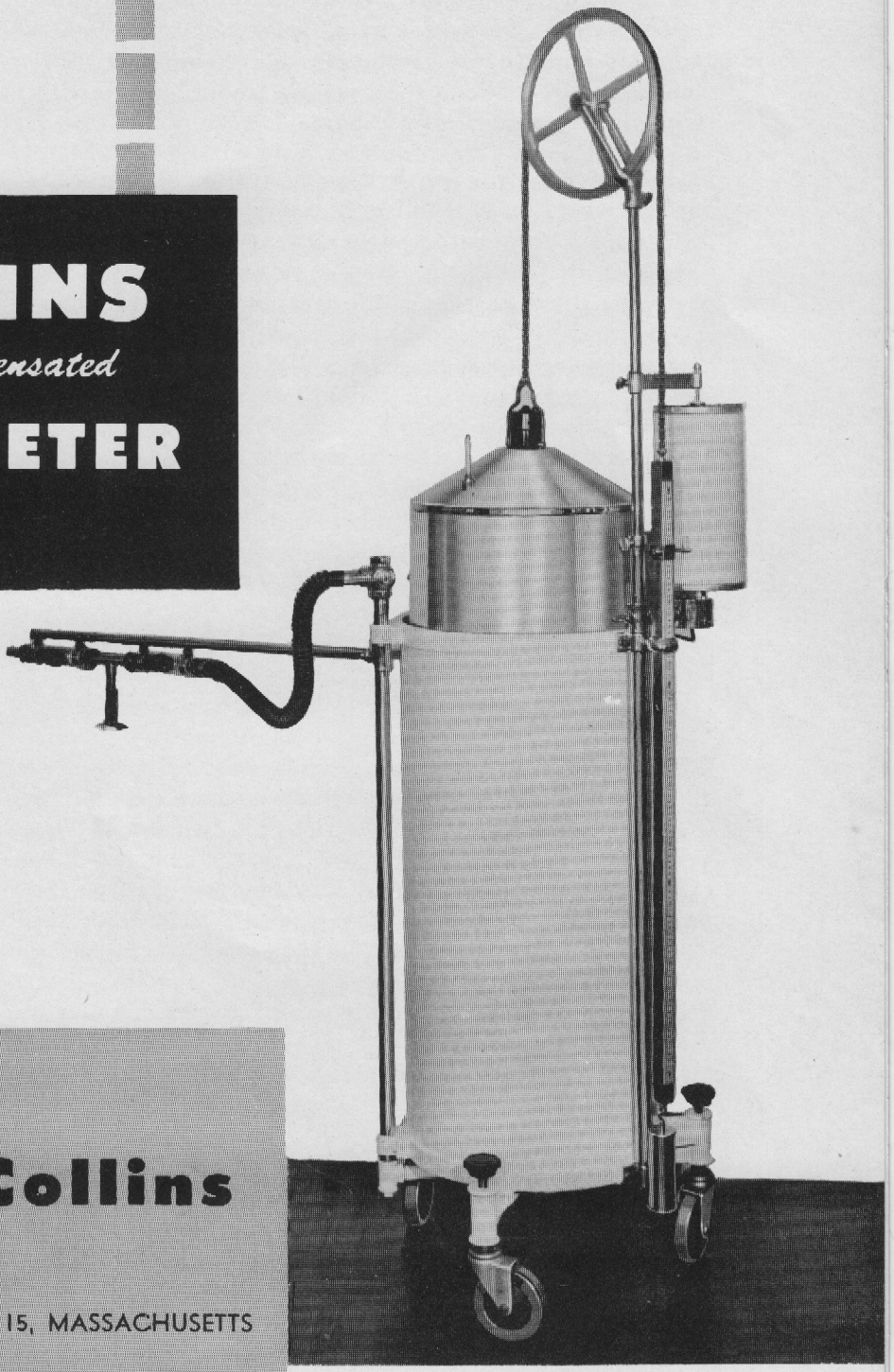
COLLINS

chain-compensated

GASOMETER



Warren E. Collins

INCORPORATED

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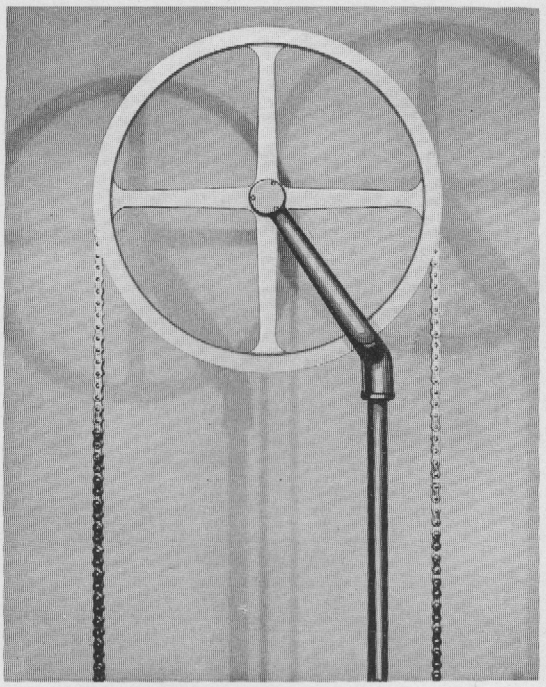
Even though most of the metabolism investigations in this country are being carried on with Benedict-Roth Recording Metabolism Apparatus, or some similar oxygen consumption measuring apparatus, there are times, as in the study of diabetes or special research problems, when it is necessary to determine the carbon dioxide eliminated as well as the oxygen consumed and thus determine the respiratory quotient. The method of determining this respiratory exchange was introduced by Tissot in 1904, and since then it has been extensively used in European and American laboratories as perhaps the most accurate method of determining the basal metabolic rate particularly where the respiratory quotient is a desired factor.

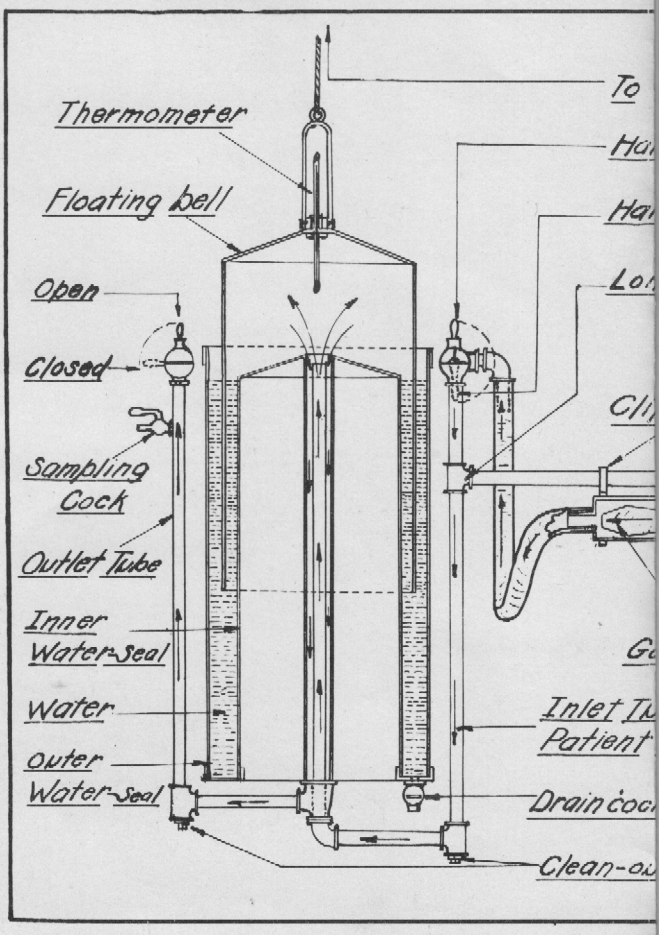
How the Gasometer Is Used While nearly everyone interested in metabolism is familiar with the *modus operandi* of such gasometers, it may be briefly stated here that the patient is simply connected with the apparatus, either by means of the usual mouthpiece and nose clip or by the conventional face mask, in such a way that he inhales fresh out-door air and exhales directly into the gasometer. These exhalations are collected during an eight or ten-minute period, after which samples of the expired air are taken to be analyzed for oxygen and carbon dioxide content by means of a gas analysis apparatus. It is this gas analysis together with the volume of air expired during a known period of time that determines the basal metabolic rate and the respiratory quotient. The Collins Chain-Compensated Gasometer is designed especially for this work and is the result of a careful study of other gasometers previously used in this country and abroad.

