No. 830,533. PATENTED SEPT. 11, 1906.

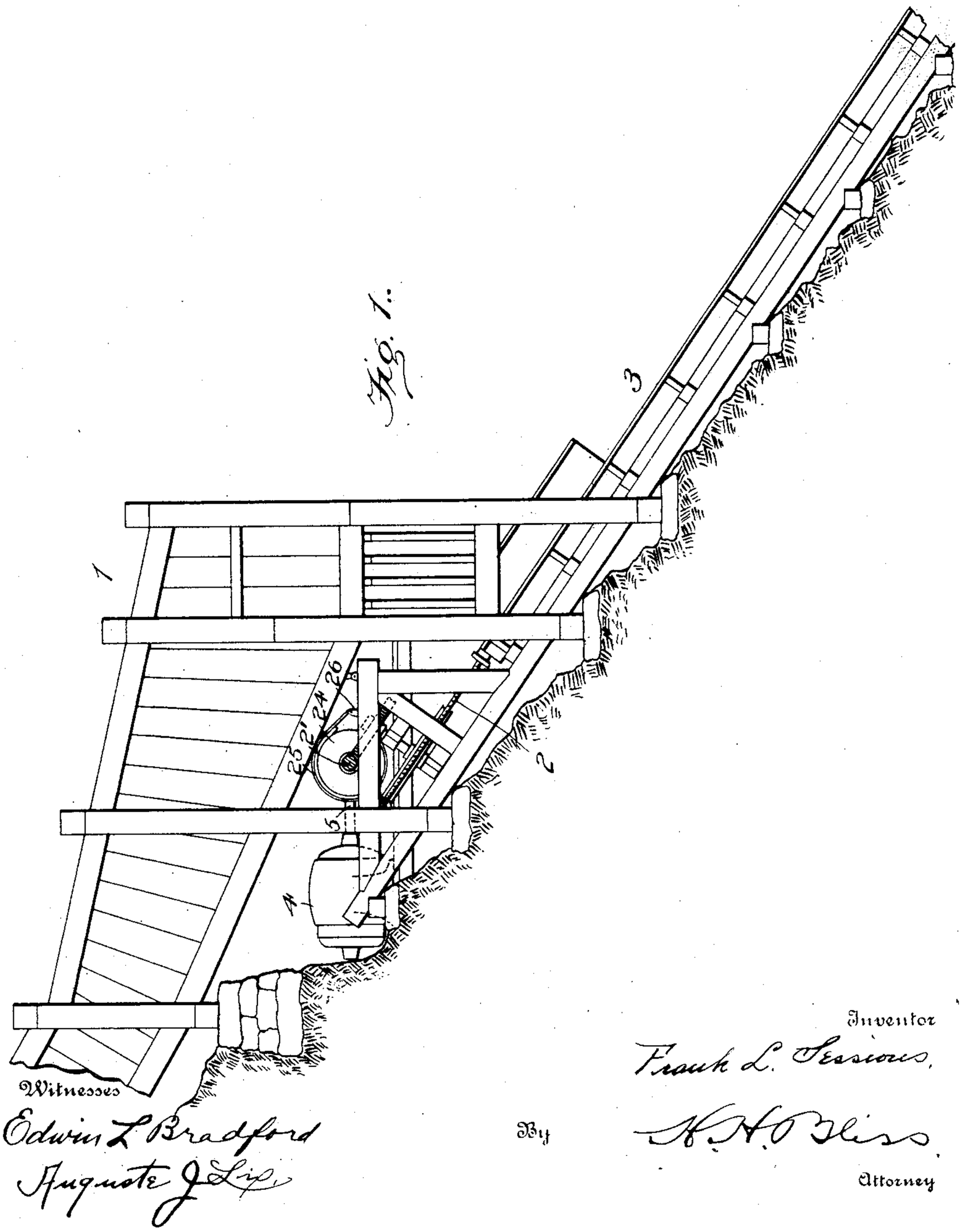
F. L. SESSIONS.

ELECTRIC BRAKE.

APPLICATION FILED JAN. 17, 1905.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 2.

