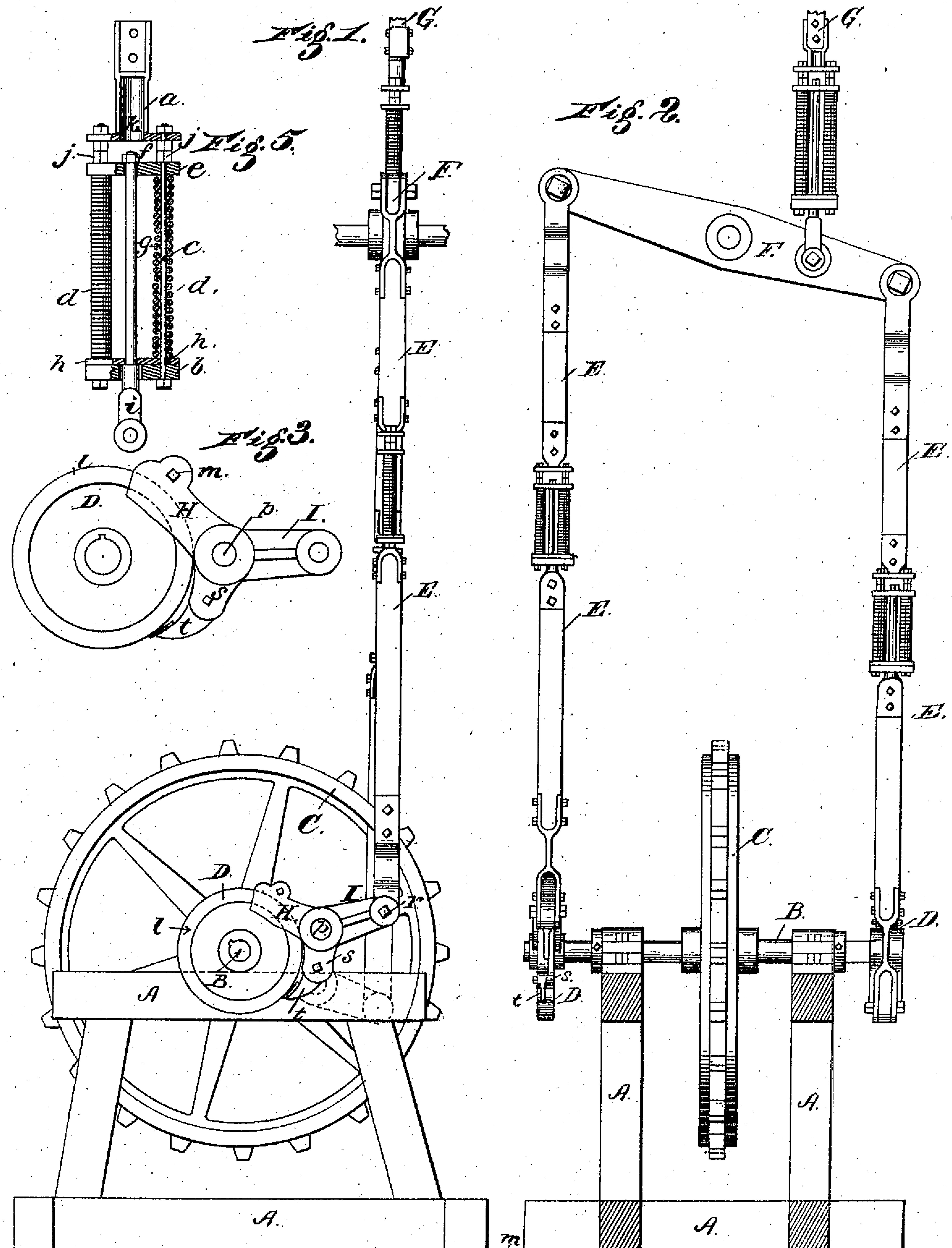
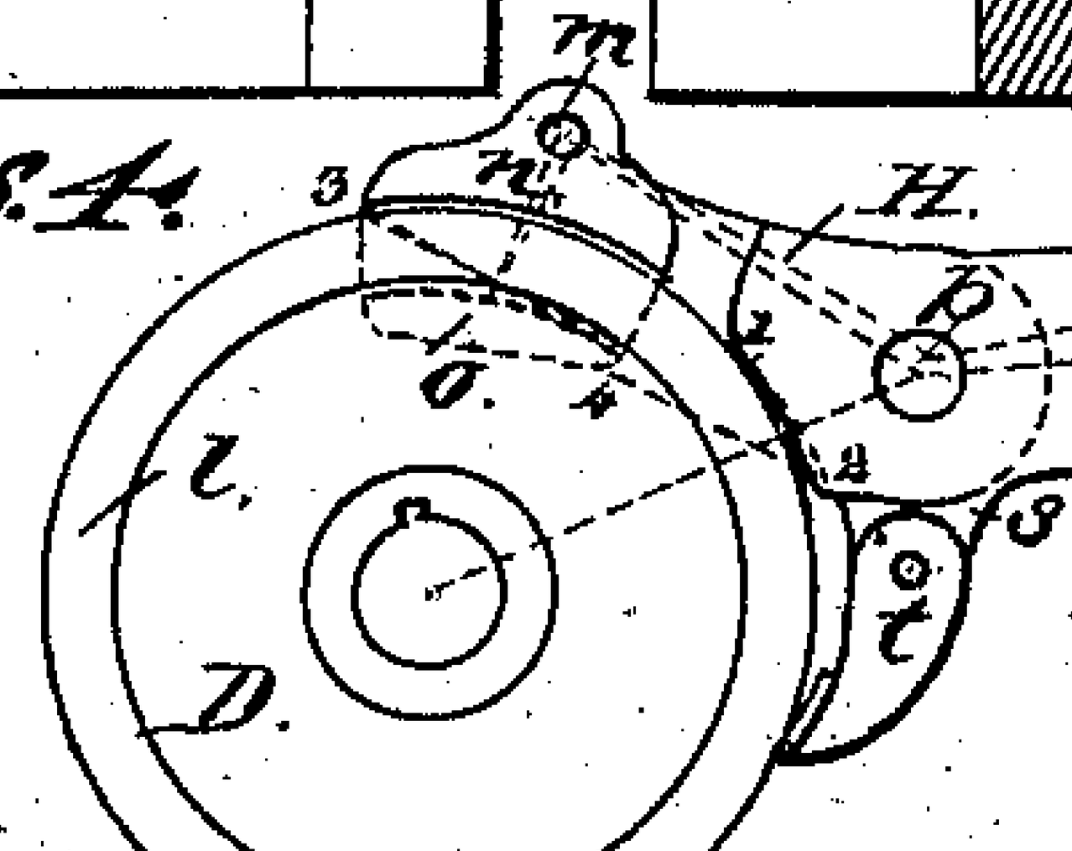
(No Model.)

