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W. M. SCOTT.

MULTICIRCUIT CONTROLLER.

APPLICATION FILED MAR. 10, 1902.

NO MODEL.

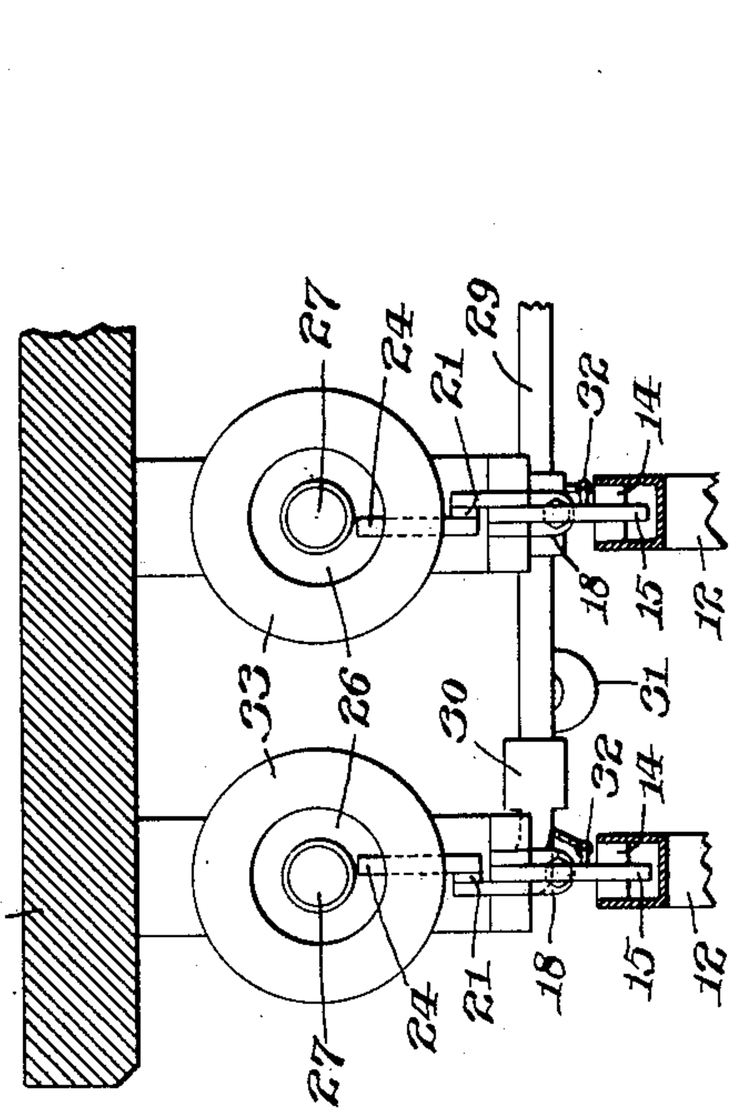

Fig. 2.