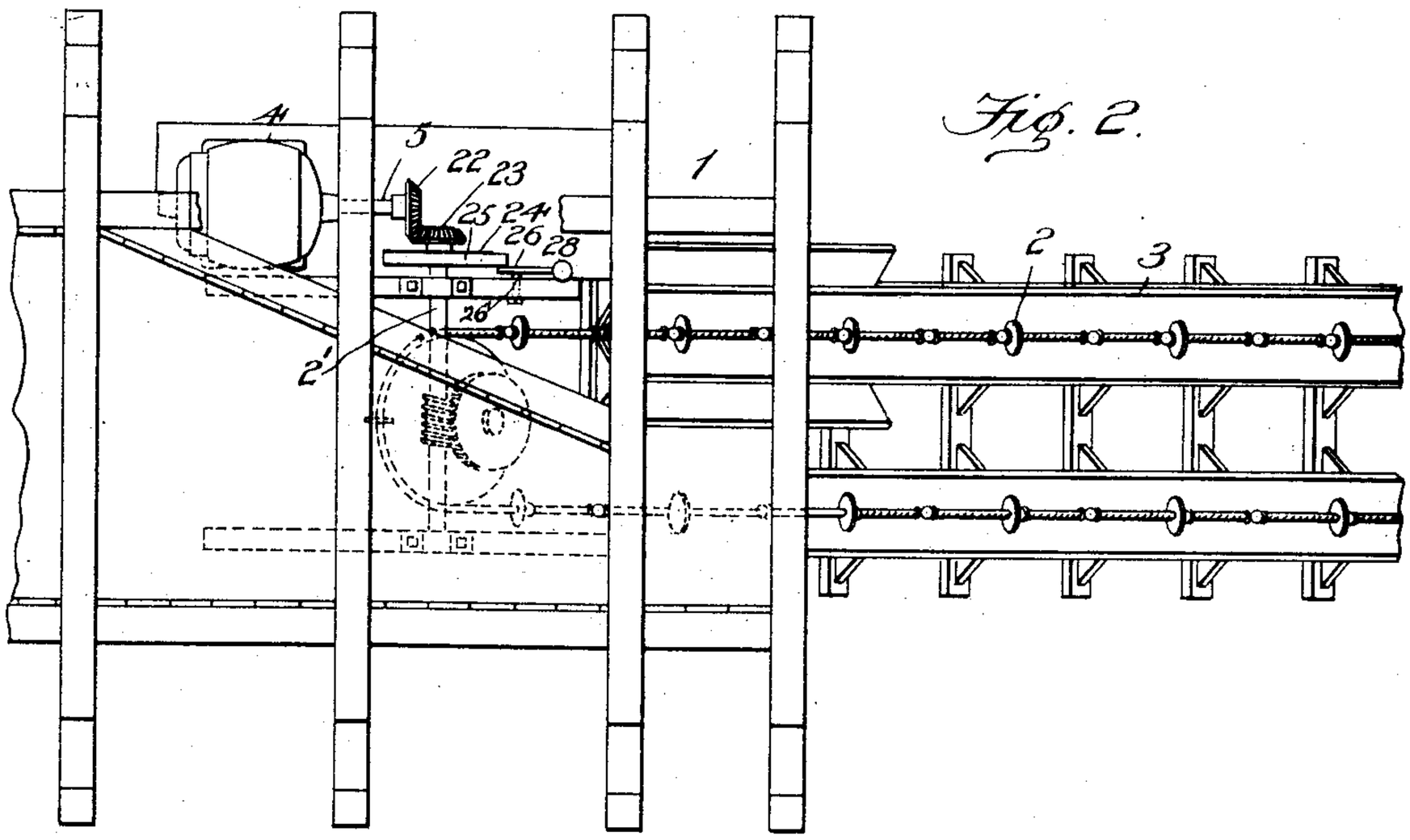
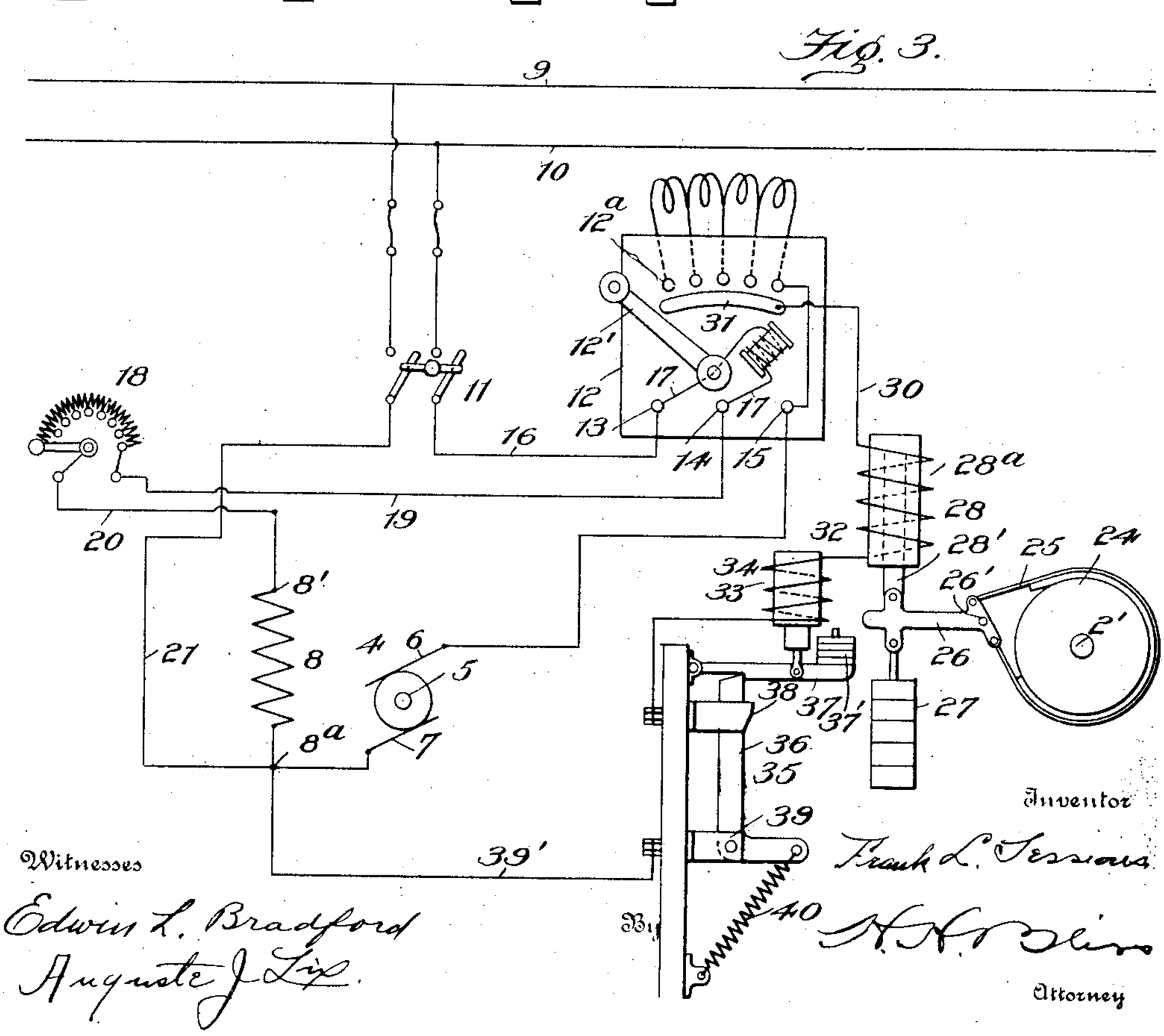