H. CROFT, Jr.

POWER CONVERTER.

No. 287,634. Patented Oct. 30, 1883.





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HENRY CROFT, JR., OF SPRINGFIELD, OHIO.

POWER-CONVERTER.

SPECIFICATION forming part of Letters Patent No. 287,634, dated October 30, 1883.

Application filed June 16, 1883. (No model.)

To all whom it may concern:

Be it known that I, HENRY CROFT, Jr., a citizen of the United States, residing at Springfield, in the county of Clarke and State of Ohio, have invented certain new and useful Improvements in Power-Converters, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.

My invention relates to that class of power-converters especially designed for wind-engines, for the purpose of converting the reciprocating motion of the pump-rod into rotary motion for driving machinery, the general principles of construction of which will be found in my prior Patents No. 253,515, of February 14, 1882, and No. 256,465, of April 18, 1882, and the object of my present invention is twofold: First, to provide a novel means for preventing the jars and concussions incident to the sudden starting and unequal speed of the wind-wheel, which I accomplish by employing spring-couplings to unite the divided end of the pump-rod, or of the pawl or clutch driving beams, or both, as may be desired; second, to dispense with pawls and ratchets, in which there is always lost motion, and which make more or less noise, and to substitute a positive friction-grip which is noiseless and very effective.

To this end the novelty consists, first, in the combination, with one or more of the divided reciprocating beams, of interposed spring-couplings, whereby said beams are rendered longitudinally elastic; secondly, in the combination, with a circular disk or wheel having peripheral flanges on both sides, and keyed or otherwise fastened to the driving-shaft, of a jointed vibrating clutch mechanism adapted to grasp and firmly hold the flanges of the disk or wheel on the upward stroke, and to become self-disengaged on the downward; thirdly, in the details of construction and combination of the parts, all as will be herewith set forth and specifically claimed.