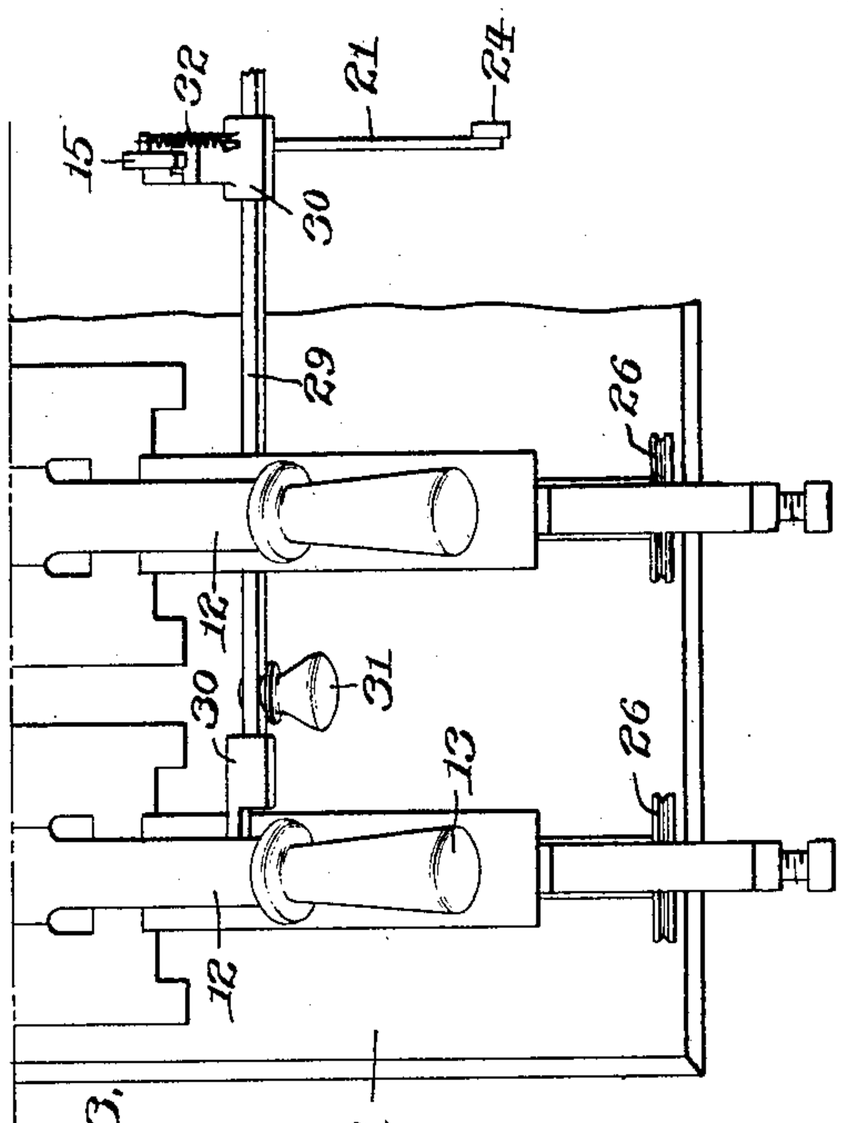

Fig. 3.

