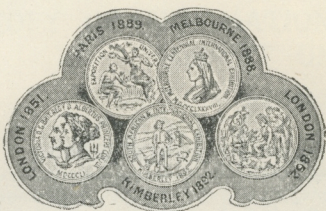


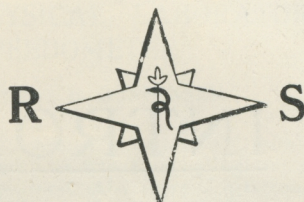
55
*Rotherhams
Coventry*

TIME-SPEEDMETERS
SPEEDOMETERS
FOR
MOTOR CYCLES
AND CARS

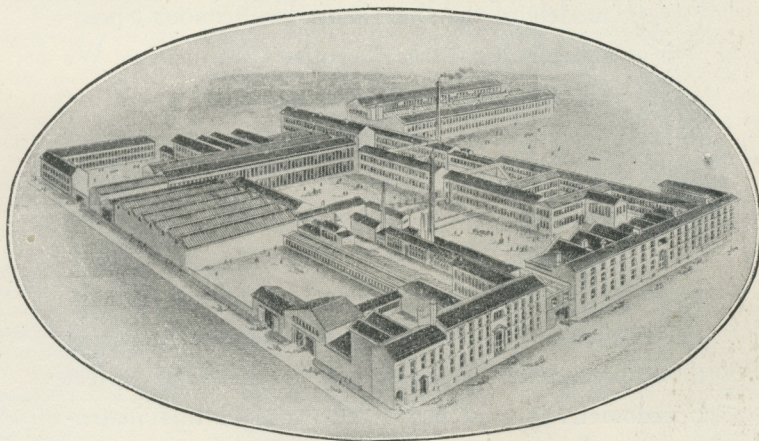
MILEAGE RECORDERS



ESTABLISHED 1750



TRADE MARK



Rotherham & Sons Ltd.

Watch Manufacturers and Engineers

COVENTRY, England

*Makers of all kinds of Specialities to the
MOTOR, CYCLE, ELECTRICAL
-AERO, GAS and ALLIED TRADES*

*LUBRICATORS, TAPS & VALVE WORK
FOR ALL KINDS OF MACHINERY*

Telegrams : : : : Rotherhams, Coventry
Telephone Nos. : : : : 752 and 753
Codes : 5th Edition A.B.C. and Marconi International

LONDON OFFICE: 1, 2 & 3, HOLBORN CIRCUS, E.C.

INTRODUCTION

ON the following pages we illustrate our different models of the Bonniksen Isochronous Speedometer for Motor Cycles and Cars. We have re-designed the Cardan Shaft and Front Wheel Drive Fittings, making them much stronger, more readily adaptable, and universal, so that they can be quickly fitted to any make of car. We make special fittings to suit Morris, Crouch, Singer, Ford, Triumph, and other cars. Absolutely unique are the time-keeping principles on which the mechanism of this Speedometer is based. It is the most perfect Speedometer in existence. The case of this instrument is of similar size and design to our Motor Clock case, so that the two instruments make a handsome addition to any dashboard. The ratio of the Speedometer can be arranged so that it can be driven from transmission mechanism of any car with this type of Speedometer drive ; and we supply special cable nipples to suit this drive on any type of car.

Our Hub-fitting Mileage Recorder is a strong, well-made instrument, specially suitable for Lorries, Char-a-bancs, Motor Road Sweepers, and other public service vehicles.

We shall be pleased to quote for designs of complete Facia Boards, comprising Speedometer, Clock, Pressure Gauge, and Ignition Switch.

COPY OF THE NATIONAL PHYSICAL LABORATORY'S REPORT ON A SPEEDOMETER

Sent by : B. BONNIKSEN

Maker : B. BONNIKSEN

DESCRIPTION.—Isochronous friction operated speedometer with dial graduated from 0 to 50 miles per hour, and two hands recording the speed alternately, the idle hand occupying the zero position. Also there is a rectangular slot in the dial disclosing the figures of a "Veeder" mileage indicator. The instrument is numbered on the dial 122.

INTERNAL.—The principle is as follows:—

A gear wheel having 50 teeth is mounted on a shaft in such a manner that it can rotate with the shaft by friction through steel discs pressed up by a spiral spring, or it can be held in any definite position within the magnitude of one tooth, the shaft still revolving.

The wheel is driven, through gearing, by the road wheel, and carries a small peg which comes against a stop when the pointer reaches zero. By this wheel, and by a duplicate of it, the recording pointers are driven.

The pointers rest alternately at zero until carried forward in the manner described below.

The speed record depends upon two factors:—

(a) The rate of rotation of the 50-tooth gear wheel;

(b) The length of time this gear wheel is allowed to rotate.

The first factor depends directly on the speed of the road wheel, the second on the operation of a clock escapement, itself actuated by the friction discs referred to above, and so arranged as to allow the pointer to rotate for exactly $\frac{1}{2}$ -sec., starting always from zero, and then to remain at rest for 5-secs. before returning to zero.

Thus if the road wheel is running at 50 miles per hour, the pointer goes once round the dial in $\frac{1}{2}$ -sec., but if the speed is only one-half of this, the pointer only goes half round the dial in $\frac{1}{2}$ -sec., and therefore stops at a reading of 25 miles per hour.

The instrument is not capable of recording speeds less than five miles per hour, since the pointer requires $\frac{1}{2}$ -sec. in which to move from zero to the speed to be recorded, and has therefore only $4\frac{1}{2}$ -secs. in which to return to zero. The whole of this time is taken up in passing to zero from the point 5 on the dial when the road wheel speed is five miles per hour. If the speed be less than five miles per hour the pointer has not time to return to zero. Further, the escapement does not work regularly below this speed.

