the quill, and the spindle has been traversed to and fro through the flier with a quill upon it.

According to my invention I employ hollow spindles, each of which terminates in a tubular flier—that is to say, a tube which is slotted lengthwise to its extremity—and the quill is thrust upon a suitable support presented downward within the end of the tubular flier, and by this support the quill is supported and held entirely independent of the spindle. A traverse-guide consisting of a sleeve or thimble slides upon the exterior of the tubular flier, and is locked to turn therewith, so as not to wear the thread. A whirl is upon the spindle, and upon this whirl drives a constantly-running band, and whenever desired the whirl and the spindle are stopped by a stop-lever, which forces the whirl against a brake and holds it and the spindle stationary, while the band renders loosely around the whirl. Although this operation of the band and stop-motion does produce some wear of bands, it provides a stop-motion of extreme simplicity, and the advantages secured more than counterbalance the additional wear of the band.

In the machine each row of spindles is supported in a double girt comprising upper and lower rails secured together by struts between the spindles, so as to hold them at exact distances apart. The upper rail of the girt carries in it a bearing-bushing, in which the spindle is journaled, and the lower rail of the girt carries a thread-centering device and oil-guard, which is concentric with the spindle, and which enters slightly within the spindle. The quill-support has connected with it a vertically-movable rod, and the quill is raised as it is filled by contact with the silk upon it of the tubular flier, and as it is filled its vertically-movable stop-rod actuates a stop-lever, so as to bring it in contact with a lump or projection forming an uneven surface on the whirl, and as the whirl turns the lump or projection by cramping on the stop-lever swings the lever on its fulcrum, and thereby causes it to crowd the whirl against a brake-collar on the bearing-bushing, thus stopping the spindle until the full quill has been removed and an empty quill substituted.

The invention consists in novel combinations of parts, some of which are hereinabove described, and which are hereinafter set forth, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a side view of a machine embodying my invention, a portion only of the spindles in one row being shown. Fig. 2 is an end view of the machine. Fig. 3 is a transverse section of the machine between its ends. Fig. 4 is an elevation, upon a larger scale, of one spindle and flier and its appurtenances and a transverse section of one of the double girts of the

machine. Fig. 5 is an elevation of the parts shown in Fig. 4, but completely in vertical section; and Fig. 6 is a perspective view of the quill-holder, which holds the quill.

Similar letters of reference designate corresponding parts in all the figures.

A designates the end standards or frames of the machine, and between these extend girts B B′ B^2 B^3. The girt B′ is here represented as double, composed of upper and lower rails connected by struts or posts *b*, so as to hold them invariably at exact distances apart, for a purpose hereinafter described. In the girt B′, at opposite sides of the machine, are rows of spindles C, one row upon each side of the machine, and these spindles have whirls *c*, around which pass driving-bands *c*′. A separate driving-band for each spindle embraces its whirl *c*, and also embraces a driving drum or pulley, C′, upon the main shaft C^2 and separate guide-pulleys C^3, which are above the driving drum or pulley, and the bands *c*′ for driving the spindles are preferably arranged according to Letters Patent No. 296,377, granted April 8, 1884, to John E. and Eugene Atwood.

Each spindle C terminates at its upper end in a tubular flier, C^4, which has a cylindrical exterior, and upon which slides freely a traverse guide or collar, C^5. The tubular flier C^4 is slotted lengthwise, as shown at c^2, and the traverse-guide C^5 is correspondingly slotted at c^3, and the traverse-guide is locked to turn with the flier by a pin, c^4, entering the slot c^2 in the flier. I have here shown fast and loose pulleys C^6 C^7 upon one end of the shaft C^2, and at the opposite end I have represented a pinion, c^5, which engages a wheel, c^6, and through a pinion, c^7, transmits motion to a wheel, c^8. Connected with the wheel c^8, so as to rotate as one therewith, is a cam, c^9, which acts upon the end of the arm or lever c^{10}. Upon opposite sides of the center of the machine are two rock-shafts *d*, which are connected together by arms *d*′, having sector-gears which engage each other, as best shown in Fig. 2, and the two rock-shafts *d* also have arms d^2, which extend outward from each shaft, and are forked to embrace freely the tubular fliers C^4, and to bear against the lower flanges of the traverse-guides C^5. There is a sufficient weight in the traverse-guides to produce their free descent when the arms d^2 move downward, and the two arms themselves serve to move the guides upward, and consequently the two rock-shafts *d* and the cam c^9 produce the traverse necessary in winding both rows of quills.

