3 Sheets—Sheet 1

J. N. SMITH.

Car-Axle Box.

No. 212,755. Patented Feb. 25, 1879.

Fig. 1.

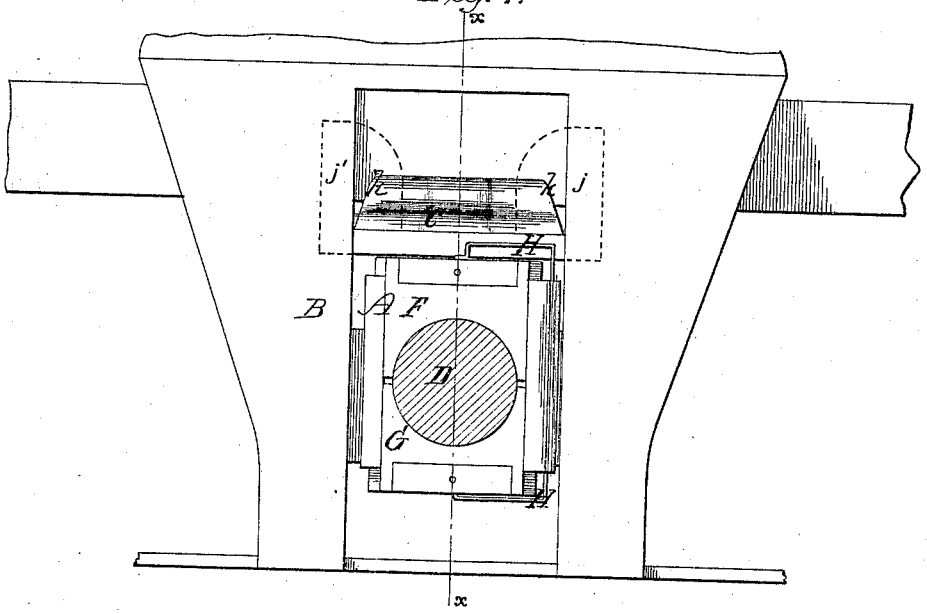


Fig. 2.

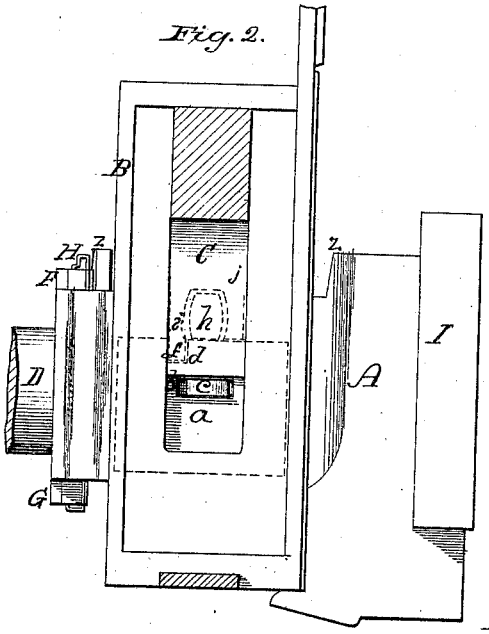


Fig. 3.

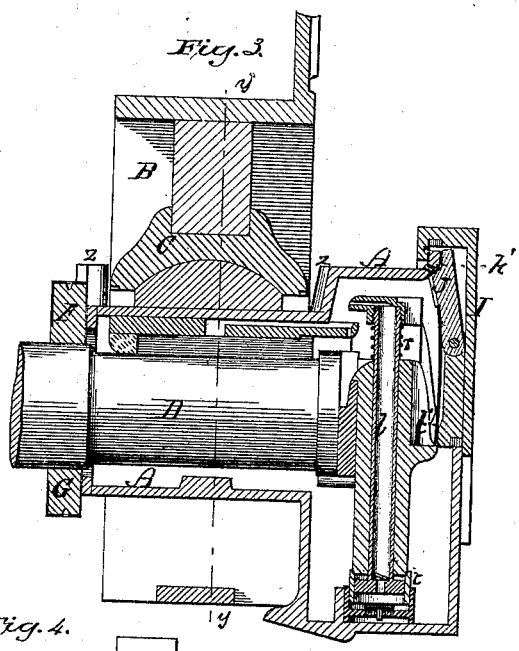
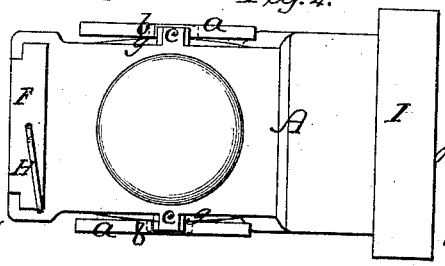


Fig. 4.