The mileage indicator is a "Veeder" counter driven through a pinion and crown wheel from the main spindle.

We have tested this speedometer at a large number of speeds from about five to 60 miles per hour, and again at from about 90 to 120 miles per hour.

With its present combination of gearing—being that described in the manufacturer's letter of October 5th, 1912—the effective circumference of the road wheel should be 81-in.; its diameter 25.8-in.

On the assumption of the above size of road wheel the instrument was found to record correctly at every speed tested.

There is a certain irregularity of behaviour when the speed is any multiple of 50 miles per hour, as the pointer which is returning to zero may or may not traverse the complete circle of the dial, according to whether the speed is slightly more or slightly less than the even figure. The speed actually recorded is, however, correct.

The mileage indicator is correct for the above mentioned size of road wheel.

The workmanship is good, the friction surfaces are well made, and the instrument as represented by this pattern seems to be one which is quite capable of withstanding the use for which it is designed.

In the event of this instrument being deposited at the Laboratory as a pattern, other instruments conforming to this pattern will be accepted for routine tests, and such instruments as are found to be satisfactory in accordance with the regulations laid down in the Pamphlet issued by the Laboratory will be marked with the NPL Monogram and a registration number.

R. T. GLAZEBROOK, Director.

November 21st, 1912.
Ref. M. 100 B. p. 4.

“The Isochronous Speedometer.”

INSTRUCTIONS FOR FITTING TO MOTOR CYCLE:—

- 1.—Fix the Clip on handle-bar.
- 2.—Fix the spur wheel on the spokes of the front wheel, central and true.
- 3.—Fix Gear-box-lever on the front axle screw, placing cable-direction toward the clip on handle-bar.
- 4.—Adjust the two spur wheels to gear in FULL WIDTH OF TEETH. If depth of gearing is too deep or too shallow, bend the lever “out” or “in” respectively.
- 5.—Now attach the flexible cable to the gear-box and couple up at top. Lead key-way coupling in with the fingers, and
- 6.—See that the flexible shaft is not under tension or any strain. To adjust for length, turn gear-box lever round on its fixing centre, bringing gear-box lower or higher as required, re-adjusting direction of the cable to point towards the Speedometer.
- 7.—Lubricate gear-box frequently.
- 8.—Watch over all nuts and screws that they are permanently rigidly fixed, as any rocking or wriggling destroys the mechanism.
- 9.—Do not take gear-box to pieces; return if defective.
- 10.—Speedometer will want no oil and should not be opened.

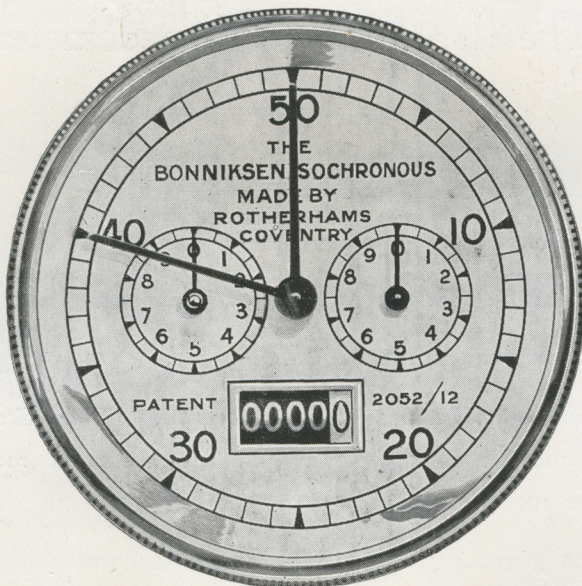
“ The Isochronous Speedometer ”

SOME IMPORTANT POINTS:—

- (a) Unlimited Speed-reading.
- (b) Indicating hand is “locked” for 5 seconds.
- (c) Absence of vibration of hand.
- (d) Dial (of 50 divisions) is mathematically divided like a watch dial; one rotation of hand shows 50 miles speed, two rotations of hand show 100 miles speed, and so on.
- (e) The governing agent is a large size “watch balance and balance spring,” the isochronous properties, of which are well known as time-measuring agents, with centuries of reputation to their credit.
- (f) The speedometer can be supplied if required with a dial of 100 divisions showing 100 miles to the circle.
- (g) All parts are *slow* moving, including the flexible shaft, which rotates at two-thirds the road wheel speed.
- (h) Small size, viz. : 3 inches diameter of bezel, $1\frac{3}{8}$ inches depth of box.
- (k) Total mileage is accurately recorded on all instruments. A trip mileage recorder is supplied in addition at slight extra cost.

“ ROTHERHAMS ”

MOTOR CYCLE TYPE



MODEL 1 2 $\frac{1}{2}$ " Dial

PRICE ... TRIP £5 0 0

NON-TRIP 4 10 0

Rear Drive, 10/- extra, fitted to American Machines.

Postage 9d. extra.