In the upper rail of the double girt B′, at each side of the machine, are bearing-bushings D, which have at the top flanges, d^3, resting against the rails of the girt, and in which the spindles C are journaled. The portion of the spindle which forms the journal is smaller than the tubular flier C^4, the latter having a shoulder, d^4, which bears against the top of the bearing D. I have shown secured upon the lower portion of each bushing D, and adjacent to the whirl *c*, a brake-collar, D′, which has a conical lower surface entering a conical recess in the top of the whirl *c*, for a purpose hereinafter described. In the lower rail of the double girt is represented a tubular thread-centering device or oil-guard, D^2.

e designates the quill, which is fitted upon a stem or quill holder or support, E, depending from a downwardly-turned rod, E′, which is free to slide in a suitable guide, *e*′, and which has collars e^2 e^3 upon it for limiting its movement.

In Fig. 6 I have best shown the quill holder E. It has a spring-extension, *s*, which forms a yielding stem for entering the quill *e*. The holder E has in it a bore or socket, *s*′, which receives the downwardly-turned end of the rod E′, and a hook, s^2, which, when the holder is turned, passes or hooks over the rod E′. The silk or thread enters the lower end of the oil-guard or thread-centering device D^2, passes upward through the hollow spindle C, is thence taken outward through the slots c^2 c^3, and passes above the traverse-guide C^5, through the slot c^2, inward to the quill *e*, around which it is wound. The quill *e* remains stationary, and by the rapid rotary motion of the spindle C and the flier C^4 the thread is laid upon the quill *e* while resting in the slot c^2 in the flier, and the top of the flier being cut obliquely, as is best shown in Fig. 4, so that one side of the slot c^2 will form a shoulder, c^{11}, for carrying the thread around. It will be observed that as the quill increases in body by the winding the interior of the tubular flier C^4 bears against or substantially upon the quill and gradually lifts the quill and the rod E′, upon which it is fixed, and the rising movement of the rod E′ is utilized to stop the machine in a manner which I will now describe.

F designates a stop-lever, which, as here shown, is fulcrumed at *f* to the part forming the oil-guard and thread-centering device D^2, and which is adapted by its upper end to bear against the lower side of the whirl *c*, and I have shown such lower side as oblique, or as having a lump or projection, *s*′, against which the lever F may come to a bearing.

In the lever F, I have represented a lifting projection or stud, *f*′, with which the arm or coller e^3 of the stop-rod E′ may come in contact. Ordinarily the weight of the upper part of the stop-lever F is so placed as to its fulcrum as to hold the lever out of contact with the lump or projection *s* on the whirl, but as the quill becomes nearly complete the rising movement of the rod E′, acting through the tappet or collar e^3, serves, through the stud or projection *f*′, to raise the stop-lever F and move it inward or upward, so that the lump or projection on the whirl will in the revolution of the latter, strike the top of this lever, and as soon as this occurs the whirl instantly carries the lever inward by friction and causes

it to block the whirl *c* upward firmly against the brake-collar D′, thereby stopping the whirl and spindle and permitting the band *c′* to continue to render around the stationary whirl until such time as the whirl is again released from the embrace of the stop-lever F.

It will be obvious that in passing the threads to the machine it is of the utmost importance to have the spindles stop when the quills are full, with the slots c^2 c^3 presented at the front, so that ready access may be had to them for threading the filaments. This may be secured by properly arranging the whirls *c* on the spindles, so that when their lumps or projection *s* have, by engaging the stop-levers F, effected the stopping of the whirls and spindles the slots c^2 c^3 in the tubular fliers C^4 will be presented outward at the front. When the stop-lever F is pivoted behind the spindle, as in this example of my invention, the whirl is fixed on the spindle so that its lump *s* is about diametrically opposite the slots c^2 c^3.