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Inventor:

J. Nottingham Smith,

By his Attorney,

J. S. Brown.

J. N. SMITH.

Car-Axle Box.

No. 212,755. Patented Feb. 25, 1879.

Fig. 5.

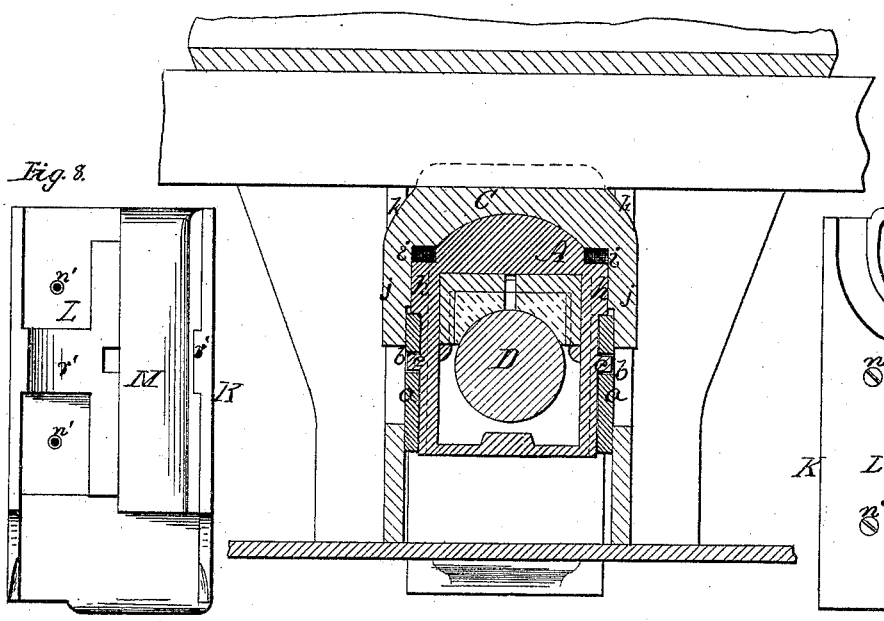


Fig. 8.

Fig. 9.

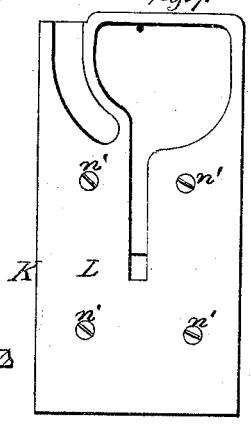


Fig. 6.

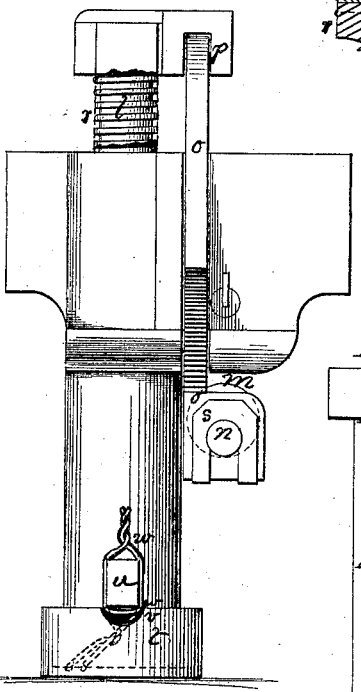


Fig. 10.

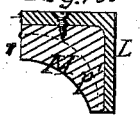


Fig. 7.