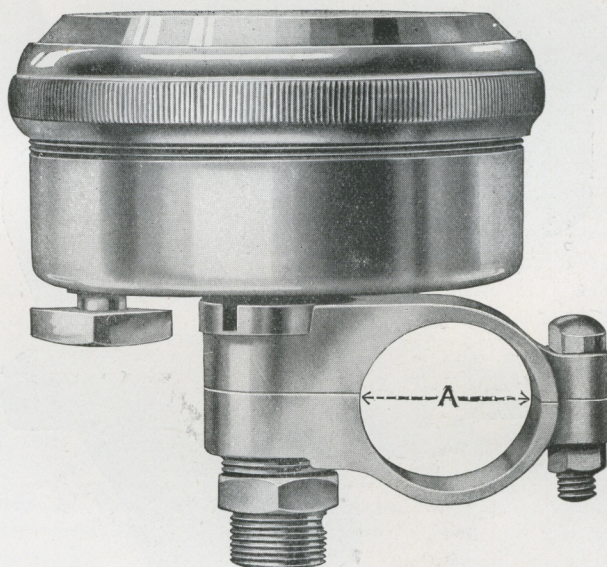
Complete with all necessary fittings.

Polished Brass or Nickel Finish.

FOR ORDER FORM SEE PAGE 25.

“ ROTHERHAMS ”

MOTOR CYCLE TYPE



MODEL 1 2½" Dial

Illustration shows Handle Bar Clip.

Diameters of Handle Bar (A), $\frac{7}{8}$ ", $\frac{15}{16}$ ", 1" and $1\frac{1}{8}$ ".

PRICE ... TRIP £5 0 0

 NON-TRIP 4 10 0

Rear Drive, 10/- extra, fitted to American Machines.

Postage 9d. extra.

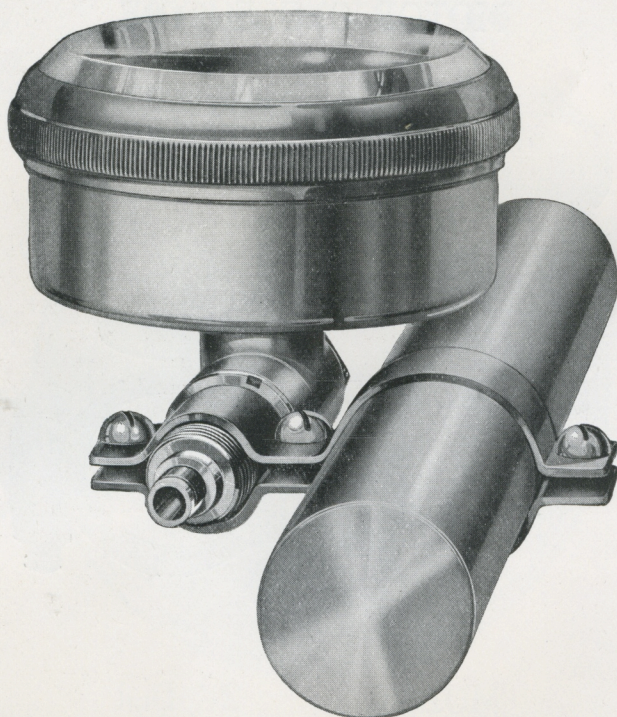
Complete with all necessary fittings.

Polished Brass or Nickel Finish.

FOR ORDER FORM SEE PAGE 25.

" ROTHERHAMS "

MOTOR CYCLE TYPE



MODEL 3 2½" Dial

This model is designed for use when riders desire the speedometer fitted on TOP BAR instead of handle bar, the speedometer being driven from the back wheel instead of the front.

PRICE	...	TRIP	£5	0	0
		NON-TRIP	4	10	0

Rear Drive, 10/- extra, fitted to American Machines.

Postage 9d. extra.

Complete with all necessary fittings.

Polished Brass or Nickel Finish.

FOR ORDER FORM SEE PAGE 25.

HOW TO READ THE BONNIKSEN ISOCHRONOUS SPEEDOMETER

Provided the instrument has been correctly fitted: when the car or cycle is moving more than 5 m.p.h. the hand which starts from 50 and moves partly round the dial registers the actual travelling speed at the point where it stops. It remains in this position for 5 seconds, when the other hand, which meanwhile has returned to and remained at 50, which is also zero, moves up to a position indicating the speed at that precise moment. The first hand then travels on round the dial to take up position at 50, ready for its next journey to register the speed, but while it is moving round the dial to 50 it should be ignored. Briefly, the speed is registered first by one hand and then the other, and the hand which is to register the speed always *starts* from 50.

The only exception to above is when the speed is exactly 50 m.p.h., when the indicating hand will start from and stop at 50.

At speeds over 50, say 60 m.p.h., the indicating hand will go round the dial, pass 50, and stop at 10. $50 + 10 = 60$, and so on *ad infinitum*.

At speeds below 5 m.p.h. the movement of the hands is erratic, and cannot be relied on.

The Total Distance Recorder is a Veeder-counter. The figures on the extreme right are tenths of a mile. If the figures read as follows: 12345, the distance recorded is one thousand two hundred and thirty-four and five-tenths miles, or $1,234\frac{1}{2}$ miles.

