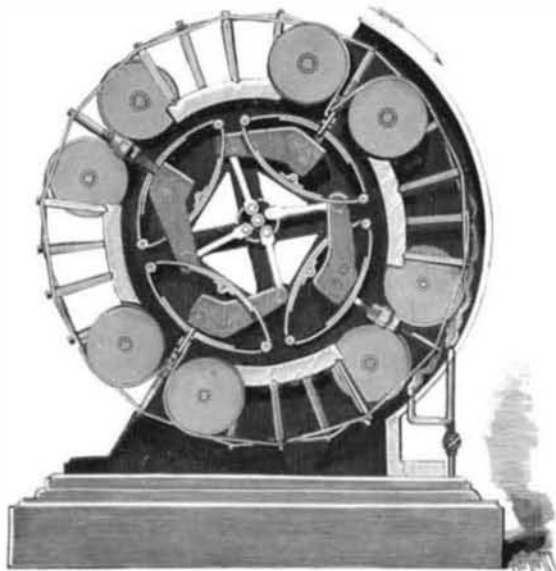


**A MOTOR OPERATED BY THE EXPANSION AND CONTRACTION OF METAL.**

In the motor shown in the accompanying illustration, two bands are alternately expanded by the direct application of heat, and the bands are so connected with springs that when one band is expanded it releases its hold on the springs while the other band is receiving the full pressure of the springs. "Pyromo" is the name given this motor by its inventor, Dr. W. W. French, of Fort Branch, Ind. The engraving represents a sectional side elevation of the motor, a loosely rotating wheel having an exterior expanding



FRENCH'S MOTOR.

and contracting rim preferably made by sets of metallic bands arranged one alongside the other. The bands are subjected to the heat from gas burners which open into a hood on one side of the wheel, and the ends of each band pass over pulleys journaled in suitable bearings in the sides or spiders of the wheel, the two sets of bands passing over corresponding sets of alternately arranged pulleys. The ends of the bands, after passing over the pulleys, connect with links in the middle of the outer leaves of elliptical springs, the springs being attached, at the middle of their inner leaves, to rods secured in the sides of the wheel. The several bands are supported intermediate of their pulleys on posts, and the bands are connected at their middle by inwardly extending links, with levers fulcrumed in the sides of the wheel. Each link has a turn buckle, whereby the length of the link may be increased or diminished, and the levers are connected by other links with a disk on a crank arm on the shaft. The bands of each set connect at their ends with the same springs, and they connect by independent links with separate levers opposite each other and connected with opposite sides of the disk on the shaft. As a band is heated from the burners, its expansion releases a set of springs, whose closing power is exerted on the ends of another band, and through the two links and lever a pull is exerted on the disk to cause the wheel to rotate in the direction of the arrow. A similar operation takes place with the other bands. The motor is designed to be self-governing, the springs establishing a yielding connection between the bands and levers, to prevent the bands from breaking and take up slack until the running temperature is reached.

**A New Cure for Stiff Joints.**

At St. Bartholomew's Hospital, London, an ingenious hot air bath is now in use for the treatment of sprains, inflamed joints due to gout or rheumatism, and similar affections. It consists of a copper cylinder about three feet long and eighteen inches in diameter, which will hold an arm up to the shoulder or a leg up to the middle of the thigh; it stands on an iron frame and is heated by gas burners placed underneath, so that the temperature can be raised to 300° or 400° Fab. The patient is placed in an arm chair at one end of the cylinder, the limb is introduced, and the joint made air-tight by a rubber band. No discomfort is felt up to 250° until perspiration sets in, when the

moisture has a scalding effect, which is relieved by opening the further end of the cylinder and letting the moisture evaporate. A sitting usually lasts forty minutes. The immediate effect is a greatly increased circulation in the part treated, profuse local perspiration, and relief from pain.

**BRISTOL'S RECORDING AMPERE METER.**

The accompanying engravings illustrate a new recording ampere meter, which is being placed upon the market by the Bristol Company, of Waterbury, Conn. This instrument, in connection with their recording volt and watt meters, which are already well known, makes it possible to keep a continuous record, day and night, of the output of an electric lighting or power plant.

The general design of this instrument is clearly shown in Fig. 2, an interior view, from which it will be seen to consist of a stationary solenoid, an armature, B, carried by a non-magnetic shaft through the center of the solenoid, the shaft being supported at its opposite ends on steel knife edge spring supports, C and D, the same as in Bristol's recording volt meter.

