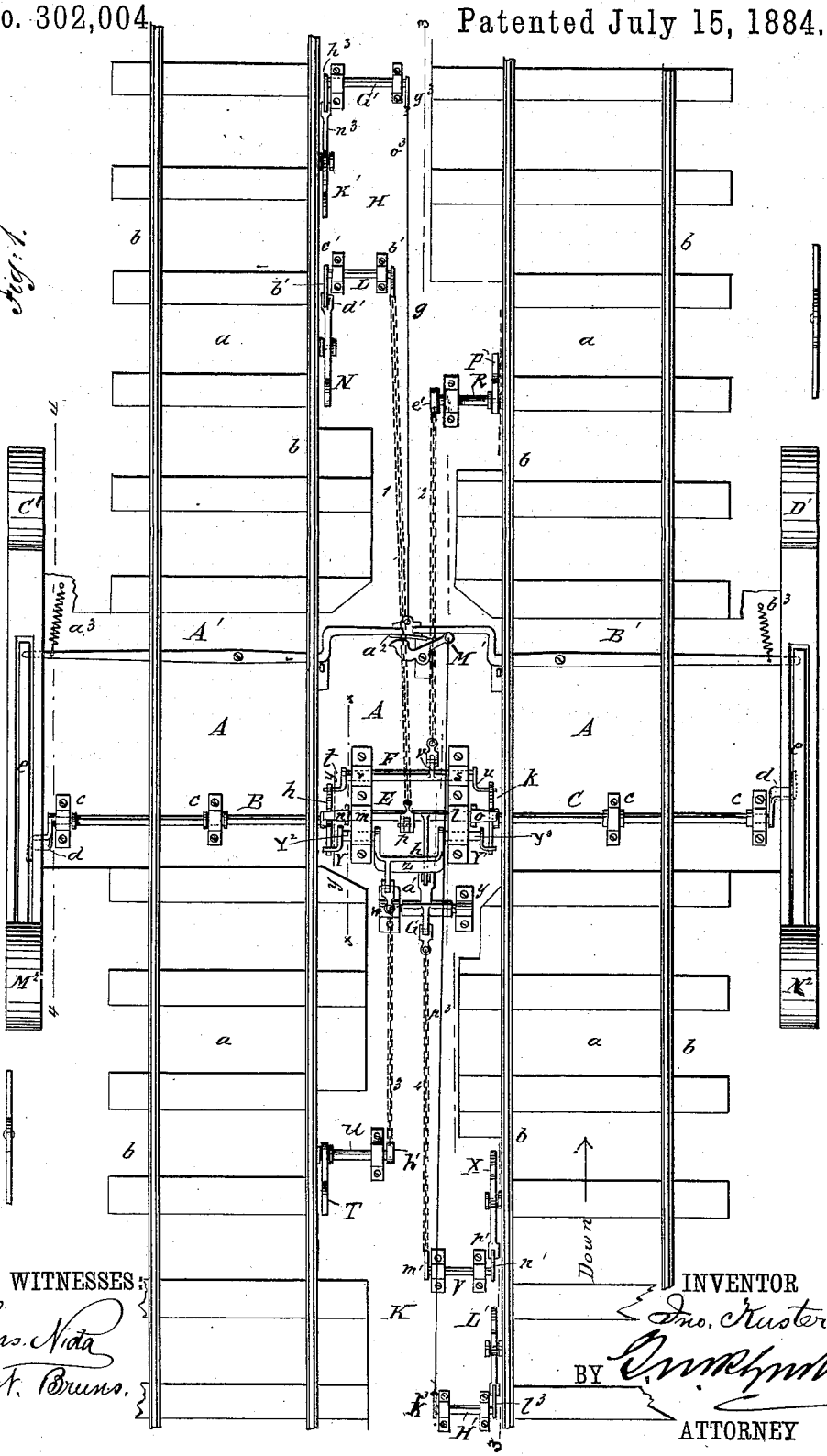
(No Model.) 2 Sheets—Sheet 1.

J. KUSTER, Jr.

AUTOMATIC GATE AND ALARM FOR RAILWAY CROSSINGS.

No. 302,004. Patented July 15, 1884.

Fig. 1.



