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L. LENOT.

APPARATUS FOR CHECKING THE OUTPUT OF MACHINERY.

APPLICATION FILED MAY 22, 1902.

NO MODEL.

Fig. 1 -

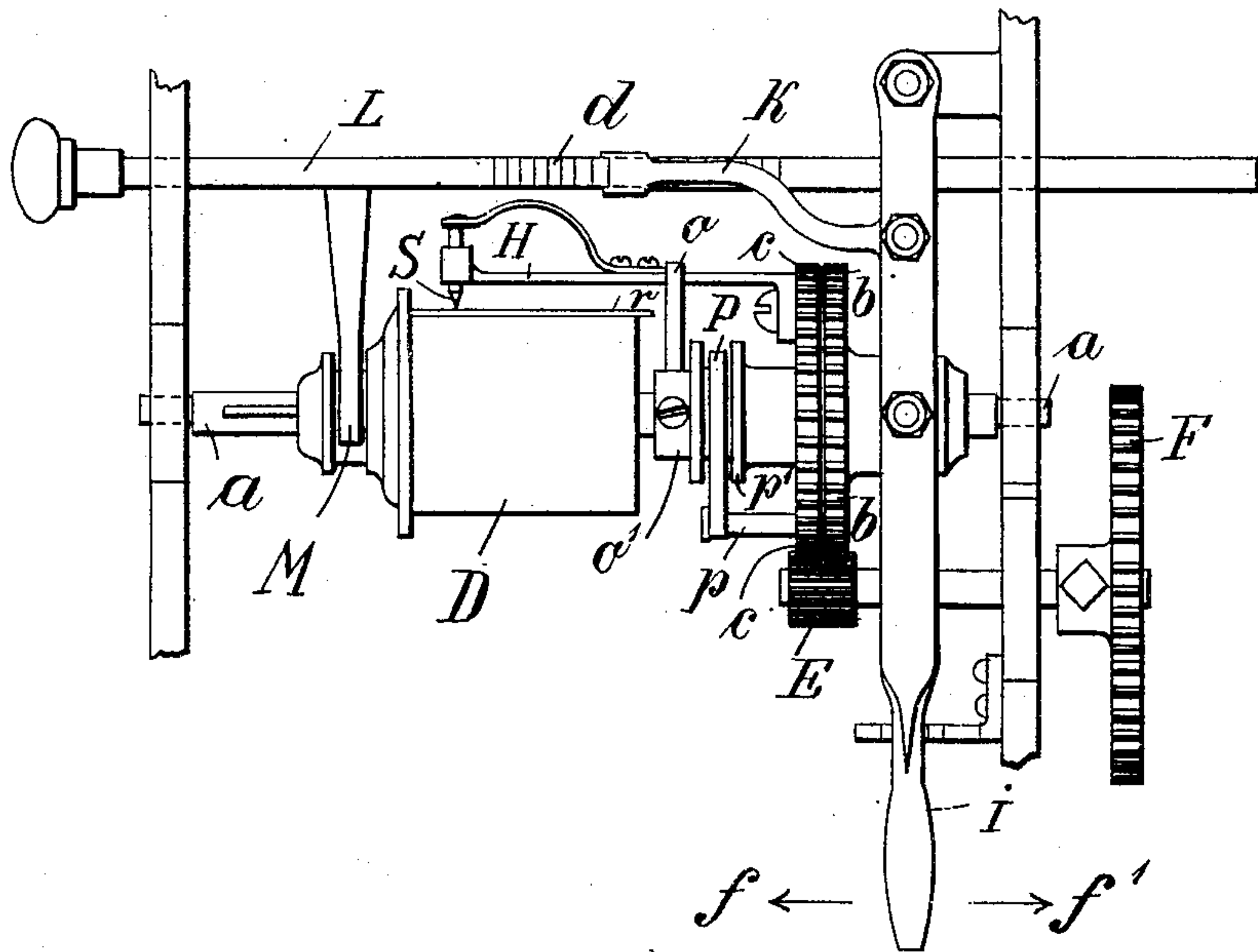


