

1923

# Tower and Street Clocks Manufactured by the E. Howard Clock Co. Boston, Massachusetts

E. Howard Clock Company

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XI ERS ELECTRIC CLOCK XII SYSTEMS WATCH- MAN CLOCKS

# TOWER AND STREET CLOCKS



## THE E. HOWARD CLOCK COMPANY

BOSTON - NEW YORK - CHICAGO

*The Nation's Timekeepers  
Since 1842*

TIME RECORD  
MOVEMENTS  
LOCK  
TIME  
VAULT  
REGULATORS  
CLOCKS  
HALL  
CLOCKS  
SPECIAL DESIGN  
BANK OFFICE,  
RAIL ROAD  
MAN CLOCKS  
TOWER AND  
STREET  
CLOCKS  
MARINE  
CLOCKS  
SKOTTS  
TOOHS AND

Another Quality Reproduction  
By Tran Duy Ly N.A.W.C.C. #28777  
ARLINGTON HOROLOGY & BOOK CO.  
P.O. BOX #327  
ARLINGTON, VIRGINIA 22210

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*This reprint contains the complete Ca. 1923  
E. Howard Tower and Street Clocks  
Catalog and pictures taken from Ca. 1890  
E. Howard Tower Clock Catalog.*

# TOWER AND STREET CLOCKS

*Manufactured by*

THE E. HOWARD CLOCK CO.

BOSTON, MASS.

ESTABLISHED 1842

E. HOWARD & CO.  
BOSTON

TRADE-MARK

*Factory and Executive Offices*  
206 EUSTIS STREET, BOSTON, MASS.

*Sales Offices*  
BOSTON, 387 WASHINGTON STREET  
NEW YORK, 305 BROADWAY  
CHICAGO, 31 NORTH STATE STREET

*Directors*

MURRAY CHEEVER  
EDWARD A. BIGELOW  
WILLIAM J. ELTON  
DAVID C. PERCIVAL  
HAROLD C. KEEMAN

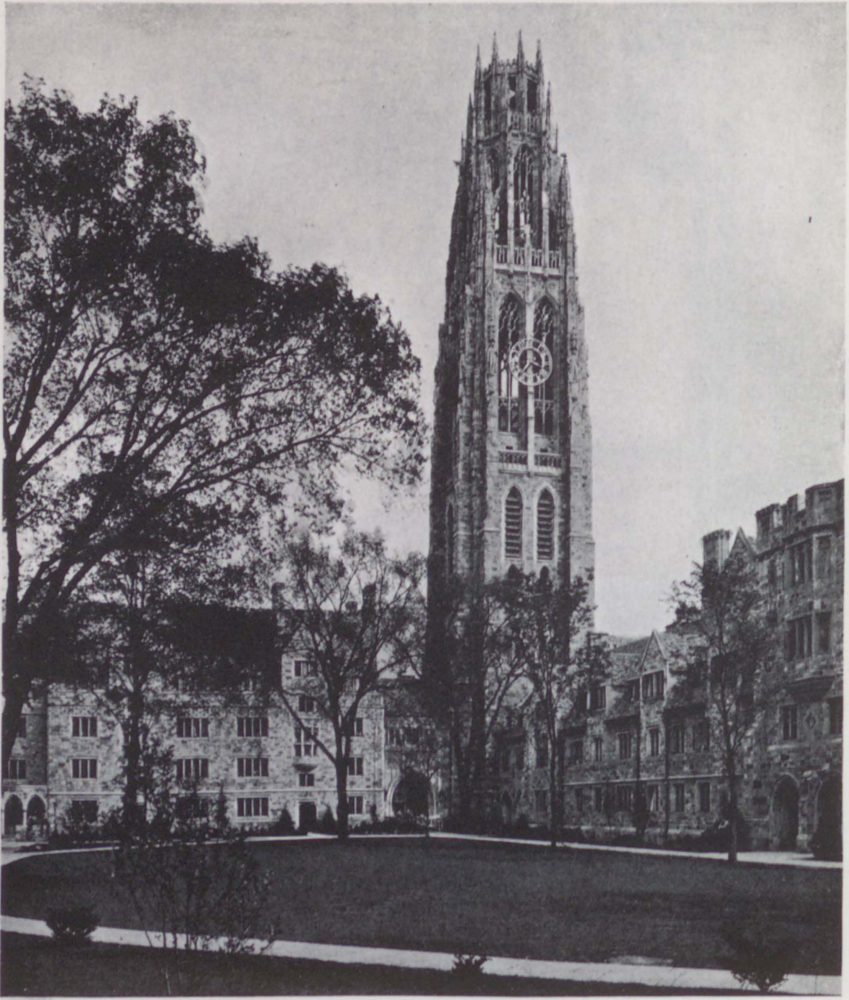
*Officers*

*President*  
MURRAY CHEEVER  
*Vice-President & Treas.*  
WILLIAM J. ELTON  
*Secretary & Gen. Mgr.*  
HAROLD C. KEEMAN