THE TRIP RECORDER

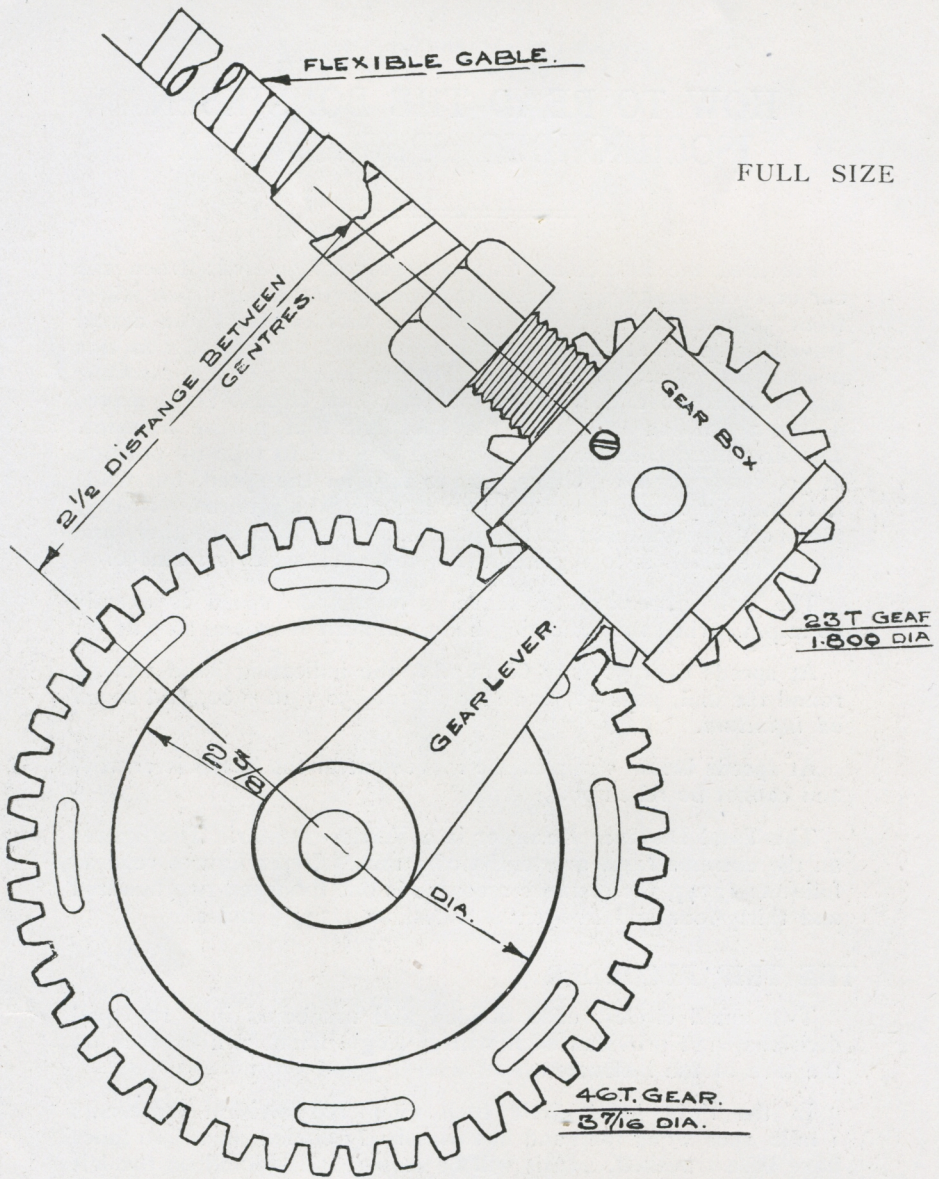
Two small circles, each divided and numbered into 10 equal divisions, and provided each with a single hand, will be seen on the face of the instrument.

In the right hand circle each numbered division represents 1 mile, thus when the hand has completely circled round, 10 miles have been travelled, and it will be seen that the hand on the left hand circle has now moved on one division, which in the left circle denote 10 miles each. For instance, if the hand in left hand circle points to 6, and the hand in right hand circle points to 8, the distance travelled is 68 miles.

The trip can be set to zero by turning the special button until both hands point to O in the two circles.

The button may be turned either way, whichever gives the quickest result.

“ ROTHERHAMS ”



FULL SIZE

DETAIL OF GEARS AND GEAR BOX ON FRONT WHEEL OF MOTOR CYCLE

This illustrates our smallest gears for fitting on front wheels having a small diameter hub flange.

We provide larger gears, having 52 and 26 teeth respectively, for wheels having larger hubs, also solid gears for drilling to fit on disc wheels.

CAR TYPE

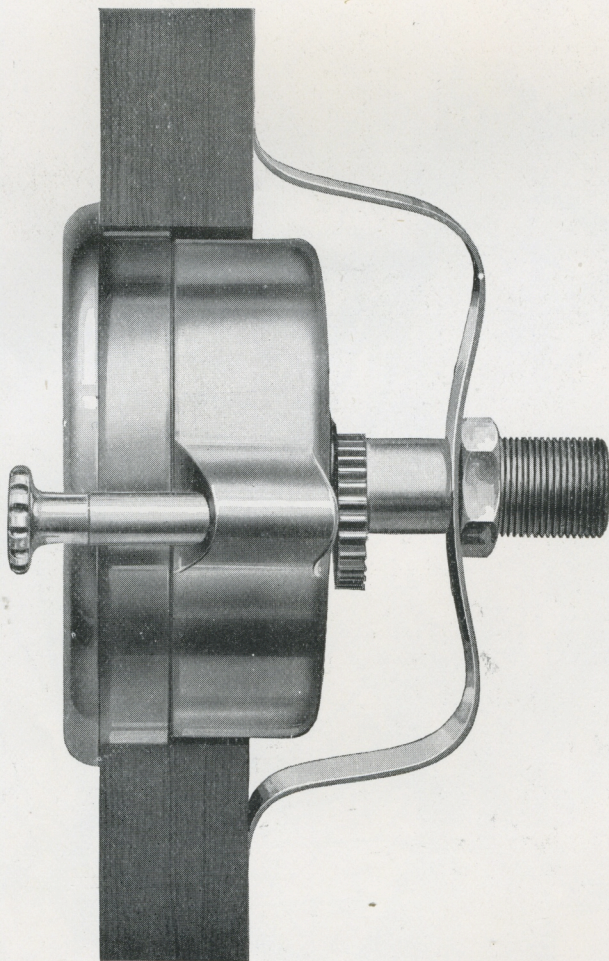
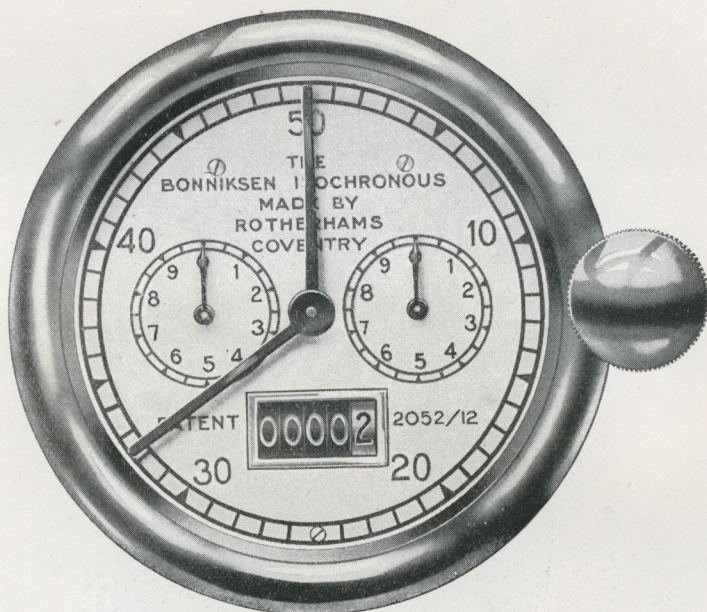