Chain-Compensation vs. Other Methods With all gasometers there has been the problem of allowing for the buoyant effect of the water on the bell because the bell weighs more out of the water than it does when totally immersed. In some gasometers made in private laboratories this feature was disregarded, but in other gasometers it was taken care of either by a water syphon system or by the so-called eccentric wheel. The water syphon system is a continual source of trouble because of the syphon "breaking," and the eccentric wheel is too elaborate and complicated with its little weight, fine piano wire and delicate adjustment to be a permanent success.

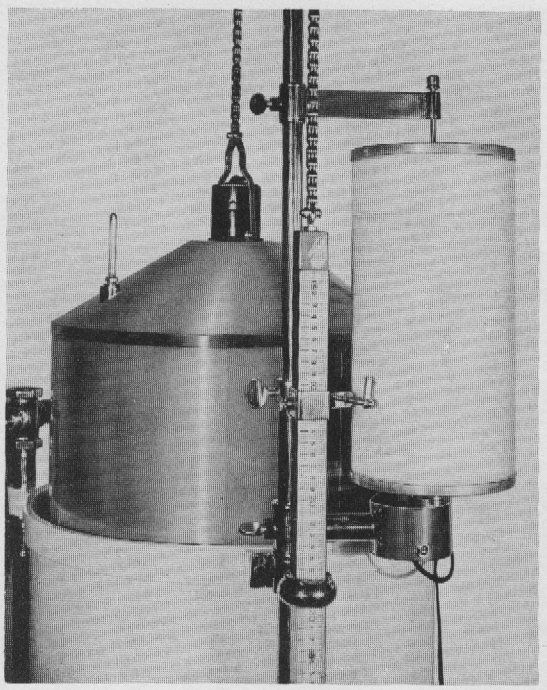
In the Chain-Compensated Gasometer the gradually increasing weight of the bell as it rises from the water is automatically and positively taken care of by a rather heavy but very flexible cable chain connecting the counterweight with the bell and passing over the pulley. It is of such a size and weight as to keep the bell in perfect equilibrium in all positions with the result that the collected expired air in the gasometer is never under com-



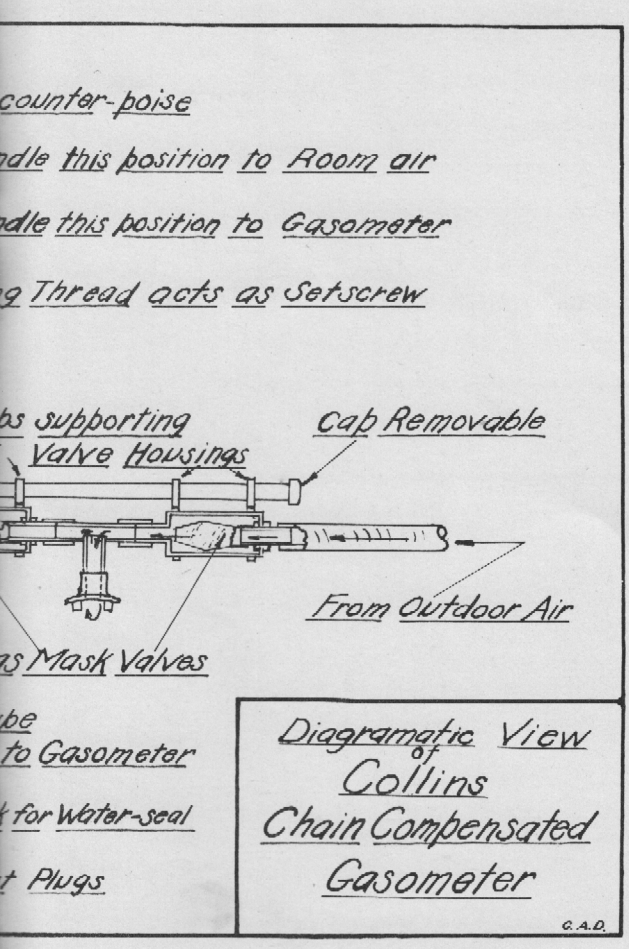
Perfect equilibrium is maintained by a chain passing over a pulley connecting a Gasometer bell, immersed in water, with a fixed counter weight.



WARREN E. COLLINS, INC



An electric Kymograph is optional. This unit is mounted to the upright standard with a recording pen attached to the counter poise weight. A mixing fan is also available to provide uniform composition of the air in the Gasometer bell.



pression or distention. It is the simplest compensating device ever used on a gasometer—one that cannot get out of order, never needs adjustment, never to be worried about. It is so simple it is a wonder it had not been used years ago:—just a chain passing over a wheel connecting a gasometer bell immersed in water with a fixed counterweight. As the bell rises it gradually increases in weight; at the same time more chain is passing over to the weight side of the pulley and consequently the weight gradually becomes heavier. It is in just this way that a perfect equilibrium is maintained.