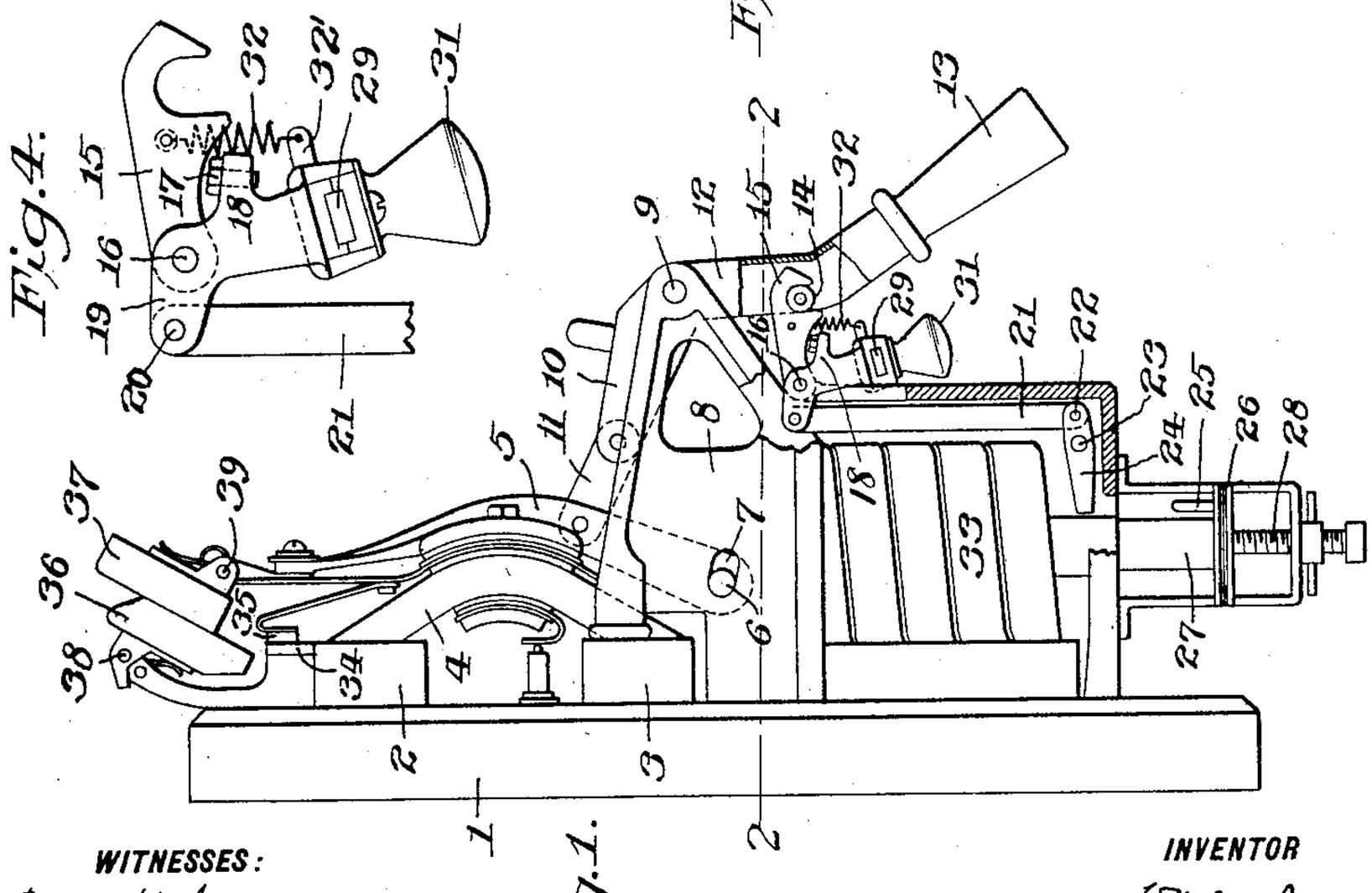

Fig. 4.

Fig. 1.

WITNESSES:

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No. 746,587. Patented December 8, 1903.

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MULTICIRCUIT-CONTROLLER.

SPECIFICATION forming part of Letters Patent No. 746,587, dated December 8, 1903.

Application filed March 10, 1902. Serial No. 97,411. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM M. SCOTT, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Multicircuit-Controller, of which the following is a specification.

My invention consists of automatic means for altering the condition of a group of electric circuits carrying either alternating or direct currents, or both, upon the occurrence of predetermined conditions in any one of the group of circuits.

It consists also of a plurality of circuit-controllers so constituted and arranged that upon abnormal conditions obtaining in any one or more of the circuits to be controlled the entire group of controllers operates together.

It comprises, further, a plurality of automatic circuit-controllers which are restrained in their normal position by latches, all these latches or restraining means being operated upon by the tripping means of any one of the controllers upon the occurrence of predetermined conditions in the circuits of the controllers.

It is of importance in many systems of electrical distribution to cause a change in the condition of a number of circuits upon the occurrence of predetermined conditions in any one or more of such circuits. For example, in a multicircuit arc-lighting system, a three-wire system, or in a system employing multivoltage balancing transformers and circuits it is often desirable to cause an opening of all of the circuits upon an overload in any one of them or upon an abnormal rise of potential or other condition. It is to meet such demands that the hereinafter-described apparatus is constituted. It operates in the nature of a protective device.