Illustration shows method of fixing speedometer
on instrument board.

“ ROTHERHAMS ”

CAR TYPE



MODEL C2

FLUSH FITTING TYPE

2½-in. or 3-in. dial.

Complete with all necessary fittings for either cardan shaft or front wheel drive.

PRICE	...	TRIP	£6 10 0
		NON-TRIP	6 0 0

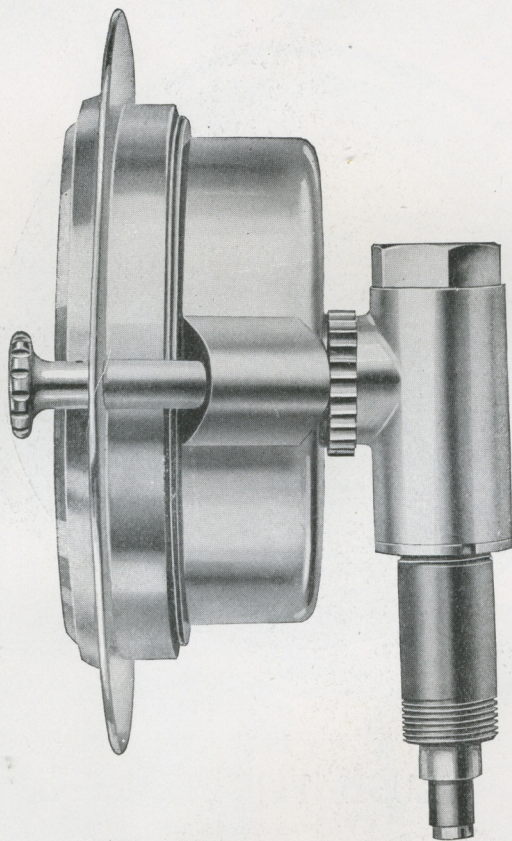
Postage 1/- extra.

Finish : Polished Brass, Nickel or Black Plated.

FOR ORDER FORM SEE PAGE 27.

“ ROTHERHAMS ”

CAR TYPE



MODEL C3

FLUSH FITTING FLANGE TYPE
WITH RIGHT ANGLE DRIVE

2½-in. or 3-in. dial.

Complete with all necessary fittings for either cardan shaft
or front wheel drive.

PRICE	...	TRIP	£6	10	0
		NON-TRIP	6	0	0

Postage 1/- extra.

Finish: Polished Brass, Nickel, or Black Plated.

FOR ORDER FORM SEE PAGE 27.

“ ROTHERHAMS ”

CAR TYPE



MODEL C4

BRACKET FITTING TYPE

2½-in. or 3-in. dial.

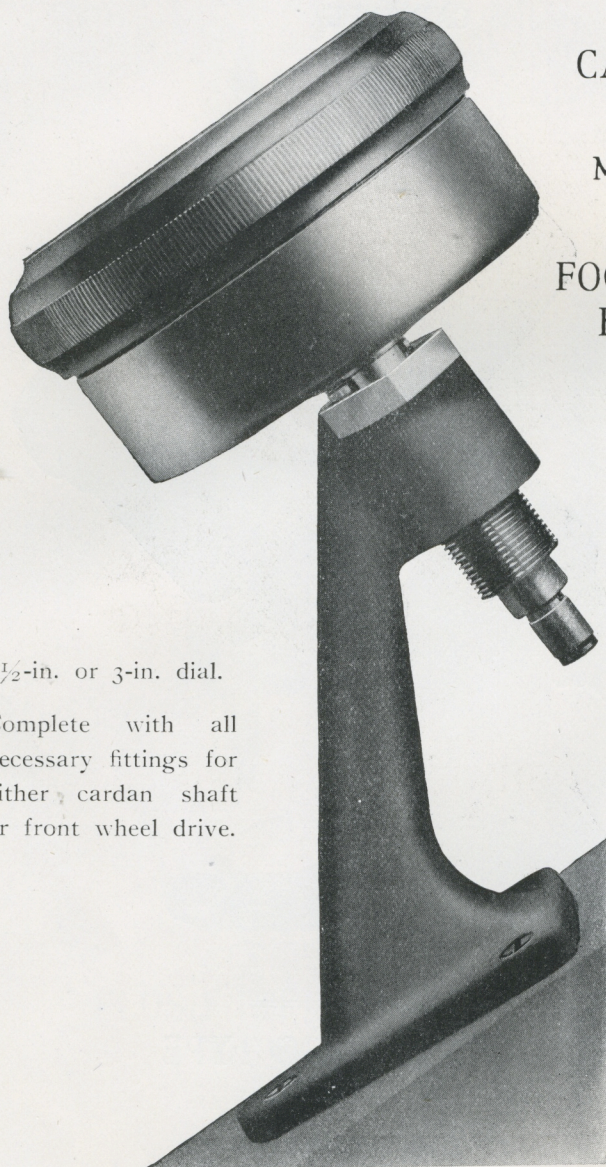
Complete with all necessary fittings for either cardan shaft
or front wheel drive.