The recording pen arm, E, is secured directly to the steel spring support, D, and partakes of its angular motion as the armature is attracted to the coil or solenoid by a current passing through the solenoid. Although the actual distance that the armature itself moves is small, it will be observed that it transmits an angular motion to the pen arm, resulting in a wide range on the chart without employment of multiplying devices between the spring and the pen.

A novel feature of this instrument is the form of armature which is used to procure a chart with the divisions nearly uniform throughout its range. It consists of two parts, a flat and very thin disk of iron and a small sleeve or core of iron on the non-magnetic shaft. The sleeve is completely concealed from view within the solenoid. The disk is stiffened by a plate of non-magnetic metal.

If the armature consisted simply of the flat disk portion, the magnetic attractive force would increase very rapidly as it approached the solenoid, giving a chart with divisions as in the Bristol's recording volt meter: contracted at lower portion on the scale but very open at upper portion; while if the armature consisted only of the core portion, the attractive force upon it would decrease as it approached the central or neutral position of the solenoid, and the divisions for the lower portion would be quite open, becoming contracted at upper portion of the scale.

After considerable experimenting, a combination disk and core armature has been found which produces the nearly uniformly divided scale as shown in the speci-

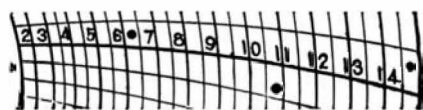


Fig. 3.

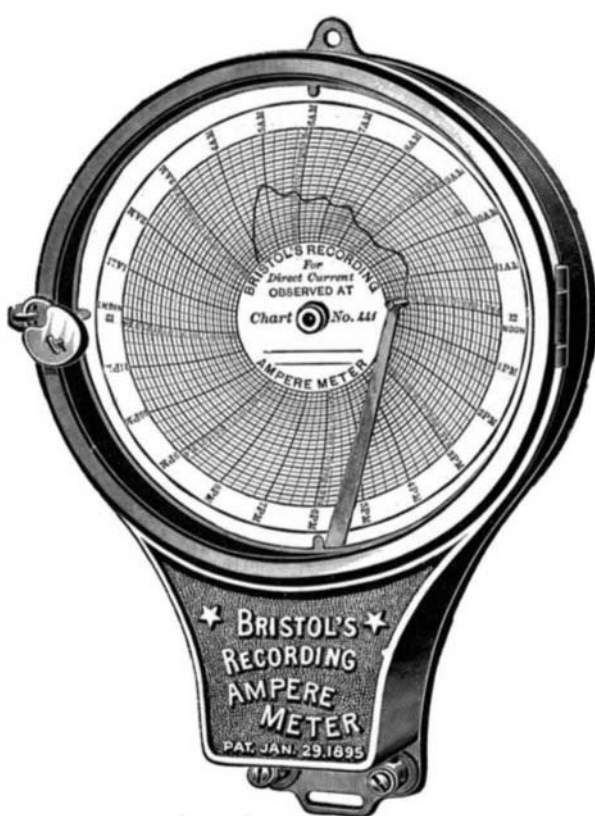


Fig. 1. BRISTOL'S RECORDING AMPERE METER.

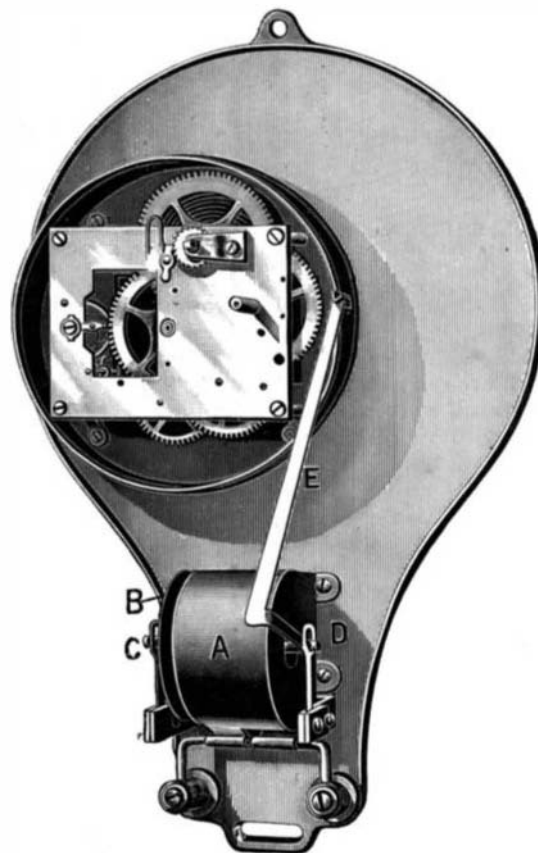


Fig. 2.

men section of a chart, Fig. 3, for a range of fifteen amperes.