Reference is to be had to the accompanying drawings, in which—

Figure 1 is a side elevation of one of the controllers. Fig. 2 is a horizontal view, partly in section and with parts omitted, taken on line 2 2, Fig. 1. Fig. 3 is a front elevation of the controllers, the upper portions being omitted. Fig. 4 is a side elevation of an essential feature of my invention which relates to the tripping means.

1 represents a base or slab, of insulating material, such as slate or marble, upon which are secured the massive contact-blocks 2 and 3, which in the circuit-closing position are bridged by the laminated member 4, which in turn is insulated from and mechanically secured to the member 5, which has both a rotary motion and a motion of translation. The rotary motion takes place around the pivot 6, which also has a transitory motion in slot 7. Secured to the base 1 is a bracket 8, in which is formed the slot 7 and at whose outer extremity is the pivot 9. Upon 9 is pivoted the member comprising the extensions 10 and 12, there being secured to the latter the operating-handle 13. The extension 10, together with the link 11, forms a toggle combination which upon the depression of handle 13 causes the laminated member 4 to be cramped into circuit-closing position with the contacts 2 and 3. The link 11 is pivoted in both members 10 and 5. In the member 12 is pivoted a roller 14, which is engaged in the circuit-closing position by the latch member 15, pivoted at 16 to the frame of the device.

The adjustable bolt or nut 17 is secured in the outwardly-extending arm of the member 18, which is also pivoted at 16 and has a rear extension 19. The members 15 and 18 are independent of each other in their relations to the pivot 16. At the extremity of the extension 19 is a pivot 20, upon which the vertical link 21 has a bearing, such link also being pivoted at its lower end at 22 to the lever 24, which oscillates on the fixed pivot 23.

25 is a pin extending upwardly from the notched disk or plate 26, secured to the member 27, which forms a part of or is attached to the core of the solenoid 33.

At 28 is shown an adjusting-screw by means of which the normal position of the solenoid-core is determined. The adjustment of screw 28 therefore determines at what condition of a circuit the controllers will operate.

29 indicates a rod or bar which extends across in front of all the controllers on the base 1, as shown in Figs. 2 and 3, where two

have been shown side by side, each consisting of the apparatus as described in connection with Fig. 1. The member 29 is secured at each controller to its respective member 18, as shown in detail in Fig. 4. This is accomplished by a clamp, such as shown at 30. At the middle of each group of controllers there is fastened to the bar 29 the handle 31, whereby the trips of all the controllers may be operated manually and independently of any circuit conditions obtaining.

A spring 32 connects the latch 15 of each controller with a lug 32′ on the clamp 30 of each controller or directly upon the bar 29 or the member 18 itself.

34 is a supplemental contact in electrical connection with contact-block 2 and is adapted for engagement by the contact 35, which is flexibly mounted upon a leaf-spring upon the member which carries the laminated bridge-piece 4.

At 36 is shown a second supplemental contact, of carbon, which is engaged by the movable carbon contact 37. These contacts are pivoted, respectively, at 38 and 39. The purpose of these contacts is, as well known in the art, to cause the final rupture to take place between them to avoid arcing at the main contacts.

The operation of the device is as follows: Upon an overload or abnormal condition in any of the circuits the solenoid-core 27 of the controller for that circuit is drawn up forcibly by the coil 33, causing the pin 25 to strike the lever 24 a blow sufficient to cause the rocking of member 18 through the medium of 21 upon its pivot 16 and to deliver a blow through the bolt or nut 17 to the latch 15, which in consequence moves out of engagement with roller 14 and permits the breaking of the toggle in a manner well known in circuit-breakers to cause an opening of the circuit. A circuit-controller is in each circuit of a group, and upon the actuation of any solenoid-core the corresponding member 18 opens the latch of that particular circuit-breaker, and there is communicated to every other member 18 in the group through the agency of the bar 29 a like force which operates in like manner upon the several latches 15 of the various circuit-breakers. It is apparent, therefore, that any abnormal condition in any circuit of a number of circuits will cause a change in condition of all of the circuits in the group.