Fig. 2 -

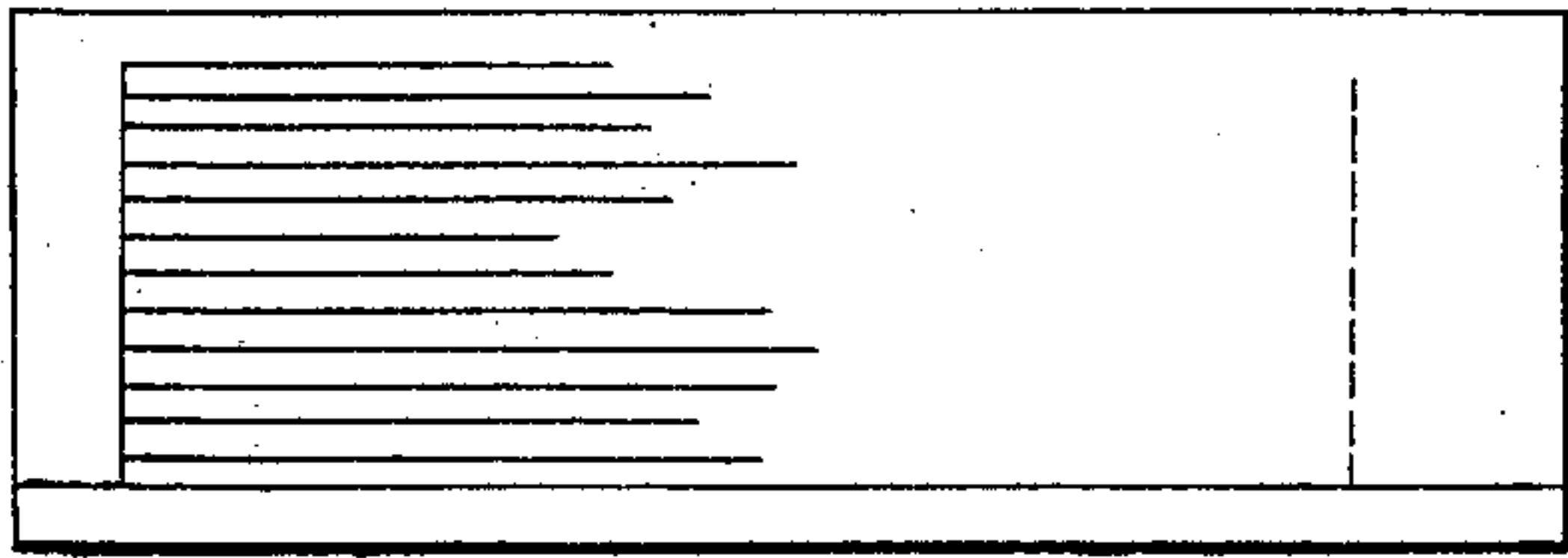
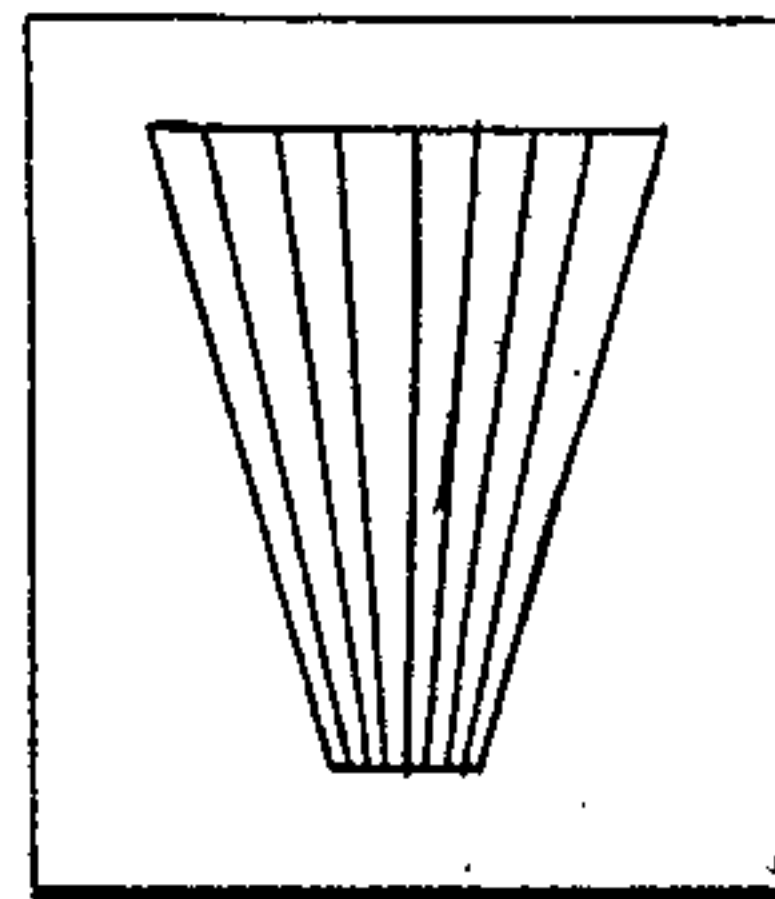


Fig. 3 -



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR CHECKING THE OUTPUT OF MACHINERY.