PRICE	...	TRIP	£6	10	0
		NON-TRIP	6	0	0

Postage 1/- extra.

Finish: Polished Brass, Nickel, or Black Plated.

FOR ORDER FORM SEE PAGE 27.



CAR TYPE

MODEL C5

FOOTBOARD
FITTING
TYPE

2½-in. or 3-in. dial.

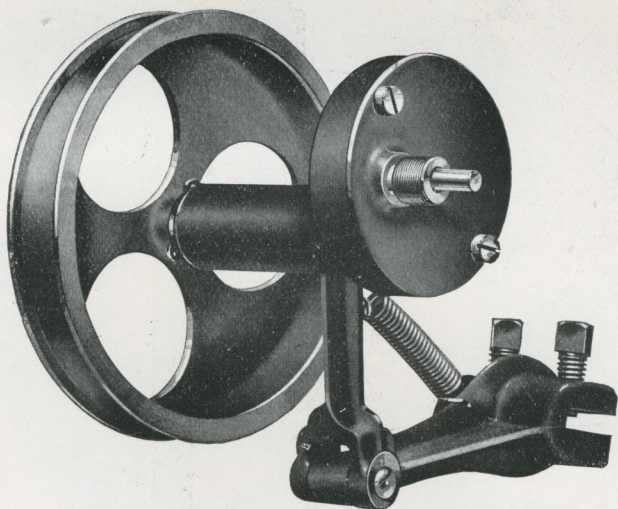
Complete with all
necessary fittings for
either cardan shaft
or front wheel drive.

PRICE	...	TRIP	£6	10	0
		NON-TRIP	6	0	0

Postage 1/- extra.

Finish: Polished Brass, Nickel, or Black Plated.

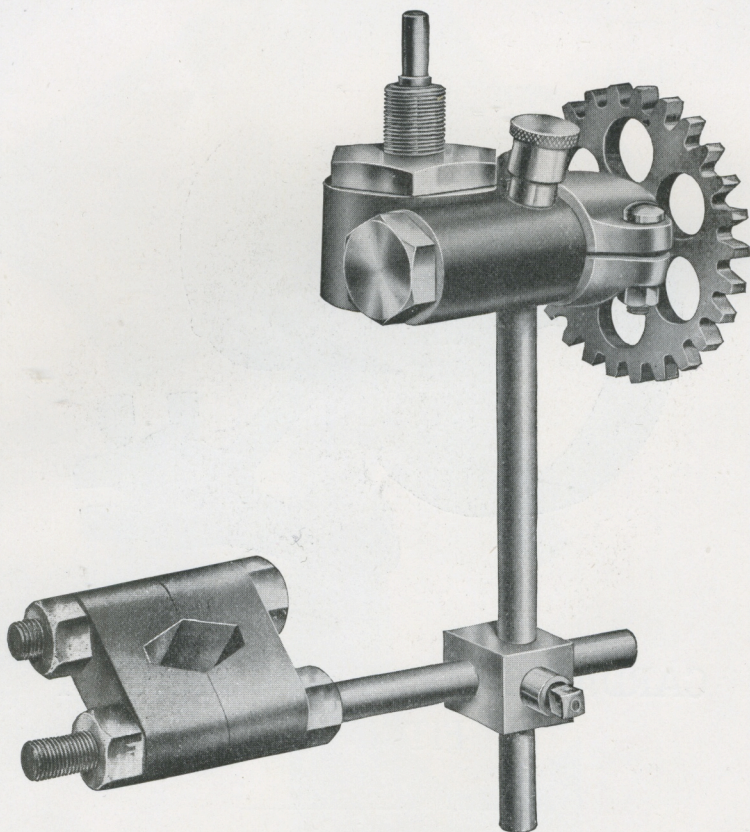
FOR ORDER FORM SEE PAGE 27.



CARDAN SHAFT DRIVE BRACKET FITTINGS

The fitting is simply clamped by means of two screws to the frame side member of the chassis, and a split pulley is fixed on to the carden shaft. The cable is then fixed to the bracket and the belt finally adjusted.

Supplied for either left or right side of chassis, and can be used upside down if it is necessary to clear the brake rods, etc.