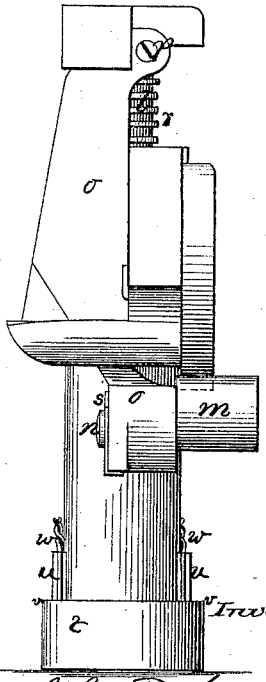
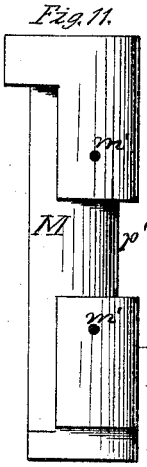


Fig. 11.



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Car-Axle Box.

No. 212,755. **Patented Feb. 25, 1879.**

Fig. 12.

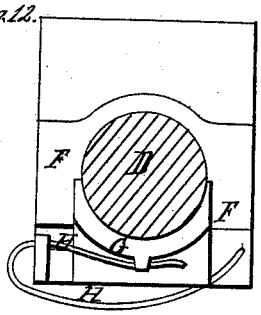


Fig. 13.

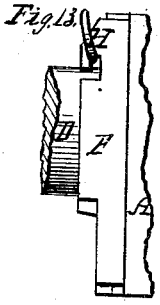


Fig. 14.

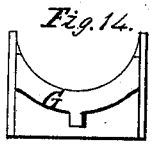


Fig. 15.

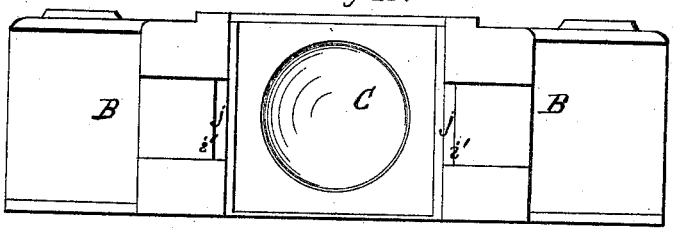
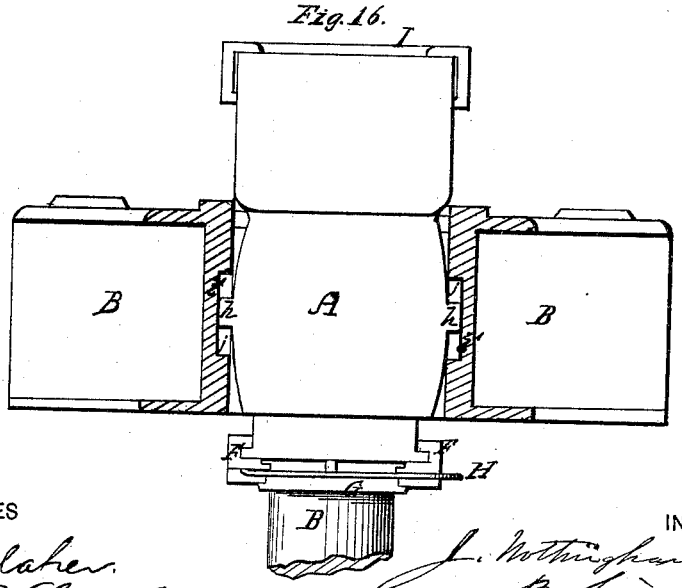


Fig. 16.



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UNITED STATES PATENT OFFICE.

JOSEPH NOTTINGHAM SMITH, OF JERSEY CITY, NEW JERSEY.

IMPROVEMENT IN CAR-AXLE BOXES.

Specification forming part of Letters Patent No. **212,755**, dated February 25, 1879; application filed April 30, 1877.

