

(No Model.)

F. M. NELLIS & S. D. HUTCHINS.
PRESSURE INDICATOR FOR AIR BRAKE APPARATUS.

No. 594,033.

Patented Nov. 23, 1897.

Fig. 2

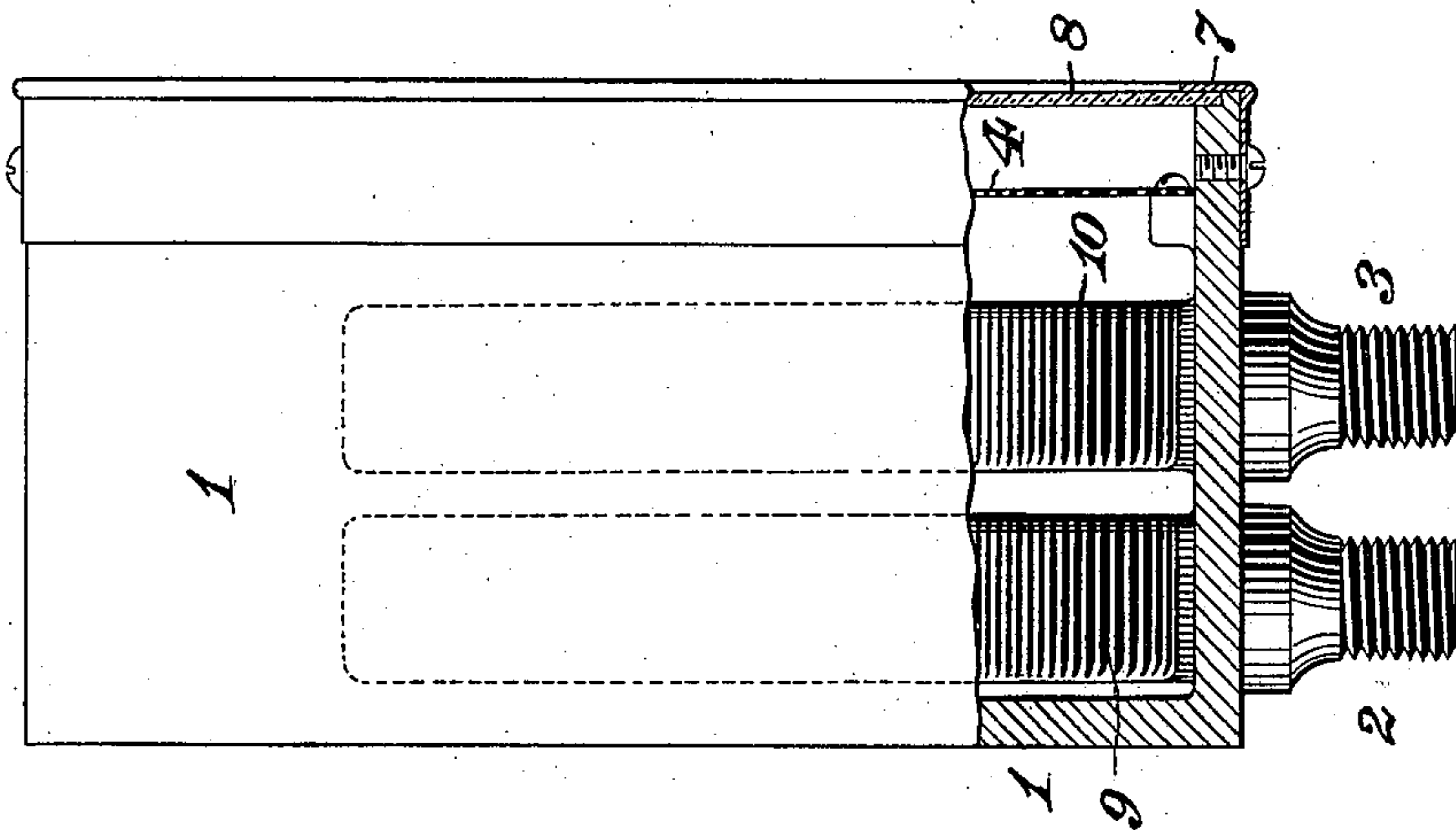
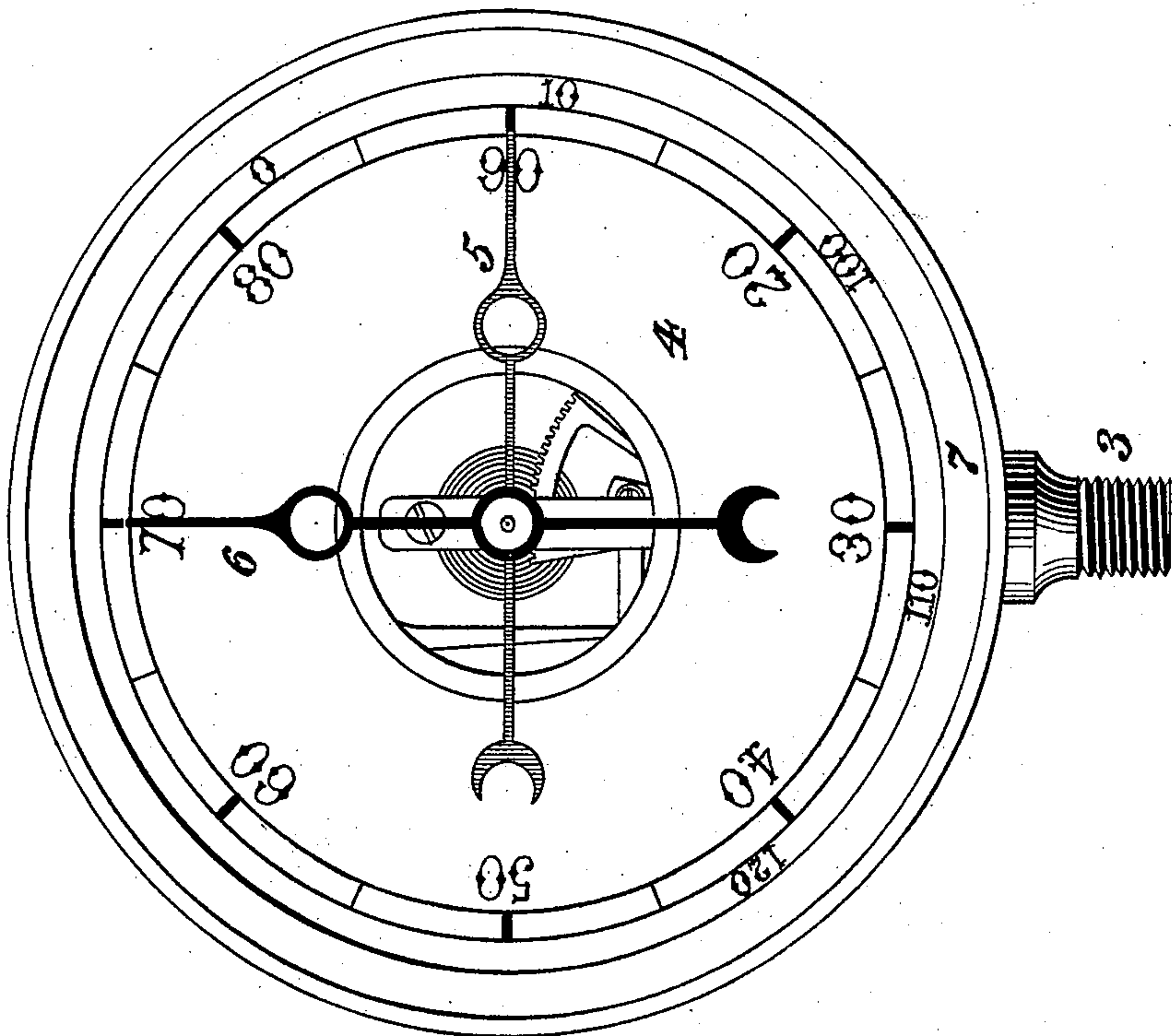


Fig. 1



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UNITED STATES PATENT OFFICE.

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PRESSURE-INDICATOR FOR AIR-BRAKE APPARATUS.