Fig. 3.



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ELECTRIC BRAKE.

No. 830,533. Specification of Letters Patent. Patented Sept. 11, 1906.

Application filed January 17, 1905. Serial No. 241,525.

To all whom it may concern:

Be it known that I, FRANK L. SESSIONS, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Electric Brakes, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to an improvement in electromagnetically-operated brakes for conveyer or elevator systems, it being particularly adapted to prevent the too rapid descent of the elevator or conveyer under the action of gravity.

Figure 1 is a side elevation of a conveyer system, provided with a brake embodying my improvements. Fig. 2 is a plan view of the upper part of said system. Fig. 3 is a diagrammatic view of the improved electromagnetic brake and the apparatus and wiring of the electrical circuit.

1 represents a tipple adapted to deliver material to an elongated endless carrier or conveyer 2, which is inclined to the horizontal and is adapted to retard the descent under gravity of the material received by it. 3 is a trough in which the said conveyer operates.

4 represents a shunt-wound motor having the armature 5, the brushes 6 7, and the motor field 8.

9 and 10 represent, respectively, the positive and negative conductors of a source of current-supply.

11 is a double-pole single-throw switch arranged in the electrical circuit.

12 is a starting-box having the resistance-controlling lever 12′, which is adapted to engage with each of the series of resistance-controlling contacts 12^a. 13, 14, and 15 are binding-posts on the said starting-box.

16 is a conductor leading from one pole of the switch 11 to the binding-post 13.

17 is a conductor connecting the binding-post 13, the current-switching lever 12′, and the binding-post 14 together.

18 is a rheostat for controlling the current in the motor field. One terminal of this rheostat is connected by the conductor 19 to the binding-post 14 on the starting-box and the other terminal is connected by the conductor 20 to one terminal 8′ of the field-coil 8 of the motor. The binding-post 15 on the starting-box is connected to one end of the resistance therein and also to the brush 6 of the motor. The other brush 7 of the motor is connected by a conductor 21 to a pole of the switch 11. The terminal 8^a of the motor field is connected to the said conductor 21. It will thus be seen that the field is connected directly across the armature-circuit.

The armature-shaft 5 has a pinion 22 thereon which is adapted to mesh with a bevel-pinion 23 on the driving or head shaft 2′ of the conveyer 2.

24 is a brake-wheel rigidly secured to the shaft 2′. 25 is a brake-band adapted to engage with the periphery of said wheel, and 26 is a lever adapted to control the action of the said brake-band in the well-known manner. This lever is pivotally supported at 26′ and has suspended from its front end a weight 27, which is adapted to exert a sufficient power upon the lever to cause it to clamp the brake-band tightly to the brake-wheel.