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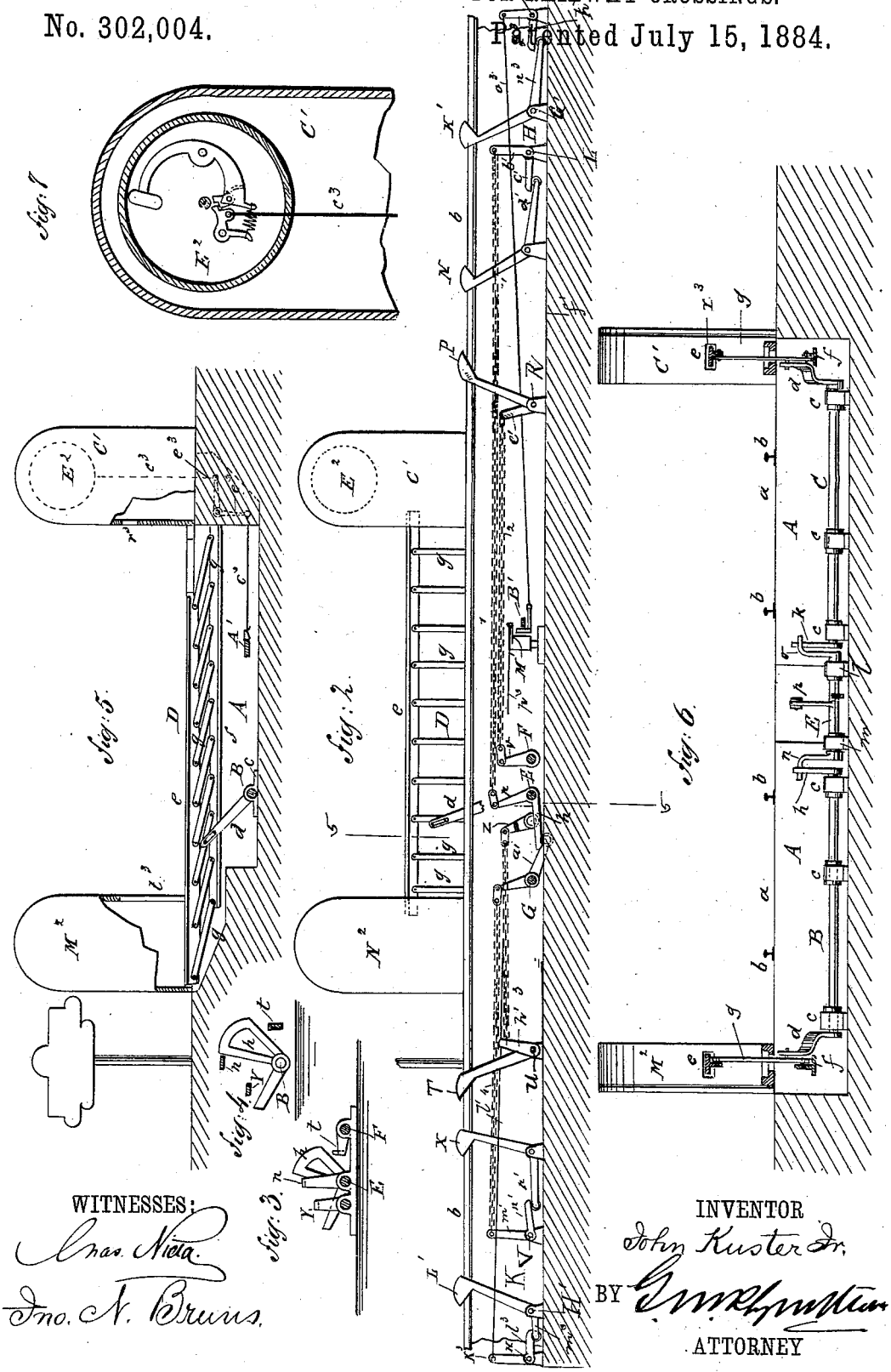

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JOHN KUSTER, JR., OF STAMFORD, CONNECTICUT.

AUTOMATIC GATE AND ALARM FOR RAILWAY-CROSSINGS.

SPECIFICATION forming part of Letters Patent No. 302,004, dated July 15, 1884.

Application filed January 11, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN KUSTER, Jr., of Stamford, county of Fairfield, State of Connecticut, have invented a new and useful Improvement in an Automatic Gate or Gates and Alarm for Railway-Crossings; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying sheet of drawings, forming part of this specification.

This invention is in the nature of an improvement in an automatic gate or gates and alarm for railway-crossings; and the invention consists in a series of turning shafts with levers or cranks fixed thereto or connected therewith, in combination with connecting chains or rods, and vertically-adjustable gates and alarm-bells, whereby the gates are elevated and depressed automatically and the alarm sounded by the wheels of a passing train.