To all whom it may concern:

Be it known that I, JOSEPH NOTTINGHAM SMITH, of Jersey City, in the county of Hudson and State of New Jersey, have invented certain Improvements in Car-Axle Boxes and Oilers; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification—

Figure 1 being a view of the inner end of a car-axle box constructed with my improvements, represented as mounted in a pedestal, the axle-journal being in cross-section; Fig. 2, a side elevation of the axle-box and of the pedestal in which it is mounted; Fig. 3, a longitudinal vertical section of the axle-box and vertical section of the pedestal in which it is mounted, the section being in a plane indicated by the line *x x*, Fig. 1, the axle being represented in place, but not shown in section; Fig. 4, a top view of the axle-box separate, showing, also, the guard-plates, which are inserted between the axle-box, at the sides and the pedestal; Fig. 5, a transverse vertical section of the axle-box and journal, and through the pedestal, in a plane indicated by the line *y y*, Fig. 3; Fig. 6, a side elevation of the automatic oil-raising device as mounted in the stopping-bar of the axle-box; Fig. 7, a side elevation of the same, the view being taken at right angles to the view in Fig. 6; Fig. 8, a view of the lower side of the bearing which rests on the axle-journal, one of the soft-metal lining-blocks being removed; Fig. 9, a top view of the bearing; Fig. 10, a transverse section of one of the soft-metal blocks as secured in the shell of the bearing; Fig. 11, a side view of one of the soft-metal blocks; Fig. 12, a view of the inner end of the axle-box and cross-section of the axle-journal, showing an improved construction of the dust-excluding plates; Fig. 13, a side view of the inner end of the axle-box, showing an edge view of the dust-excluding plates; Fig. 14, a view of the lower dust-excluding plate detached; Fig. 15, a bottom view of a modified construction of the pedestal and of the saddle situated therein; Fig. 16, a cross-section of the lower part of the modified pedestal, looking upward, showing, also, a bottom view of the axle-box fitted therein.

Like letters designate corresponding parts in all of the figures.

The complete axle-box and oiler, as represented in these drawings, include many features of improvement which have been secured to me by previous Letters Patent. Those features it will not be necessary for me to describe in full, nor to refer to, except as some of them may bear essential relation to the features of novelty which constitute the subject-matter of the present invention.

As to the mounting of the axle-box A in the pedestal B, I employ guard-plates *a a*, which lie vertically edgewise at the sides of the axle-box, as seen most clearly in Fig. 4. These guard-plates, when the axle-box is mounted in the pedestal B, lie between the sides of the axle-box and the inner surfaces of the pedestal sides, and in that position serve several useful purposes: in acting as anti-friction or washer plates; to take the wear between the axle-box and pedestal; to serve, by varying in thickness, for adapting the axle-box to pedestals of varying widths; to cover and shield the openings in the sides of the pedestal; to exclude dust, and to give space for the alignment of the axle-box to the axle. These guard-plates are retained in position by having each a slot, *b*, in which a lug or projection, *c*, one on each side of the axle-box, plays freely, so that no impediment is offered thereby to the self-adjusting movements of the axle-box in the pedestal. They also have, or may have, notches *d d* in their upper edges, in which enter projections *f f* (shown by dotted lines in Fig. 2) on the inner surfaces of the saddle C. These projections do not interfere with the removal of the guard-plates, since, on raising the saddle from the axle-box, the latter, with the guard-plates, is free to be removed from the pedestal.

The swells *g g* on the sides of the axle-box play against the inner surfaces of the guard-plates, as indicated in Fig. 4, in the self-alignment of the axle-box. The axle-box also is securely retained in the pedestal by means of lugs or projections *h h* on its sides, which fit freely in notches *i i* in the inner surfaces of the saddle-flaps, as seen in Figs. 2 and 5. These notches secure the axle-box against displacement from the pedestal by longitudinal

thrust, and the ball-and-socket joint with the saddle above from disconnection. At the same time the saddle is free to be raised vertically away from the housing for removal of the latter from the pedestal or other purpose; and these notches and projections do not interfere with the self-alignment of the axle-box, the projections fitting in the notches somewhat freely to allow all the necessary self-adjusting movement of the axle-box.

The saddle itself cannot be displaced from the pedestal while the weight of the car rests thereon, it being kept therein by the flap-projections *j j*, extending outward laterally into and fitted to slide closely in the side slots or openings of the pedestal, as shown most clearly in Fig. 5. In addition to these inner projections, or instead of them in cases where the pedestals have no side slots, and consequently no such projections on the saddle-flap can be employed, I employ outside flanges or projections, extending from the inner and outer edges of the saddle laterally, so as to overlap the inner and outer surfaces of the pedestal, as shown at *j' j'*, Fig. 1, by dotted lines.