28 is an electromagnet the core 28′ of which is pivotally connected to the outer end of the lever 26. This magnet is arranged to apply sufficient force to the said lever to lift it and the weight 27, so as to release the brake-band and permit the revolution of the brake-wheel and shaft 2′.

The energizing-coil 28^a of the brake-lifting magnet 28 is connected by conductor 30 to an electrical contact 31, carried by the starting-box 12. This contact is so arranged that the starting-lever 12′ will engage with it prior to its engagement with the first of the series of contacts 12^a. The other end of the magnet-coil 28^a is connected by a conductor 32 to the energizing-coil 33 of the electromagnet 34, which is adapted to control the operation of the overload-release-circuit breaker 35, which may be of any well-known type. For illustration I have shown it as consisting of the electromagnet 34, the switch-lever 36, the detent for controlling said lever 37, the contact 38, with which the said switch is adapted to engage when in operative position, the contact 39, to which said switch-lever is pivotally connected, and the spring 40, adapted to cause the disengagement of said switch-lever from the contact 38 when the magnet 35 operates to release the said detent.

One end of the energizing-coil 33 of the magnet 34 is connected to the contact 38,

The contact 39 is connected by a conductor 39′ to the conductor 21 of the motor field.

It will be seen that the brake-lifting magnet 28 is connected directly across the armature-circuit and in parallel with the motor field, it having in its circuit an overload-release-circuit breaker. When it is desired to operate the motor as a motor, current may be applied to it from the line 9 through the starting-box 12. In view of the fact that the switching-lever 12′ engages with the contact 31 prior to its engagement with the first of the series of contacts 12ª, which control the flow of current to the armature, it will be seen that the magnet-coil 28ª will be energized prior to the energizing of the armature-coils and that in consequence the brake-weight 27 will be elevated by the action of the electromagnet 28 and the tension on the brake-band 25 released, so that the armature can be caused to rotate free of the resistance of the brake.

When the motor is being used as a generator—as, for example, when it is being used to retard the conveyer 2—the motor being a shunt-wound one and the direction of the rotation of the armature being the same as when the motor was driven from a source of current-supply, its field 8 will be energized in the same direction as when the motor was supplied with current from the main line. This will insure that the brake-lifting magnet 28 will be properly energized, so as to allow the shaft 2′ to revolve free of the retarding action of the brake. Should the load upon the conveyer 2 become so great as to cause the armature 5 to revolve above the desired speed, this increase of speed of rotation will develop a sufficient electromotive force to send an excessive current through the circuit of the brake-lifting magnet, with the result that the circuit-breaker 35 will be opened, breaking the circuit and permitting the weight 27 to descend under the action of gravity and to immediately apply the brake to stop the rotation of the shaft 2′.

The rheostat 18 is interposed in the circuit in order to regulate the field of the motor when it is running as a generator. The circuit-breaker 35 may be regulated by means of the weights 37′ on the detent-arm 37 to vary the predetermined current rate necessary to cause the operation of the circuit-breaker.

In the drawings I have illustrated but one of many uses to which my invention may be applied. It will be understood that numerous modifications of my proposed manner of operating an electromagnet control for a brake mechanism may be devised without departing form the spirit of my invention.

When the motor is operating as a generator, the current flows from the field 8 to the rheostat 18, thence to the starting-box 12, from the contact 31 thereon through the magnet-coils 28ª and 33, and thence back to the field. The current through the said energizing-coils is in the same direction that it was when they were supplied from the source of current-supply.

It will be seen that weight 27 will operate to stop the rotation of the head-shaft 2′ either when the electromotive force in the circuit of the electromagnet 28 is greater than the predetermined amount or when it is insufficient to properly energize the coil 28ª of the said magnet, so that should the current through the system be interrupted in any manner the weight will at once operate to stop the motion of the shaft 2′.

I claim—

1. The combination with a source of electrical supply and a shunt-wound motor electrically connected therewith, of a brake connected with the armature-shaft of said motor and adapted normally to oppose its rotation, an electromagnet for releasing said brake and an electromagnetically-operated circuit-breaker, the energizing-coils of the brake-releasing magnet and the circuit-breaker being in series with each other and connected directly across the current-supply line in parallel with the armature of the motor.

2. The combination with a source of electrical supply and a motor electrically connected therewith, of a brake connected with the armature-shaft of said motor and adapted to normally oppose the rotation thereof, an electromagnet for releasing said brake, and an electromagnetically-operated circuit-breaker having its energizing-coil connected in series with the energizing-coil of said brake-releasing magnet, the said coil being connected directly across the current-supply line in parallel with the armature of the motor.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK L. SESSIONS.

Witnesses:
F. E. Van Slyke,
C. L. McConkey.