In the accompanying sheet of drawings, Figure 1 is a plan or top view of my invention. Fig. 2 is a longitudinal vertical section taken on the line 3 3, Fig. 1. Fig. 3 is a section of detail taken in the line *x x*, Fig. 1. Fig. 4 is a section of detail taken in the line *y y*, Fig. 1. Fig. 5 is a longitudinal section on the line 4 4, Fig. 1, showing the gates in their open position. Fig. 6 is a cross-section on the line 5 5, Fig. 2. Fig. 7 is a longitudinal section of the bell-box.

Similar letters of reference indicate like parts in the several figures.

The danger attending the crossing of railway-tracks by common roads is so well known that it is simply necessary to mention the fact without further comment. To stop passing vehicles at such crossings, many devices have been contrived, some of which are in practice on numerous railroads.

To construct stop-gates for the road-crossings of railways, and also alarm-bells to give warning of approaching trains, so that their operation shall be not only automatic but certain and positive, I make a transverse excavation, A, of convenient dimensions and form, in the road-bed *a* of the railway, under the tracks *b*. This excavation is preferably constructed in line with or in continuation of the common road which crosses the track. It may, however, be located elsewhere under the track. Into this excavation are secured to suitable foundations of timber, (not shown,) or otherwise, a series of collars or bearings, *c*, which support shafts B and C. These shafts extend under the tracks of the roadway longitudinally of the excavation A. To each outer end of these shafts B and C are securely fixed and at right angles to the same levers *d*, and to the upper ends of each of these levers are attached by pivots gates D. These gates consist of an upper rail, *e*, and a lower rail, *f*, the two rails being connected by a series of bars, *g*, which are pivoted at their ends to the upper and lower rails of the gate; also, to the shafts B and C are fixed bell cranks or levers *h* and *k*, in line with the shafts B and C, and between the inner ends of the same; also, supported in suitable bearings, *l* and *m*, is a shaft, E, with levers *n* and *o* fixed to its ends, and a bell-crank lever, *p*, secured to it midway from its ends; also, supported in suitable bearings, *r* and *s*, is a shaft, F, with cranks *t* and *u* fixed to its ends, and a lever, *v*, between the same; also, supported in suitable bearings, *w* and *y*, is a shaft, G, with a bell-crank lever, *a'*; also, in the excavation A, adjacent to and parallel with the shaft E, and supported in suitable bearings, are the shafts Y^2 Y^3, to which are fitted right-angle cranks Y and Y', with an intermediate bell-crank lever, Z, between them. In the road-bed, and below the tracks on either side of the excavation A, and parallel with the tracks, are also formed excavations H and K. Into the excavation H, and supported in suitable bearings, is fitted a turning shaft, L, with a lever or crank, *b'*, at one end, and a lever or crank, *c'*, at right angles to the first-named lever at the other; and, also, in the excavation H, suitably pivoted therein, is a tripping-lever, one of the arms, N, of which extends upward and close to the outer edge of one of the rails of the track *b*, and the other crank, *d'*, which is bent nearly at right angles to the lever N, extends under the crank *c'* of the shaft L; also, in the excavation H, and pivoted therein, is a tripping-lever, with one of its arms, P, at one end of a shaft, R, ex-

tending up to and close beside one of the rails of, say, the down track of the road, and its other arm, c', at the other end of said shaft R, connected with the chain 2, and within the excavation K is placed, in like manner to the above-described tripping-levers, a tripping-lever, with one of its arms, T, at one end of the shaft U, extending upward and close to the outer side of the rail of, say, the up track of the road, and with another arm, h', at the other end of said shaft attached to the chain 3; and within the excavation K is also placed another turning shaft, V, with levers m' and n' fixed to its ends and at right angles to each other; and suitably pivoted in the excavation K is a tripping-lever, one of the arms X of which extends upward and close to the side of the rails of, say, the down track of the road, and its other arm, p', extends beneath the lever n' of the shaft V.

At the sides of the track, and extending across the road-crossing, are in suitable vertical guides placed the gates D, before mentioned. Fixed to the lever p at one of its ends, and to the lever b' by its other end, is a connecting chain or rod, 1, and fixed to the lever v of the shaft F at one of its ends, and to the arm e' of the shaft R at its other end, is the connecting chain or rod 2, and fixed to the bell-crank lever Z at one of its ends, and at its other end to the arm h' of the shaft U, is a connecting chain or rod, 3. Fixed to one of the arms of the bell-crank a' and the lever m' of the shaft V is a connecting chain or rod, 4; also, in the excavation A are suitably pivoted levers A′ and B′. The inner ends of these levers are bent, as shown in Figs. 1 and 2, with a plate, a^2, fixed to one of the bent ends of one of the levers, which plate bridges the space between these bent ends of each of said levers. The outer ends of the levers A′ and B′, and also in the excavation A, have secured to them coil-springs a^3 and b^3; also, to the outer ends of the levers A′ and B′ are connected wires c^3, (see Fig. 5,) the other ends of the wires being attached to levers e^3, which are pivoted in or below the bell-boxes C′ and D′, placed at each side of the track. To the upper end of these levers e^3 are fixed hammers to operate alarm-bells E^2.