FRONT WHEEL DRIVE FITTINGS

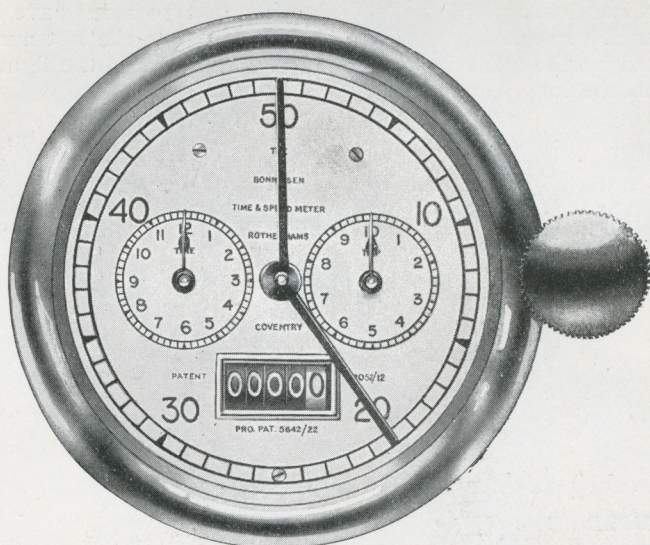
Fit vee clamp to steering connecting rod arm on right side of car.

To obtain correct meshing of driving gears, slacken both clamps on adjusting rods and place small gear wheel in correct position and re-tighten both clamps.

“ ROTHERHAMS ”

THE BONNIKEN TIME-SPEEDMETER

(Prov. Pat.)



WHAT IT DOES

Tells you exactly how long your car or cycle has been running to accomplish a journey.

Tells you the exact distance travelled by the car or cycle.

Tells you (by calculation) the exact average running speed for the journey.

Automatically deducts all time lost by stoppages.

Tells you the time of day, if set at starting by your watch, for so long as the car runs without a stop.

WHAT IT COSTS

CAR TYPE.—Complete with drive for front wheel or cardan shaft,

£8 0 0

CYCLE TYPE.—Complete with front or rear drive (American Rear Drive 10/- extra),

£6 10 0

Postage 1/- extra.

FINISH ... Brass, Nickel or Black Plated.

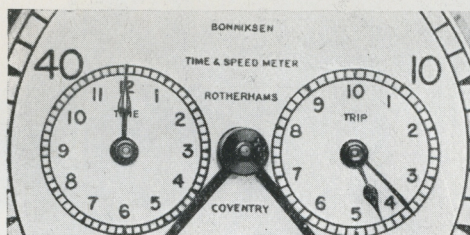
FOR ORDER FORM SEE PAGE 28.

" ROTHERHAMS "

How To Read The Time and Trip Dials of the Time-Speedometer

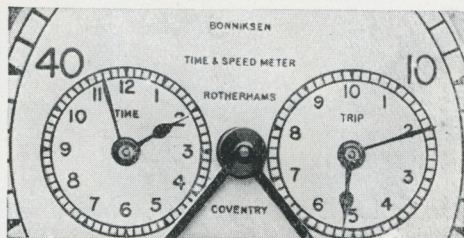
The "Time" dial is read exactly like a watch. The Trip dial also has two hands like a watch, but is divided into 10 divisions, the long hand covers one division for each mile run, and the short hand covers one division for each 10 miles; when therefore the long hand has completed 10 miles and is at zero the short hand will point to "1," showing that 10 miles have been covered. In reading the Trip always first note the last number passed by the short hand, multiply by 10 and add the figure to which the long hand points.

EXAMPLE
1



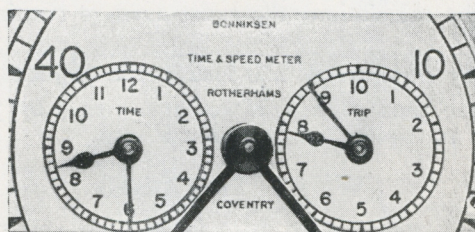
Distance Recorded $43\frac{4}{5}$ miles.

EXAMPLE
2



1 hour 57 minutes. 52 miles.

EXAMPLE
3

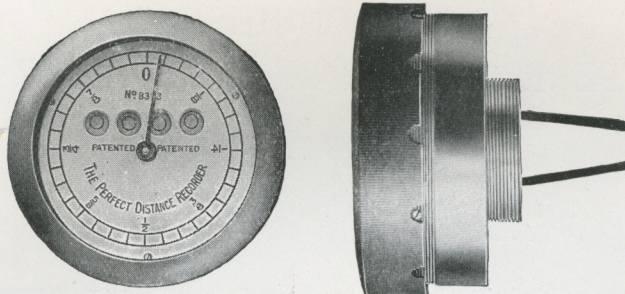


$8\frac{1}{2}$ hours. 179 miles.

In the last example it is assumed that the user knows he is in the second hundred miles of his journey, as the Trip dial only records to 100 and then repeats.

In the above examples the Time hands are set to 12 o'clock before starting irrespective of the time of day, and the Trip hands are set in a similar position.

FOR ORDER FORM SEE PAGE 28.