General Construction Details Around this important feature of chain-compensation has been designed a gasometer of unusual construction. It is built of the very best materials—copper, bronze, brass and aluminum being used throughout. The gasometer body is of heavy copper and is securely soldered into a base ring cast of bronze. The top of the body is riveted to another bronze ring corresponding to the base ring. The breathing tubes and the pulley standard are held in place by special brackets which are bolted to the top bronze ring and the base casting.

Levelling screws are provided which also have 5″ ball-bearing casters in their bases to facilitate the moving of the apparatus. The gasometer has a capacity of 120 liters, and is finished in attractive ivory enamel with all trimmings and fittings polished chromium.

The counterpoise pulley is mounted on a standard which may be telescoped so as to occupy less space. This is of advantage when the apparatus has to be moved. The pulley is made of aluminum, turned true in a lathe and is mounted in annular ball bearings, one in each side of the pulley fork.

The two-tube breathing system is employed one for breathing into the apparatus and the other for sweeping it out and collecting samples. All tubing and openings are especially large so that there will be no resistance to breathing.

Mouth-Breathing Device Another exclusive feature of the Chain-Compensated Gasometer is the mouth-breathing attachment which comes as standard equipment. While the face mask has always been regarded as a necessity with previous gasometers, the mouthpiece and nose-clip have been selected for the Collins Chain-Compensated Gasometer; first, because this is the arrangement used on thousands of metabolism apparatus like the Benedict-Roth and second, many persons dislike the mask. The mouth-breathing attachment is shown in the illustration and consists of a horizontal arm, adjustable for height,

supporting two flutter valves between which is the mouthpiece. This is very similar to the mouth-breathing device used on the Benedict-Roth Recording Metabolism Apparatus, is very comfortable and is not so difficult to make air-tight as is the mask. Of course, face masks may also be used with this gasometer if preferred, and without any reconstruction or rearrangement of the apparatus.

Exclusive Features The Collins Chain-Compensated Gasometer embodies these new and advanced principles of construction making it in every respect a superior apparatus to its predecessors and even its contemporaries.

(1) Automatic and positive compensation of the bell by means of a simple chain.

(2) Mouth-breathing attachment so universally used on thousands of metabolism apparatus like the Benedict-Roth.

(3) Telescoping pulley standard with pulley running in ball bearings.

(4) Two breathing tube system considered desirable by the more prominent investigators.

(5) Superior construction and design throughout making it an apparatus that will last a life-time.

Other Sizes The Collins Chain-Compensated Gasometer has been so successful in the standard 120 liter size that we have been requested to make it in sizes of 350, 500 and 600 liters for special research problems. These larger sizes are not carried in stock but can be made up to special orders on short notice.

Specifications

COLLINS CHAIN-COMPENSATED GASOMETER, 120 liter size, manufactured completely of heavy gauge copper sweat soldered to bronze base ring. Two breathing tubes, 7/8" inside diameter. Body dimensions, 18" diameter and 36" high. Gasometer bell made of 20 ounce copper with a chromium plated cap fitted with centigrade thermometer. Bell dimensions 16" diameter x 34" high. Bell connected with counterweight by compensator chain, passing over 12" aluminum pulley mounted in grease sealed ball bearings. Height of pulley from floor 8 feet; when telescoped, overall height is only 5 feet 6 inches.

Complete with inspiratory and expiratory valves, rubber mouthpieces, nose clip and connecting length of corrugated rubber tubing.....Price $585.00 F.O.B. Boston, Mass.

Accessories

Kymograph to record respirations $100.00

Mixing fan to provide uniform composition of air in gasometer bell 50.00

COLLINS CHAIN-COMPENSATED GASOMETERS are also made in 600 liter and 350 liter sizes. The same general construction details are followed, namely all copper construction. The 600 liter size body measures 34" in diameter by 48" high. Its bell measures 32" in diameter by 46" high. Overall height is 9 feet.

Complete with mixing fan $800.00

The 350 liter body measures 27" in diameter by 48" high. Bell measures 25" in diameter by 46" high. Overall height is 9 feet to top of pulleys.

Complete with mixing fan but without mouthpiece or mask $750.00

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