In the excavations H and K, and supported in suitable bearings, so as to freely turn therein, are shafts G′ and H′. These shafts have attached to them right-angle cranks g^3 h^3 and k^3 l^3, respectively; also, in the excavations H and K are pivoted, one in each excavation, tripping-levers K′ and L′. These tripping-levers extend upward and close to the rails of the up and down tracks, respectively, of the road, the lower ends of the levers being bent at right angles, forming levers m^3 and n^3, which last-named levers pass under the levers h^3 and l^3 of the shafts G′ and H′. From the crank g^3 of the shaft G′ to the bent end of the lever A′, and secured to them, is a rod or chain, o^3, and to the crank k^3 of the shaft H′ is fixed one end of a rod or chain, p^3, which rod or chain extends to a tripping bell-crank, M′, to which last-named crank it is likewise secured, it being understood that all of the several shafts, cranks, levers, and connecting-rods are below the road-bed of the railway, with the exception of the tripping-levers N, P, T, X, K′, and L′, which extend upward, as before described.

Now, when my automatic alarm and stop-gates and their several connecting parts are constructed substantially as hereinbefore recited, they are operated as follows: The wheels of a train passing along the up track of a road, for instance, are brought in contact with the upper end of the tripping-lever K′, causing the lower end of the lever to turn on its pivot, thereby elevating the lever n^3, throwing upward the crank h^3 of the shaft G′, causing that shaft to turn and throw backward its crank g^3, thereby drawing the chain or rod o^3, which in turn draws the inner bent end of the lever A′, forcing the plate a^2 to actuate the bent end of the lever B′, compelling these levers to turn on their pivots, respectively, and draw the bell-wires c^3, attached to their outer ends, until these wires have imparted motion to the bell-cranks e^3, causing them to strike with their hammers the bells E′ in bell-boxes C′ and D′, the levers A′ and B′ being restored to their normal state by the elastic action of the springs a^3 and b^3, and the alarm-bells are similarly sounded by the wheels of a train passing along the down track when they come in contact with the tripping-lever L′, which, through the shaft H and its cranks k^3 and l^3 and its connecting chain or rod p^3, causing the alarm-bells to sound through the action of the bell-levers A′ and B′ in precisely the same manner referred to when describing the operation of the tripping-lever K′, excepting that, instead of the rod p^3 being connected directly with the lever A′, it actuates that lever and the lever B′ through or by the tripping-lever M′. Now, since these tripping-levers K′ and L′ are placed at some distance from the road-crossing it is desired to alarm, due notice is given at that point that a train is approaching on either the up or down track. Shortly after in this way giving the alarm the wheels of the passing train are brought in contact with the tripping arm or lever N, causing this lever or arm to turn on its pivot, thereby throwing upward the lever d' at its lower end, and also the crank c' on the shaft L, and throwing backward the crank b' on that shaft until the connecting chain or rod 1 is tightly drawn, which operation pulls over the bell-crank lever p on the shaft E, causing thereby the shafts B and C (see Fig. 6) to turn in their respective bearings through the action of the cranks or levers n and o, fixed on the ends of shaft E, and the bell-cranks h and k on the ends of the shafts B and C, so that as these shafts turn the lever d throws upward the gates D, and by that operation causing them to assume a vertical position, that bar the road-crossing from the track, and in this way prevent accident.