I have shown upon the girt B^2 jacks or fixed spindles *g*, on which are placed the spools *g′*, from which the threads are severally taken, and adjacent to these jacks or spindles are brake-levers g^2, which bear upon the silk on the spools, as shown best in Fig. 1, and which are loaded by weights g^3. In a portion of Fig. 1 I have shown an arrangement of stop motion which may be employed when the machine is employed for doubling the ends from several spools for each quill. A number of different spools, *g′*, are arranged upon one bar, g^4, and the several ends are taken from them through a number of fallers, *h*, which are fulcrumed at *h′*, and which have a tendency to drop backward when the thread breaks.

H designates a lever, which is fulcrumed at h^2, and has an upwardly-extending arm adapted to strike against the stop-lever F when swung toward the right hand of Fig. 1. The lever H is so balanced by the weight h^3 that the arm h^4 normally remains horizontal; but when by the parting or giving out of an end one of the fallers, *h*, drops back upon the lever-arm h^4, an upwardly-extending arm of the lever H is moved in the direction indicated by the arrow in Fig. 1, and by striking against the stop-lever moves the latter upward within range of the rotary whirl *c*.

It will be seen that my machine is of the simplest and most inexpensive construction possible, and that notwithstanding it possesses all the necessary requisites for good work.

The quill proper, *e*, may be considered as the quill support for receiving the silk.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with a hollow spindle having a slotted tubular flier at one end and open entirely through its opposite end, and a quill-support entering said tubular flier and on which the quill is held independently of the spindle, of a traverse-guide on the flier, and mechanism, substantially as described, for rotating the spindle and flier and for traversing said guide, substantially as herein set forth.

2. The combination, with the spindle having at one end the tubular flier slotted lengthwise to its extremity, and having its end oblique to form a shoulder at one side of the slot, the spindle being open entirely to its opposite end, of a quill-support entering the flier and on which the quill is held independently of the spindle, a traverse guide on the flier, and mechanism, substantially as described, for operating the spindle and traverse-guide, substantially as herein described.

3. The combination, with the spindle having at one end a tubular slotted flier and a traverse-guide locked to turn with but sliding on the flier, the spindle being open entirely to its opposite end, of a quill-support entering the open end of the flier, on which the quill is held independently of the spindle, and mechanism, substantially as described, for operating the spindle and traverse-guide, substantially as herein set forth.

4. The combination, with a spindle, a flier, a traverse guide, and a movable quill-support, of a whirl on the spindle for receiving a continuously-running band, a brake for checking the whirl and spindle, a stop-lever for applying the brake, and a stop-rod operated by the movable quill-support to trip the stop-lever, substantially as herein described.

5. The combination, with the spindle C and its tubular and slotted flier C^4, of the traverse guide on the flier, the whirl having a lump or projection, and the stop-lever F, for engaging the lump or projection to stop the whirl and spindle, the whirl when on the spindle having its lump or projection about diametrically opposite the slot in the flier, so as to stop the spindle with the slot at the front of the flier and clearly exposed, substantially as herein described.

6. The combination, with the spindle C, the tubular slotted flier, and the traverse-guide C^5, of the bearing-bushing D, having the brake-collar D′, the whirl fast on the spindle and adjacent to the brake-collar, the stop-lever F, and mechanism, substantially as described, for operating the spindle and traverse-guide, substantially as herein set forth.

7. The combination, with a hollow spindle having a tubular slotted flier, of a traverse-guide on the flier, a whirl on the spindle, a stop-lever engaging the whirl to stop the whirl and spindle on a quill being full, and a quill-support entering the tubular flier and having a stop rod provided with an adjustable collar for acting on the stop-lever as the quill and support are moved by the quill-bearing on the flier, substantially as herein described.

8. The combination, with the hollow spindle and tubular slotted flier, of the traverse-guide C^5, the oil-guard or thread-centering device D^2 at the lower end of the spindle, a quill-support entering the flier, and mechanism, substantially as described, for operating the

spindle and traverse-guide, substantially as herein set forth.

9. The combination, with the end frames and double girts rigidly secured together by struts *b*, of the hollow spindles terminating in tubular fliers, the traverse-guides C^5 on the fliers, the quill-supports entering the fliers, bearing-bushings D, fixed in the upper rail of the girts, the thread-centering devices and oil-guards fixed in the lower rail of the girts, and mechanism, substantially as described, for operating the spindles and traverse-guides, substantially as herein set forth.

JOHN E. ATWOOD.

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