It is to be noted that the change in condition of a circuit may be either from the amount of current flowing or a change in the potential, in which latter case the solenoid-coil 33 instead of consisting of a few turns of conductor of large cross-section will be composed of a relatively fine winding and will be connected in shunt to the circuit rather than in series therewith. Furthermore, should it be desired to open all of the circuits when all are operating under normal conditions it is simply necessary to raise the handle 31, which will cause each member 18 of the several controllers to lift their respective latches 15. It is to be noted, also, that the springs 32 exert a lifting force upon the bar 29 and all the members 18, and it requires an impact of less amount upon any one of the levers 24 to cause an opening of the circuit-controllers than would be the case were such spring absent. It is to be noted, further, that each of the circuit-controllers can be closed independently of the others, because the inertia of the bar 29, the members 18, and associated parts is so great that upon a sudden depression of any one of the handles 13 of a circuit-breaker which is in open position will cause the latch 15 to rise and to ride over into engaging position, as shown in Fig. 1, without raising the bar 29 to an extent sufficient to open any circuit-breakers which are in closed position.

By the herein-described arrangement it is seen that the various latches are not positively connected together. This fact does not prevent their being positively opened upon the occurrence of abnormal conditions in any circuit, nor does it prevent the closure of any circuit without causing the opening of others.

It is to be understood that I do not limit myself to the precise controller herein shown, inasmuch as my invention may be applied to any type of circuit-controller and also to those circuit-controllers which simply introduce or withdraw an impeding device from a circuit. Furthermore, instead of operating upon abnormal increase of current flow or rise of potential my invention is applicable to those systems where the controller operates upon fall of potential or decrease in the amount of current flowing through and which are commonly known as "low-voltage" or "underload" devices in contradistinction to the overload device as herein shown and described.

What I claim is—

1. In a multicircuit system, a controller for each circuit comprising separable coöperative contacts and an independently-pivoted latch for locking the contacts in operative relation; a hammer for delivering a blow to the latch and a member uniting the hammers of all the controllers.

2. In a multicircuit system, a controller for each circuit comprising separable coöperative contacts, an independently-pivoted latch for locking the contacts in operative relation, electromagnetic means, and a hammer operated to deliver a blow to the latch, and a member uniting the hammers of all the controllers.

3. In a multicircuit system, a controller for each circuit comprising separable coöperative contacts, an independently-pivoted latch for locking the contacts in operative relation; electromagnetic means, and a hammer operated thereby to deliver a blow to the latch; and a member resiliently connected to each

latch, uniting the hammers of all the controllers.

4. In a multicircuit system, a controller for each circuit comprising separable coöperative contacts, an independent latch for locking the contacts in operative relation, electromagnetic means, and a hammer operated thereby, for delivering a blow to the latch, a common pivot for the latch and hammer and a bar uniting the hammers of all the controllers.

5. In a multicircuit system, a controller for each circuit comprising separable coöperative contacts, an independent latch for locking the contacts in operative relation, electromagnetic means, a hammer operated thereby to deliver a blow to the latch, a common pivot for the latch and hammer, and a bar resiliently connected to each latch, uniting the hammers of all the controllers.

6. In a multicircuit system, a controller for each circuit comprising separable coöperative contacts, an independent latch for locking the contacts in operative relation, electromagnetic means, a hammer operated thereby to deliver a blow to the latch, and a common pivot for the latch and hammer.

7. Interdependent controllers comprising separable coöperative contacts, independent latches for locking said contacts in operative relation, and means actuated by the current of the circuit of any controller for actuating all the latches.

8. In a multicircuit system, controllers comprising separable coöperative contacts, an independent latch for locking the contacts in operative relation; electroresponsive means for disengaging the latch, a bar resiliently connected to the latch and uniting the latch-disengaging means of all the controllers, whereby all controllers are actuated by the actuation of any one and whereby the controllers may be independently restored to normal position.