As the gates D move upward in the manner just described, the several jointed bars, *g*, of the gates D turn vertically, causing the upper bars, *e*, of the gates to be at sufficient height above the track to bar the crossing, and as the gates in this way are elevated, they so remain until the train proceeds on its course, bringing its wheels in contact with the tripping-lever T, which lever is forced over on its pivot, the arm *h'* thrown backward, bringing thereby tension on the chain or rod 3, it bringing over the upper arm of the bell-crank Z, causing this crank to turn in its bearings until the cranks Y Y', fixed on either side of the same, are brought in contact with the lower arm of the bell-crank levers *h* and *k*, which last-named cranks turn the shafts B and C in a reverse direction, causing the levers *d* at their ends to draw downward the lower rails, *f*, of the gates D, the pivoted bars *g* in turn bringing down the upper rails, *e*, of these gates until the several parts constituting the gates are below the surface of the road-crossing, and no longer offer opposition to its being passed, and so on the down track. After the wheels of the train have passed the tripping-lever L' and sounded the bell, as before stated, they are brought in contact with the tripping-lever X, causing it to turn, and its lower part or lever, *p'*, to throw upward the crank *n'* of the shaft V, thereby throwing backward the crank *m'* and bringing tension upon the chain 4, which throws the bell-crank lever *a'* until it engages with the lower arm, *h*, of the bell-crank lever *p*, thereby, through the shaft E, causing the shafts B and C to turn in their bearings and throw upward the gates D, in the manner before described, in which position they remain until the wheels of the train are brought in contact with the tripping-lever P, when that lever is forced over, turning on its pivot, and by means of its arm or lever *e'* drawing the chain or rod 2, causing thereby the shaft F (see Fig. 1) to turn until its cranks *t* and *u* are brought in contact with the bell-crank levers *h* and *k*, and the shafts B and C are turned in a reverse direction, again bringing downward the elevated gates, in the manner described in the previous operation. Now, as these stop-gates D are elevated, one end of the upper rail, *e*, of the gates enters into mortises r^3 and r^3 in the bell-boxes C' and D', and the opposite ends of these upper bars pass into slots t^3 in the upright boxes M^2 and N^2, (see Fig. 1,) preserving the gates from contact with any object attempting to pass them.

The excavations A, H, and K may be covered with removable covers of any desired description, to prevent their receiving deposits of snow or dirt, which would tend to interfere with the operation of the several parts described; and the upper rails, *e*, of the gates D, when within their guides, or when the gate is in its closed position, effectually keep like deposits from the passage-way or guides of the gates.

The details shown in Figs. 3 and 4, hereinbefore referred to, show the position of the bell-crank lever *h* when the gate is down.

From the foregoing description it is obvious that the operation of the alarm-bell and the elevation and depression of the stop-gates is automatic and positive, not depending upon the watchfulness of gate-keepers or the uncertainty of electric currents, but working with certainty by the very trains of whose approach it is intended to give notice.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. Mechanism for automatically operating gates for railway-crossings, consisting of the shaft E, having the levers *n* and *o*, the chain or rod 1, connected with said shaft E, and with the shaft L, which is operated by the tripping-lever N, the shafts B and C, provided with the crank-levers *h* and *k*, respectively, to be operated by the levers *n* and *o* to move a gate to close the crossing, combined with the shafts Y^2 and Y^3, having the levers Y and Y', also to operate the bell-crank levers *h* and *k*, the intermediate bell-crank lever, Z, of the said levers Y and Y', the shaft U, and rod or chain 3, connecting levers Z and shaft U, and the tripping-lever T, for operating the same to move the gates to open the crossing, all substantially as shown and described.

2. Mechanism for automatically operating gates for railway-crossings, consisting of the shaft E, having levers *n* and *o*, the chain or rod 1, connected with said shaft E, and with the shaft L, which is operated by the tripping-lever N, the shafts B and C, provided with crank-levers *h* and *k*, respectively, to be operated by the levers *n* and *o* to move the gates to close the crossing, the shafts Y^2 and Y^3, having the intermediate crank-lever, Z, and the levers Y and Y', which latter operate the bell-crank levers *h* and *k*, the rod or chain 3, connecting the lever Z and shaft U, and the tripping-lever T, for operating the same to move the gates to open the crossing, combined with the shaft G, bell-crank lever thereon, and chain or rod 4, connected therewith, and with the shaft V, and the tripping mechanism, as described, for operating the shaft V, the shaft F, having levers *t* and *u*, and the shaft R and the rod or chain 2, extending between said shafts F and R, and the tripping mechanism for operating said shaft R, all substantially as and for the purpose described.

3. An alarm mechanism for railroad-crossings, consisting of the levers A' and B', shafts G' and H', the wires or rods o^3 and p^3, connecting the same, the tripping-levers K' and L', for operating the shafts G' and H', respectively, to move the levers A' and B', to sound an alarm at the outer ends of said levers, and the springs a^3 and b^3, for retaining the levers in position to be operated, combined with and operating independently of

the gate-operating mechanism, substantially as shown and described.

4. In an alarm and stop-gate device for railway-crossings, the turning shafts B and C, in combination with the shaft E and the several crank-levers fixed to the ends of said shafts, respectively, connecting rods or chains 1, 2, 3, and 4, the shafts L, R, U, and V, and the tripping-levers N, P, T, and X, substantially as shown and described.

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