When the axle-box is removed from the pedestal the saddle is readily removed from and inserted into the pedestal, notwithstanding the lateral projections above described, by first canting it laterally in the pedestal, the rounded or oblique form of the side edges *k k* thereof enabling it to be thus turned in the pedestal.

In Figs. 15 and 16 are represented a modified arrangement of the side projections *h h* of the housing and *j j* of the saddle, respectively, in connection with a slightly-modified construction of the pedestal, which has instead of side slots vertical recesses *i' i'*, wherein both the projections *h h*, Fig. 16, of the housing, and the projections *j j*, Fig. 15, of the saddle move up and down. The latter projections fill the width of the recesses in the inner faces of the pedestal, so that the saddle has no play except its up-and-down movement; but the projections *h h* of the housing do not fill the entire width of the recesses, thereby allowing a slight horizontal swinging movement of the housing in the pedestal for the purpose of self-alignment to the axle; but their outer faces run close to the backs of the recesses of the pedestal, to prevent a rocking movement of the housing around the axle-journal. With this construction the guard-plates *a a* (shown in other figures) may be dispensed with, if preferred.

The construction of dust-excluding plates F G, as shown in Figs. 1, 2, 3, and 4, does not differ essentially from that shown and described in a previous patent granted to me.

The upper dust-excluding plate, F, as shown in Figs. 12, 13, and 14, closing around the axle-journal D for the upper half of its circumference, has side projections reaching nearly or quite down to the bottom of the housing, and in these projections, as ways, the lower dust-excluding plate, G, slides upward to close the lower half of the circumference of the axle. Thus the two plates are free to move either together or separately. Then a spring, H, is secured to the upper plate, as shown, while its free end bears upward against the lower plate, thereby keeping both the upper plate close upon and the lower plate close up against the axle.

The sliding door I, which closes the outer end of the housing, as shown in Fig. 3, has a spring-dog, J, which springs inward when the door is closed down and catches under the upper edge of the housing, thereby preventing the opening of the door.

To unlock the door, a push key or pin is inserted through a hole in the housing, as at *k'*, thereby releasing the dog.

To prevent the complete removal of the door and the liability to be lost from the housing, lugs, as at *l'*, are formed on its inner surface to strike the edge of the housing when the door is lifted as high as necessary for any purpose.

This construction for retaining the door constitutes one feature of my invention.

Next, as to the self-acting device for constantly supplying lubricating-oil to the axle-journal: The device described in Letters Patent granted to me September 26, 1876, for raising the oil by the momentum of a freely vibrating momentum-plunger, actuated by the motions of the cars running on the track, operates perfectly and without failure in all cases where there is sufficient vibratory motion of the cars to produce the necessary vibrations of the oil-raising plunger. It is possible that on some smooth and straight tracks the vibrations of the plunger may be slight; and in cases of stationary journal-bearings to which this oiling device also is applicable, there is little or no vibration to cause such a plunger to act by its momentum. In such cases I apply an additional device, positive in its action, for raising the oil upon the top of the journal. In the case of car-axle journals I connect this device with the vibratory plunger, and render it auxiliary thereto.

In the accompanying drawings the momentum-plunger is represented at *l*.

The improved oil-raising device consists in a roller, *m*, mounted by an eccentric journal or shaft, *n*, in a suitable connecting-rod or vibrator, *o*, suspended by a pivot, *p*, from or otherwise flexibly connected with the plunger *l*. The upwardly-acting spring *r* of the plunger is of sufficient force not only to lift the plunger, but to sustain the eccentric roller and its suspending rod, and cause it to press lightly against the lower side of the axle-journal D, so that the revolutions of the journal will cause the roller to turn, and, because of its eccentric shaft, when the roller turns, it causes an up-and-down motion of the suspending rod *o* and of the plunger *l*, to which the said rod is pivoted or attached. Hence, by the vibrations of the plunger thus effected, the oil is raised from the reservoir and discharged upon

the axle-journal in the manner described in the aforesaid Letters Patent. The action of this eccentric roller does not interfere with the ordinary vibrations of the plunger, and so long as those vibrations continue from its momentum the roller is not apt to often come in contact with the journal, and its operation is not then required; but if the momentum vibrations of the plunger cease or become slight, or there is nothing to cause them, then the eccentric roller is, by the spring *r*, brought into contact with the revolving journal, which, by friction, imparts a revolving motion to the roller, thereby causing the vibration of the plunger.