In the accompanying drawings, Figure 1 is a side elevation of a power-converter containing my improvements. Fig. 2 is a front view of the same. Fig. 3 is an enlarged side elevation of one of the driving-disks and clutch mechanism. Fig. 4 is a similar detailed view to better illustrate the action of the gripping mechanism. Fig. 5 is an enlarged detailed view in front elevation of one of the spring-couplings.

The same letters of reference are used to indicate like parts in all the figures.

A represents any suitable frame-work, in which is journaled the shaft B, carrying the main driving-wheels C, and on each end the driving-disks D. These disks and the driving-wheels are keyed or otherwise suitably fastened to the shaft.

E E are the beams, pivoted at their upper ends by suitable links to the walking-beam F, which is actuated by the pump-rod or other reciprocating prime mover G. The lower ends of the beams E E are suitably pivoted to the toggle-arm of the clutch or gripping mechanism.

The above parts, with the exception of the clutch or gripping mechanism, may be constructed as shown in my patents above referred to, or in any other suitable manner.

It is well known that windmills run at very irregular speeds, sometimes starting rapidly and very suddenly with great force. Where the connections are rigid, more or less damage is apt to result by reason of the resistance offered. To prevent this damage and breakage I employ the spring-couplings shown more particularly in Fig. 5, each of which couplings, where more than one is used, is composed of the upper flanged socket, *a*, and the lower perforated cross-head, *b*. This lower cross-head is united to the flanges of the socket *a* by means of two or more guide-rods, *c*, upon which coiled springs *d* are fitted, as shown. Upon the upper ends of these springs, and also surrounding the rods *c*, so as to play thereon, is a cross-head, *e*, to which is centrally attached, by a head or nut, *f*, the pendent rod or link *g*, which passes down centrally between the rods *c*, through the lower cross-head, *h*, upon which the lower ends of the springs rest, and has at its lower end a shoulder, which, while playing freely through the cross-head *b*, bears against the under side of the cross-head *h*. The lower extremity of the rod *g* is formed with any suitable coupling, *i*, by which it is bolted or pivoted to the lower end of the pump-rod, or directly to the walking-beam, or, in case of the beams E, to their lower divisions, or directly to the toggle-arm of the pawl or clutch mech-

anism, as will be readily understood by reference to Fig. 2.

Between the flanges of the socket *a* and the cross-head *e* are tension-adjusting nuts *j*, upon the rods *e*, by means of which the initial tension or compression of the springs *d* may be regulated at will. If desired, the rod *g* may be encompassed by a coiled spring between the cross-heads *e* and *h*. The socket *a* is bolted or otherwise fastened to the lower end of the upper division of the pump-rod G, or of the beams E, or both, as seen in Figs. 1 and 2. The lower extremity of the socket *a* is recessed, as at *k*, to permit the passage into it of the head *f* of the rod *g*. Now, it will be observed from the above construction that the springs *d* will always be compressed between the cross-heads *e* and *h*, no matter whether the resistance is entirely above or entirely below, or partly above and partly below, and an effectual spring-coupling is obtained which will receive and neutralize the shocks or jars caused by the sudden starting of the wind-wheel. As before stated, but one of these spring-couplings may be employed, if located upon the pump-rod, or if it is not desired to have it upon the pump-rod one may be employed for each of the beams E, or both of the beams E and the pump-rod may be provided with spring-couplings.

I do not propose to limit myself to the particular form of the spring-coupling described, as in that particular it may be varied infinitely; but I have described what I consider the best form for the purpose.

Now, referring to the clutch or gripping mechanism, (shown more particularly in Figs. 3 and 4,) I will thus describe it: The driving-disks D are provided on each side with peripheral flanges *l*, and embracing these flanges on each side are links H, united by a bolt, *m*, where they straddle the periphery of the driving-disk. These links H have engaging-jaws *n o*, so curved as to fit, the former over and the latter under the flanges *l*, as seen in Fig. 4. The outer ends of the links H are pivoted at *p* to the toggle-lever I, whose outer end is in turn pivoted at *r* to the lower end of the beam E by means of any suitable connecting-link. The end of the toggle I next to the periphery of the driving-disks is curved, so as to conform to the circle of the driving-disk between the points 1 and 2. Above the point 1 the knuckle of the toggle is extended for a purpose to be hereinafter described.