9. Controlling means for interdependent controllers, comprising independent restraining means for each controller, means in each controller for actuating the restraining means, a member uniting the actuating means of all the controllers and a resilient connection between each restraining means and said member.

10. A controlling mechanism for interdependent controllers which comprises a latch, a hammer for delivering a blow to the latch, a common pivot for the latch and hammer, and a clamp for joining the hammer to a bar common to all the controllers.

11. A controlling mechanism for interdependent controllers which comprises an independent latch, a hammer for delivering a blow to the latch, a common pivot for the latch and hammer, a clamp for joining the hammer to a bar common to all the controllers, a lug on the clamp and a spring joining the latch to the lug.

12. A controlling mechanism for interdependent controllers which comprises an independent latch, a hammer for delivering a blow to the latch, a common pivot for the latch and hammer, a clamp for joining the hammer to a bar common to all the controllers, a lug on the clamp and a spring joining the latch to the lug and a handle on the bar.

13. In a multicircuit system, a plurality of automatic circuit-breakers, each comprising independent restraining means and means for actuating said restraining means, and mechanical means for causing the simultaneous operation of the actuating means of all the circuit-breakers.

14. In a multicircuit system, a plurality of automatic circuit-breakers, each comprising independent restraining means, means for actuating said restraining means, and a yielding connection between said restraining and actuating means.

15. In a multicircuit system, a plurality of automatic circuit-breakers, each comprising independent restraining means, means for actuating said restraining means, and a yielding connection between said restraining and actuating means, and means for causing the simultaneous operation of the actuating means of all the circuit-breakers.

16. In a multicircuit system, a plurality of automatic circuit-breakers, each comprising independent restraining means, means for actuating said restraining means, and a yielding connection between said restraining and actuating means, and means having relatively great inertia for causing the simultaneous operation of the actuating means of all the circuit-breakers.

17. In a multicircuit system, a plurality of automatic circuit-breakers, each comprising an independent latch, electroresponsive means for actuating said latch, a yielding connection between said latch and its actuating means, and a member having considerable inertia connecting the actuating means of all the circuit-breakers.

18. In a multicircuit system, a plurality of automatic circuit breakers, each comprising an independent latch, a latch-actuating device, a yielding connection between said latch and actuating device, a connection between the actuating devices, of all the circuit-breakers, said actuating devices and their connections having relatively great inertia.

19. In a multicircuit system, a plurality of automatic circuit-breakers, each comprising main fixed terminals arranged one above the other, a laminated bridging member coöperating therewith, an independent latch for restraining said bridging member and terminals in operative relation, a latch-actuating device, and a mechanical connection between the latch-actuating devices of all the circuit-breakers.

20. In a multicircuit system, a plurality of automatic circuit-breakers, each comprising main fixed terminals located one above the other, a coöperating laminated bridging mem-

ber, an independent latch restraining said bridging member and terminals in operative relation, a latch-actuating device, and a yielding connection between said latch and its actuating device, and a member positively connecting the actuating devices of all the circuit-breakers.

21. In a multicircuit system, a plurality of automatic circuit-breakers, each comprising main fixed terminals arranged one above the other, a coöperating laminated bridging member, an independent latch restraining the terminals and bridging member in operative relation, a toggle for operating said bridging member, a member for actuating said latch, and a positive connection between the latch-actuating members of all the circuit-breakers.

22. In a multicircuit system, a plurality of automatic circuit-breakers, each comprising separable coöperative contacts, an independent latch for locking the contacts in operative relation, means for actuating the latch, and a positive connection between the latch-actuating means of all the circuit-breakers.

23. In a multicircuit system, a plurality of automatic circuit-breakers, each comprising separable coöperative contacts, a latch for restraining said contacts in operative relation, means for actuating the latch, and a mechanical connection between the latch-actuating means of all the circuit-breakers, the latches being independent, whereby any circuit-breaker may be independently restored to normal position.

WM. M. SCOTT.

Witnesses:
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