SPECIFICATION forming part of Letters Patent No. 594,033, dated November 23, 1897.

Application filed June 22, 1897. Serial No. 641,843. (No model.)

To all whom it may concern:

Be it known that we, FREDERICK M. NELLIS, of the city, county, and State of New York, and SAMUEL D. HUTCHINS, of Columbus, in the county of Franklin and State of Ohio, have invented a certain new and useful Improvement in Pressure-Indicators for Air-Brake Apparatus, of which improvement the following is a specification.

In the operation of the automatic air-brake system on railroads, as is familiar to those skilled therein, a certain normal pressure, ordinarily about seventy pounds to the square inch, is maintained in the train-pipe when the train is running or in running condition, and a higher normal pressure—say ninety pounds to the square inch—is maintained in the main air-reservoir from which the train-pipe is supplied. Applications of the brakes, with greater or less rapidity and force as may be desired, are effected by making corresponding reductions of the train-pipe pressure, and the brakes are released by restoring the train-pipe pressure to its normal degree by the admission of air from the main reservoir. The character of the applications of the brake being dependent upon the nature and extent of the reductions of train-pipe pressure, a clear and accurate indication of the relative normal pressures in the train-pipe and in the main reservoir and of the degree of variation therein is essential to the proper and effective operation of the brakes by the engineer. The pressure-gages heretofore employed for this purpose are subject to the objection that comparatively slight variations of pressure are not readily discernible by the engineer, and it therefore happens that from time to time in applying brakes a greater reduction of pressure is made by him than is necessary or desirable, thereby preventing the making of a sufficiently gradual application and resulting in disastrous shocks to lading and equipment, as well as involving a waste of air, and so reducing the available braking pressure as to be insufficient for an emergency if required. It is the object of our invention to remove this imperfection by the provision of means whereby the relative normal pressures and the degrees of variation of pressure may be more clearly and accurately indicated to

the engineer both by the character of the traverse and the relative position of the respective indexes.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a front or face view of a pressure-indicator embodying our invention; and Fig. 2, a side view, partly in section, of the same.

In the practice of our invention we provide a pressure-indicator composed of a casing 1, containing two separate and independent pressure-gage mechanisms 9 and 10, which are connected by pipes 2 and 3, respectively, with the main air-reservoir and with the train-pipe of an automatic air-brake system, the latter connection being ordinarily made to the train-pipe passage of the engineer's brake-valve. The pressure-gage mechanisms, which are preferably of the well-known Bourdon type, do not in and of themselves form part of our invention, and are not therefore herein described. A dial 4 is secured in the front portion of the casing, and the indications of main-air-reservoir and train-pipe pressures are, as heretofore, made by two indexes or hands 5 6, which are actuated by the movements of the gages and are fitted to traverse, concentrically and independently, over the outside of the dial 4, upon which are marked two concentric series of numerals.

So far as above described the indicator accords with those heretofore in use, and without the application of our invention, as now to be specifically explained, would be subject to the objection hereinbefore noted. Under our invention we provide the circumference or circumferential portion of the dial 4 with an inner and an outer series of division marks and numerals for the representations of different pressures, the two series being concentric with the dial. The inner series of marks and numerals serves for the indication of the working pressures ordinarily employed in regular train service, and the divisions are so disposed and the indexes so relatively set as that in operation the indexes assume what may be termed "semaphore" positions, from which the pressures at all periods of brake application may be determined at a glance by the engineer with sufficient accuracy for