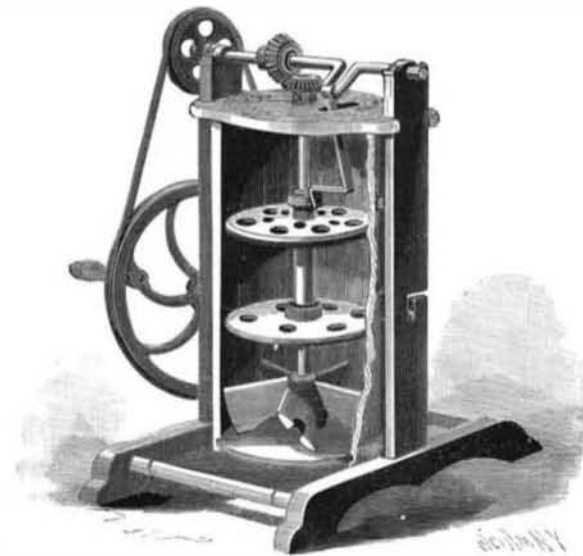
The armature and moving parts are reduced to a minimum in size and weight to avoid magnetic lag and the effect of the inertia when current is thrown off and on. To provide for cases where there are extremely rapid and large fluctuations in the current to be re-

corded, as for example on an electric railroad, a damping device will be provided, which consists of a vane of aluminum, secured to the left knife edge spring and immersed in a vessel of glycerine.

For low ranges the solenoids are designed to carry the entire current, but for high ranges shunts will be provided.

**A CHURN WITH VERTICAL AND ROTARY DASHERS.**

The two dashers with which this churn is provided, one having a vertical and the other a rotary movement, may be operated together or either dasher may be



KELLY AND HAGQUIST'S CHURN.

used independent of the other. It has been patented by Messrs. M. F. Kelly and N. A. Hagquist. The body of the churn has exterior pins on opposite sides, each pin adapted to enter an angular slot in one of the side standards, and the cover is made in two sections, flanged to fit over the upper edge of the body. In the upper ends of the standards is journaled a shaft adapted to be rotated by a belt from a hand wheel, the shaft having a crank arm, and a beveled gear being adjustably secured on it, the latter meshing with a similar gear on the upper end of a vertical shaft on whose lower end is secured the hub of a rotary dasher. Plates of somewhat diamond shape extend diagonally from the hub, the plates being adapted to agitate the milk at the bottom of the churn body. Sliding upon the vertical shaft is a sleeve upon which are located two apertured disks, constituting the vertical dasher, to which movement is communicated by means of a link connecting the upper end of the sleeve with the crank portion of the driving shaft at the top. By simply disconnecting the upper end of the link from the crank, the movement of the vertical dasher ceases, and a slight lateral movement of the driving shaft disconnects the bevel gears

through which the rotary shaft is operated, both movements being thus readily controlled by the operator for the use of both dashers together or either one separately, as may be desired. Communications relative to this improvement may be addressed to Mr. M. F. Kelly, Blossburg, Pa.

**A Giraffe Ten Feet High.**

The Zoological Society, London, has just purchased a fine female giraffe, which has recently arrived from South Africa. This is believed to be the first example of the large dark-blotched race ever seen alive in Europe, the giraffes previously exhibited having belonged to the smaller and paler form found in northern tropical Africa. As the animal stands more than ten feet high, there may be some delay, owing to the difficulty of passing it under the railway bridges, but it will probably be on view in a few days. The society has also

purchased a pair of sable antelopes (*Hippotragus niger*) and a pair of brindled gnus (*Connochoetes taurina*) all in excellent condition.

It is said that dew will not form on some colors. While a yellow board will be covered with dew, a red or black one beside it will be perfectly dry.