THE BONNIKSEN PERFECT DISTANCE RECORDER

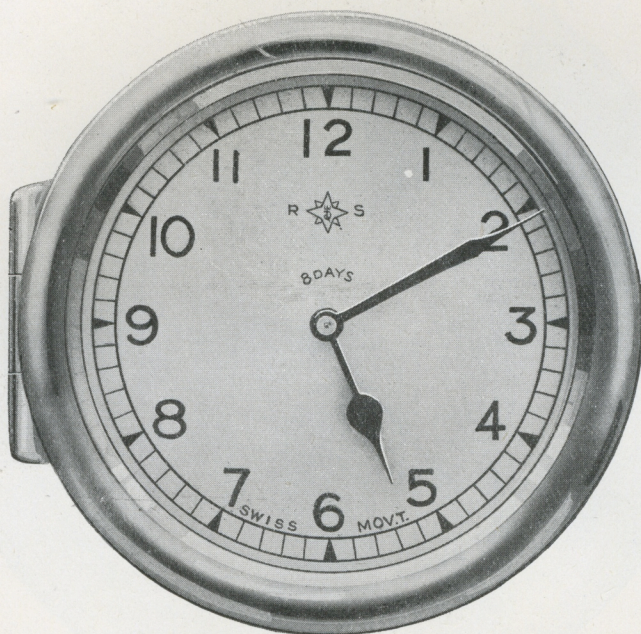
This Mile Recorder is intended for fixing to the front hub caps of motor car wheels, where it will accurately record the distance travelled within the limits of a few yards. It is only necessary to take a reading of the instrument at the commencement of a journey and again at the end. It is especially suited for the checking of mileage covered by fleets of motor lorries, char-a-bancs, etc., the readings being taken each night in the garage. If hub caps are sent to us, the recorders are fitted in such a manner that it is impossible to disconnect them from the road wheel without removing the hub cap.

The hand makes one revolution of the dial for each mile travelled. Each of the thirty-two divisions is therefore equal to 55 yards.

PRICE :

Recorder only, ready for fitting to hub caps. Brass	... ..	£2 0 0
Recorder only, ready for fitting to hub caps. Plated	... ..	2 2 0
Charge for fitting Recorder to customer's hub cap, from	... ..	5 0

FOR ORDER FORM SEE PAGE 26.



MODEL 1 Provisional Patent No. 28300,20

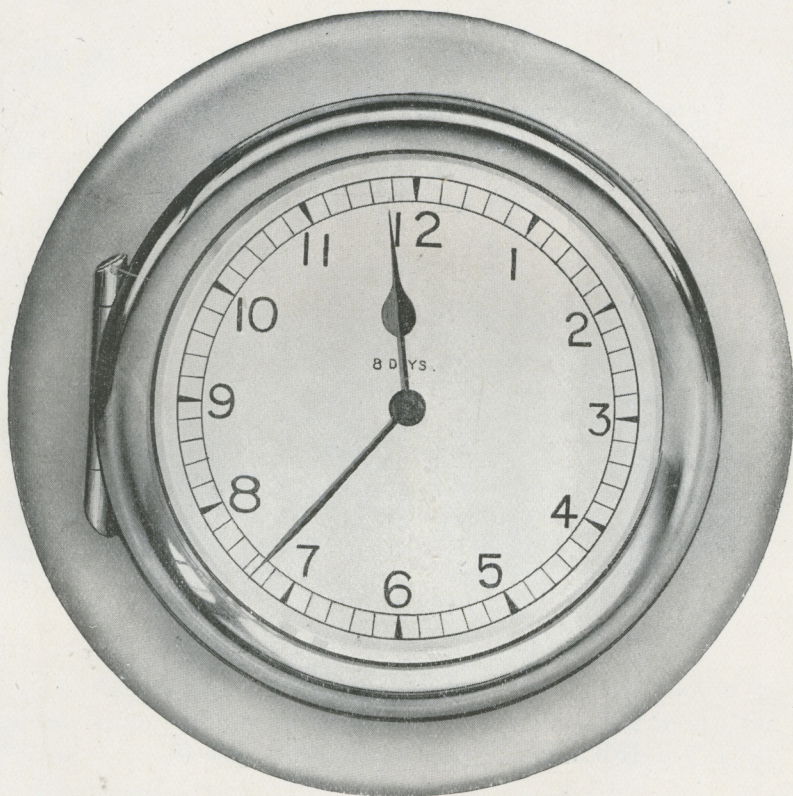
8-DAY MOTOR CLOCK

This clock is hinged on one side, and is held in the case by a self-adjusting spring catch.

PRICES: Model 1	...	...	...	...	£3 2 0	2 10 0
Model 3 with Button Wind	...	...	...	...	3 2 0	2 10 0
Luminous Dials, 20/- extra.						

These clocks are of similar appearance to the speedometers.

“ ROTHERHAMS ”



MODEL 2 Provisional Patent No. 23500.20

8-DAY MOTOR CLOCK WITH FLANGE

This is similar to our Model 1, but has in addition a 4-in. diameter flange.

These flanges can be supplied with screw holes if desired, but they are not really necessary, as the "Rotherham" method of fixing ensures the clock being securely fixed in the dashboard.

PRICE, complete ... ~~£3 4 0~~ ^{2 12 0}

Luminous, £1 extra.

Polished Brass or Nickel Finish.

“ ROTHERHAMS ”

MOTOR CYCLE SPEEDOMETER

ORDER FORM

To Messrs. Rotherham & Sons Ltd., Coventry

Name

Address

Maker's Name, Age and H.P. of Cycle

Style of finish : "Nickel Plated" or "Black Plated"

With "Mile Counter only," or with "Trip" returnable to zero

Tyremaker's Tyre dimensions (front wheel)

Or revs. of wheel for a known road distance

Diameter of handle bar

Distance of handle bar to centre of front wheel

Diameter of hub-screw thread

Signature

THE "BONNIKEN" TIME-SPEEDMETER

ORDER FORM

To Messrs. Rotherham & Sons, Ltd.,
Coventry.

Please supply one *Car/Cycle type Bonniksen Time and Speed Meter.

Make of Car or Cycle..... Year of Manufacture.....

Horse Power..... Size of Tyres..... Length of Flex
required..... Gear ratio in rear axle.....

Diameter of *Propeller Shaft/Handle Bar..... Finish.....

Front or rear drive.....

NAME.....

ADDRESS.....

* Strike out words not required.