SPECIFICATION forming part of Letters Patent No. 749,305, dated January 12, 1904.

Application filed May 22, 1902. Serial No. 108,600. (No model.)

To all whom it may concern:

Be it known that I, LOUIS LENOT, a subject of the German Emperor, residing at Lützelhausen, in the Province of Alsace, in the German Empire, have invented new and useful Improvements in Apparatus for Checking the Output of Machines, of which the following is a specification.

The subject of the present invention is an apparatus for use in works, mills, and factories of all kinds, more particularly weaving-mills, and has for its purpose the control of the workman with a view to increasing the output of the mill. The apparatus indicates, by means of a curve, the daily output of the machine, so that by comparing the actual output with the theoretical efficiency of the machine the inspector can at once ascertain whether the output during the day has increased or decreased.

The apparatus consists of two toothed gears, the number of teeth on each differing, arranged adjacent to one another on the same shaft. The gears receive their rotary motion from the feed-roller, and one gear can be disconnected from the other by means of a lever. The latter gear is mounted on the shaft, together with the drum for the card, with capability of sliding. The other toothed gear, on the contrary, to which is secured the arm for the pencil, runs loosely on the shaft and is under the action of a spring, which is brought into a state of tension when the shaft rotates. When, therefore, the gears are disconnected, (after completion of the day's work,) the pencil-carrying gear will snap back into the initial position occupied in the morning, the pencil having registered the difference of the number of teeth of the two gears at each rotation of the drum. On the two gears being again coupled together the drum is advanced through the space of one tooth by means of a toothed rack and pawl, so that every morning a new curve is commenced.

The annexed drawings show one form of construction of the apparatus.

Figure 1 is a plan view of the apparatus. Fig. 2 shows the curve for twelve days' output, and Fig. 3 the curve divided for theoretical calculation of the output.

The wheel F, having forty-eight teeth, is rotated by the regulating-wheel of the loom, which is secured to the feed-roller. The wheel F imparts its motion by means of the pinion E, having twelve teeth, to the gear *b*, having fifty teeth, mounted so as to slide on the shaft *a*, and moving with it the cylinder or drum D, round which the card is wrapped, and, secondly, to the gear *c*, having forty-nine teeth, which rotates loosely on the shaft *a* and carries the pencil-holder H. This latter gear is acted upon by a spiral spring P, which tends to draw it back and is brought into a state of tension when the gear rotates. The spring P is secured at one end to the ring *p'*, screwed to the shaft *a* and at the other end attached to the pin *p*, screwed into the gear *c* itself.

o' is a collar screwed to the shaft *a* and carrying the stop *o*, against which the pencil-arm H strikes each time it takes up its initial position.

When the loom is at work and the fabric in consequence drawn by the feed-roller in the required manner, the wheel F rotates, carrying the two gears *c* and *b* with it by reason of the pinion E, which in making a number of revolutions corresponding to forty-nine teeth carries the pencil S round in a complete circle, while the cylinder D and card wrapped on it have only made forty-nine fiftieths of a rotation. This difference of one-fiftieth of a rotation, which is repeated each time the gear *c* makes a rotation, is marked on the paper, so indicating graphically the work which the machine has done. In order to adjust the apparatus ready to commence the curve for the following day, it is only necessary to actuate the pivoted lever I in the direction of the arrow *f'*, whereby the gear *b* is released from the pinion E, and both the shaft *a* and cylinder D are set free. Hereupon the shaft *a*, with cylinder, will be pulled back by the spring P until the stop *o* strikes the pencil-arm H. In this position the pencil S is at the initial point of its path—*i. e.*, in the morning position—and in order that it may occupy the same position on the ensuing day it is only necessary to return the lever I to its first position by actuating it in the direction of the arrow *f*. Through this motion the wheel *b* is again brought into en-

gagement with the pinion E, and the cylinder D, which carries the card, again advances by the action of the pawl K (which engages in the teeth *d* of the bar L) and of the forked arm M, whereby the apparatus is brought into position to commence a new period. The card is held to the cylinder by means of the spring-plate *r*. The curves obtained starting from the same straight line of the card are located one above the other on the latter, and thus admit of rapid reading off of the daily output of the machine during a given period—*e. g.*, in the present instance during a period of twelve working days.