To a pendent ear, *s*, upon the under side of the head of the toggle I, is adjustably bolted a check-shoe, *t*, of the shape shown. By reference to Fig. 2 it will be seen that the adjacent faces of the ear *s* and check *t* are oblique or inclined, by means of which they cannot get out of adjustment by turning on their connecting-bolt without first loosening the nut of the same, and thus a very secure and rigid lock is formed between them. From this construction, and by reference to Fig. 4, it will be seen that upon each upward stroke of the toggle I the point 1 impinges upon the periphery of the disk D, and throws the pivotal point *p* out from the periphery of the disk. This throwing out from the pivot on a radial line causes the links H to be elevated at their rear ends, and causes the jaws *n* and *o* to grip the flanges *l*, the former on the upper side at 3 and the latter on the lower side at 4. This action will be readily understood by reference to the dotted lines contained in Fig. 4. In this way a most rigid and effective lock is formed between the toggle I, links H, and disk D on every upward stroke of the beam E. As soon as this motion is reversed, as on the downstroke, the curved portion of the head of the toggle between the points 1 and 2 again conforms to the periphery of the disk D and releases the grip of the link H, so that they, with the toggle, can slide back to re-engage the periphery and flanges of the disk at a lower point when the upstroke is repeated.

The employment of the check-shoe *t* is a safeguard to prevent the locking of the jaws *n o* in case the reversal of the upstroke is very quick and sudden, in which event the point 2 would, by the contact of the check-shoe with the periphery of the disk, be prevented from throwing up the rear ends of the links H, as will be readily understood.

The object of the extension of the head of the cam above the point 1 is to provide for wear, for as the head wears its concavity will extend upward into the extension of the metal, and as the jaws *n o* wear also the relation of the pivotal points will always be maintained the same relatively, even after wear, so that no adjustment of the parts is required to accommodate wear, except the adjustment of the check-shoe, which can be readily effected. In this way I secure a positive locking-grip without lost motion and without noise, and as there are two of these alternately-acting clutch mechanisms the revolutions of the driving-wheel are continuous.

Having thus fully described my invention, I claim—

1. In a power-converter, the combination, with a reciprocating prime mover, transverse walking-beam, the reciprocating beams actuated thereby, connected thereto, and provided with clutch or ratchet-and-pawl mechanism for communicating continuous revolving motion to a shaft provided with a driving-wheel, of spring-couplings uniting the divided ends of the reciprocating beams, or any of them, as and for the purpose specified.

2. The herein-described spring-coupling for power-converters, consisting of the attaching ends *a g*, cross-heads *b*, guide-rods *c*, encompassing-springs *d*, intermediate cross-heads, *e h*, and nuts *j*, the parts being constructed and relatively arranged substantially in the manner and for the purpose specified.

3. The combination, with a circular driving disk or wheel provided with peripheral flanges, of gripping-links embracing both the upper

and under sides of said flanges and actuated by a cam or toggle-lever pivoted to said links, substantially as described.

4. The combination, with circular driving disk or wheel provided with peripheral flanges, of gripping-links provided with jaws embracing both the upper and under side of said flanges, and pivoted to a cam or toggle-lever suitably united to the actuating mechanism, substantially as described.

5. The combination, with a circular driving disk or wheel provided with peripheral flanges, of gripping-links embracing both the upper and under side of said flanges, and a cam or toggle-lever pivoted to said links and adapted to engage with the periphery of said driving-disk, provided on its under side with an adjustable check-shoe, substantially as described.

6. In the clutch mechanism of power-converters, the combination, with the gripping-links H, adapted to engage with peripheral flanges on the driving-disk, of the toggle-lever I, whose head is provided with a concavity to conform to the periphery of the driving-disk, substantially as described.

7. In a clutch mechanism of power-converters, the combination, with the gripping-links H, adapted to engage with the peripheral flanges on the driving-disk, of the toggle-lever I, whose head is provided with a concavity to conform to the periphery of the driving-disk, and with an extension of the metal above said concavity, whereby wear is accommodated, substantially as described.

8. In the clutch mechanism of power-converters, the combination, with the gripping-links H, adapted to engage with peripheral flanges on the driving-disk, of the toggle-lever I, whose head is provided with a concavity to conform to the periphery of the driving-disk, and with a pendent ear, to which is bolted, by means of adjacent oblique faces, the adjustable check-shoe *t*, substantially as described.

HENRY CROFT, JR.

Witnesses:
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E. W. RECTOR.