The rapid motion of the axle-journal does not injure the roller nor disturb its operation, since, if it tends to act at all violently on the roller, the latter is immediately pushed away therefrom, and all is free again till the spring brings the roller back to the journal.

It is not necessary that the roller should be beneath the journal. It may be over the same, in which case its own weight may act or help to act to bring it in contact with the journal; or it may be arranged so as to bear laterally against the journal.

All such modifications are but variations of one principle.

For stationary shafts, where the plunger does not act by its own vibratory momentum, nevertheless the construction and operation of the well and plunger device may be substantially the same as originally described in my former Letters Patent, above referred to, and as represented in the accompanying drawings; and the eccentric roller is connected with it in a similar way, or with equivalent effect, except that the plunger only acts in obedience to the roller's movement, effected by the revolving journal. In this arrangement the force of the lifting-spring on the plunger is such as to produce a well-balanced and free vibratory motion by the proper pressure of the roller on the journal.

The eccentric roller *m* is, or may be, securely retained in its bearing in the suspending rod by having its shaft project somewhat beyond the bearing, and forming therein a peripheral groove close to the bearing, in which groove a forked plate, *s*, Figs. 6 and 7, fits, as shown, the ends of the forks of the plate being then bent over an edge of the bearing, as represented, so that it cannot be displaced by any motion or jarring of the roller. By having this plate made of elastic metal it may be removed readily and again sprung into place, whence it cannot be accidentally removed. Also, the removable bottom or cap *t* of the plunger-well is prevented from becoming loose or disconnected by the continual jarring to which it is subjected, by the simple device shown in Figs. 6 and 7. The cap is screwed upon the lower end of the well, and on one side, or on opposite sides, of the well, close to the cap, are cast or formed projections *u u*. In the upper edge of the cap are slight notches *v v*, which, when the cap is fully screwed up on the well, are brought opposite to the projections, as shown. Then by twisting or otherwise securing a piece of wire, *w*, around each projection, as shown, there being a slight groove or neck in the sides of the projections to hold the wires securely thereon, the wire also closely fitting in the notch of the cap around the projection, it becomes impossible for the cap to start from its place by any jarring to which it can be subjected. The wire is readily removable by hand whenever at any time required.

Figs. 8, 9, 10, and 11 represent my improved method of securing the lining metal in the shell L of the bearing K. The soft-metal lining is cast in separate blocks M M, of the right size and form to fit the inside of the shell. These lining-blocks are cast with the points of screws inserted therein, so that by unscrewing the screws therefrom screw-holes *m' m'*, Fig. 11, are left therein. When the blocks are applied to the shell, screws *n' n'* are inserted through the shell into these screw-holes, so that, at any time, on withdrawing the screws, the linings are free to be removed for replacement by new linings similarly prepared to fit the same shell. To secure the lining-blocks from longitudinal displacement, transverse notches *p' p'* are formed across the upper sides thereof to fit over corresponding cross-ribs *r' r'* formed on the inner surface of the shell. This method of securing the soft-metal lining is exceedingly convenient, and renders it easy to apply them and replace them at any time. It is applicable to other bearings for various machines.

There are shoulders or projections *z z* on the top of the housing, extending up in front and rear of the saddle, to secure the housing from displacement should, possibly, all other safeguards, as provided, fail.

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

1. The sliding door I, provided with the spring-locking dog J and retaining-lugs *l'*, in combination with the axle-box A, substantially as and for the purpose herein specified.

2. The combination of the eccentric roller *m*, mounted in a reciprocating holder, *o*, the plunger *l*, or its equivalent, and the journal D, substantially as and for the purpose herein specified.

3. A forked plate, *s*, in combination with the grooved roller-shaft *n* and its bearing *o*, substantially as and for the purpose herein specified.

4. Projections *u u* and wires *w w* on the well body or barrel, in combination with a well bottom or cap, *t*, provided with notches *v v*, substantially as and for the purpose herein specified.

J. NOTTINGHAM SMITH.

Witnesses:

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E. R. JOHNSTON.