This apparatus can be applied to all machines where the output depends principally upon the skill, care, and aptness of the workman. It is especially suitable in weaving, where output is a most important factor in working.

The apparatus indicates with perfect exactitude each day the percentage of the theoretical output which is actually reached by the loom. This percentage, the practical output, is variable and depends upon the following: first, the value of the loom itself and of the accessory parts necessary for producing the fabric—*e. g.*, ratières, jacquards, motion with several shuttles or constant feed of the weft; second, regulation of the loom and accessory parts; third, manner of arranging the object to be woven; fourth, nature of the materials employed, whether warp or weft; fifth, aptness of the overseer in the weaving-mill, upon whom the output chiefly depends. Here constant control is a necessity. By means of the present apparatus this end is attained, as the weaver can be controlled constantly and with the greatest certainty. The apparatus at once indicates decrease or increase in output resulting from any change in respect of the above-mentioned points. The construction is simple, a guarantee for durability and certain action.

The apparatus can be very readily attended to and can be employed on all classes of looms, whether for wool, silk, cotton, flax, hemp, &c. With the exception of the card having to be changed no renewal whatever is necessary, neither of the pinion nor any other part, no matter what the speed is or what kind of machine is being controlled. The card remains the same—that is to say, no change is requisite on account of a different speed or of a more or less closely-woven fabric. It is sufficient to calculate the length of the curve, which is equal to the theoretical output, to divide it into one-hundredths or to multiply it by one-hundredth and to transfer these divisions to the card, where the various numbers indicating the output can be read off. The curve giving the theoretical output can be rapidly divided as follows: The length in use of the card—*e. g.*, two hundred millimeters—is divided into one hundred equal parts. This divided line is drawn

on a sheet of paper. Below this line on the same sheet a second line fifty millimeters in length is drawn, so that the centers of the two lines lie vertically one above the other, then divided likewise into one hundred equal parts, and the division points of each of the two lines connected. In order now to obtain the curve divided into one-hundredth, it is only necessary to lay it on that part of the trapezium where the breadth of the latter is equal to the length of the curve.

The apparatus here described will be found of the greatest service in weaving, as by reason of the constant control of the workman which it enables and consequent information obtained by the inspectors the output is essentially increased.

It will be obvious that by transposing or otherwise arranging elements of the mechanism the apparatus may be considerably modified in construction without the essential features of the invention being departed from.

Having thus described my invention, I claim—

1. Apparatus for checking the output of machines, comprising a shaft, a toothed gear mounted with capability of sliding on said shaft, a second gear having a different number of teeth from the first-mentioned gear, loosely mounted on said shaft, a card-drum mounted on the shaft, a marking device coöperating with the card of said drum, means for operating the marking device, a pinion for connecting and disconnecting said gears, and means whereby the drum and marking device are moved relatively to each other when the gears are brought into connection, substantially as described.

2. Apparatus for checking the output of machines, comprising a shaft, a toothed gear mounted with capability of sliding on said shaft, a second gear having a different number of teeth from the first-mentioned gear, loosely mounted on said shaft, a card-drum mounted on the shaft, a marking device coöperating with the card of said drum, means for operating said marking device, means for insuring that the marking device starts at the initial position relatively to the drum after the completion of a curve on the card, a pinion for connecting and disconnecting said gears, and means whereby the drum and marking device are moved relatively to each other when the gears are brought into connection, substantially as described.

3. Apparatus for checking the output of machines, comprising a shaft, a toothed gear mounted with capability of sliding longitudinally on said shaft, a card-drum similarly mounted with capability of sliding on the shaft, a spring-controlled gear having a different number of teeth from the first said gear, loosely mounted on the shaft, a marking device carried by the said second gear, a pinion for connecting and disconnecting said gears,

and means for sliding the drum on its shaft when the gears are brought into connection with each other, substantially as described.

5 4. Apparatus for checking the output of machines, comprising a shaft, a toothed gear mounted with capability of sliding longitudinally on said shaft, a card-drum similarly mounted with capability of sliding on the shaft, a spring-controlled gear, having a different number of teeth from the first said gear,
10 loosely mounted on the shaft, a marking device carried by the said second gear, a pinion

for connecting and disconnecting said gears, a lever for causing said first gear to mesh with the pinion, a pawl carried by said lever, and
15 a rack actuated by said pawl and sliding the cylinder on its shaft, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

LOUIS LENOT.

Witnesses:

KARL SCHÄFER,
JOHAN NOS.