all practical purposes without the necessity of reference to the numerals, as hereinafter more fully described. The outer concentric series of division marks and numerals serves for the indication of the abnormally high and low pressures, which are not usually employed in train service on comparatively level roads, but may be required for service on mountainous divisions, where the maximum pressure carried may be somewhat higher, for brake-testing, or for shop uses. Before pressure is exerted on the gages both indexes point to zero, and when the pressure begins to accumulate both indexes begin their travel in the direction of the hands of a clock. If both main-reservoir and train-pipe pressure are the same, both indexes will complete one cycle at zero, which would correspond to about eighty-five pounds on the inner concentric series. At one and a half cycles one hundred and twenty pounds will be indicated on the outer concentric series, this being an abnormally high pressure, for the indication of which this series is designed. Similarly about one hundred and sixty pounds would be indicated by the outer series, if it be carried out, when two cycles have been completed. The division-marks of the inner concentric series are so disposed that a range of traverse of the train-pipe-pressure index 6 over a comparatively large circumferential distance, as, say, a quadrant or thereabout, will be equivalent to the reduction from normal train-pipe pressure to the pressure below which the train-pipe pressure should not be permitted to fall in the proper and most effective operation of the brake system in a full service application of the brakes. A comparatively large traverse of the index 6 for slight variations of pressure is thereby provided, and the indications of such slight variations are consequently much more readily discernible than in the present constructions. The division-marks are provided with numerals, which are so disposed that that which corresponds to the normal train-pipe pressure in running condition is located at the circumferential distance of a quadrant from that which corresponds to the normal main-air-reservoir pressure in running condition, and the indexes 5 and 6 are set at the same distance apart—that is to say, at right angles one to the other—and properly geared, as is familiar to manufacturers of gages, to make the traverse required. When the brake is fully applied and the conditions, therefore, such that further reduction of train-pipe pressure would be objectionable, the two indexes stand in line. The ordinary range of working pressures being, say, between fifty and ninety pounds, the divisions are marked as accurately as possible on a semicircumference or an arc which may be somewhat greater or less throughout such range, and abnormally high and low pressures are not material and need not be specially provided for.

The standard positions of the two indexes—

that is to say, at right angles in running condition and in line on a full application of brakes—thus indicate at a glance to the engineer, as in the manner of position or semaphore track-signals and without inspection of numerals, the relative normal conditions of pressure when running and in full application, respectively, which is an important advantage in allowing the engineer to give his attention as fully as possible to the track and signals and obviating the necessity of a close inspection of numerals. The existence of unduly high pressure in the train-pipe is more readily detected by reason of the longer range of index traverse and the liability to flatten wheels due to such overpressure is correspondingly avoided. The attention of the engineer is plainly called to the fact that air is being wasted when the train-pipe pressure falls below fifty pounds by the fact that the two indexes do not in such case stand in line, and by having a clearer indication of comparatively slight reductions of pressure he is enabled to make a more gradual, and consequently in service stops a better and more desirable application of the brakes, so as to first take up the slack of the train and thereafter gradually impart the desired degree of braking force to the wheels.

In order to prevent the projection of a shadow from the casing upon the face of the dial and the consequent obscuring of the indications thereon, the rim of the cap 7, by which the glass cover 8 of the dial is held in place, is preferably, as shown, turned over to fit closely against the periphery of the case, so as to be substantially devoid of projection therefrom or from the cap at its angle with the portion of the cap which fits against the glass.

We are aware that pressure-indicators having two indexes mounted concentrically and fitted to traverse over a dial were known and used prior to our invention, and such construction, broadly, we therefore distinctly disclaim. So far, however, as our knowledge and information as practical operators of air-brakes extend such prior devices have neither embodied nor suggested our invention, and when applied in an air-brake system they have been, as is well-known to those skilled in the air-brake art, subject to the objection and disadvantage which our invention fully and effectually obviates.

We claim as our invention and desire to secure by Letters Patent—

1. In a pressure-indicator for automatic air-brake apparatus, the combination of a dial provided with division-marks on substantially one-half of its circumference, for the representation of a range of pressures from that which is normal in the train-pipe on a full application of the brakes to that which is normal in the main air-reservoir in running condition, and two indexes actuated by pressure-gages connected with a train-pipe and with a main air-reservoir respectively, and fitted to

traverse concentrically on said dial, substantially as set forth.

2. In a pressure-indicator for automatic air-brake apparatus, the combination of a dial
5 provided with division-marks on substantially one-half of its circumference, for the representation of a range of pressures from that which is normal in the train-pipe on a full application of the brakes to that which is normal
10 in the main air-reservoir in running condition, and two indexes actuated by pressure-gages connected with a train-pipe and with a main air-reservoir respectively, and standing,

in normal running condition, substantially at right angles one to the other, said indexes being fitted to traverse concentrically on said
15 dial, substantially as set forth.

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