*A Fine Architectural Example*

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*Harkness Memorial Tower*

*Yale University, New Haven, Conn.*

*Howard Four-Dial Tower Clock*

*JAMES GAMBLE ROGERS, Architect*

---

*E. Howard Clock Company*



# *The Howard Line*

**T**HIS catalogue contains a few reproductions of the Howard line of Tower Clocks, the models shown herein being the result of over eighty years of specialization in Tower Clock manufacture.

During this time the reputation of E. Howard Clocks for dependability has become so enhanced, as the years have passed, that today they are the accepted standard, everywhere, and are recognized as the finest clocks in the world.

The dependability of E. Howard Clocks is the result of special design, scientific accuracy, and selected materials combined with generations of clock-making experience.

The pages of this catalogue show not only standard models which may be obtained in any size desired, but also photographic reproductions of representative installations from thousands which we have made.

Every E. Howard Clock is guaranteed to be first class in every respect, and you may hold us responsible for any original defect which may develop within five years, provided the installation is in accordance with our specifications.

E. Howard Clocks are made for every conceivable tower or public use, such as public buildings, schools, churches, office buildings, depots, factories or mills, street signs, memorials, etc. Our designers will be glad to co-operate with architects, owners or committees in the selection of the right clock for a particular use, and the preparation of specifications for its manufacture and installation.

We solicit the opportunity to confer upon any clock requirement, or proposal that is under consideration, believing that we can make suggestions and show photographs of installations that have been made, that will prove to be of value.

We are originators, and specialize on the popular sectional dials arranged for illumination.

Our prices will be found reasonable—as low as is possible consistent with a guaranteed clock that will keep accurate time, and give dependable service for years to come.

*The E. Howard Clock Company*

*Established in Boston in 1842*

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*The E. Howard Clock Co.*

TOWER AND STREET CLOCKS

MASTER CLOCKS  
ELECTRIC CLOCK SYSTEMS  
PROGRAM SIGNAL CLOCKS  
MARINE CLOCKS  
LABORATORY CLOCKS  
SAFE & VAULT TIMERS  
BANK PROTECTION TIMERS  
BANK, OFFICE, RAILROAD  
AND SCHOOL CLOCKS  
WATCHMAN CLOCKS  
CLOCKS OF SPECIAL DESIGN  
FOR RESIDENCE AND  
COMMERCIAL USE  
REGULATORS  
HALL CLOCKS  
BANJO CLOCKS  
RAILROAD CLOCKS  
RECORDER MOVEMENTS

*Correspondence*

RELATING to proposed Tower Clocks, with or without striking attachment, chiming attachment, quarter striking attachment, Angelus or any other suggested method of striking, is respectfully solicited.

*Executive Offices at the Factory*  
206 EUSTIS STREET, BOSTON, MASS.

*Sales Offices*  
387 WASHINGTON STREET,  
BOSTON, MASS.

305 BROADWAY,  
NEW YORK, N. Y.

31 NORTH STATE STREET,  
CHICAGO, ILL.

---

*Proper Size of Dials*

**E**RRORS frequently occur in the selection of sizes and styles of Dials. The diameter of a dial should be one foot in size for every ten feet of height. For Example: A six-foot dial would be proper size for sixty feet of elevation.

**I**N arranging your plans for Building Don't forget to include an outside Howard Bracket, Tower or Street Clock.

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*A Clock for Every Purpose*

## *Over Eighty Years as Clock Manufacturers*

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**E** HOWARD CLOCKS are made in various sizes, both with and without striking apparatus; also for one or for as many dials as may be desired. Materials and workmanship are the best, the wheels being of hard hammered clock brass and the teeth accurately cut. The arbors and pinions are of the best open hearth steel; the frame and supports of cast iron. The striking part is so arranged that should the clock be struck between the hours, it will simply repeat the last hour struck and will not disarrange the correct striking of the clock. The escapements used are either the "Graham Dead Beat," which is put into beat by tangent screws, or the "Dennison Gravity." The Dennison Gravity applied to many of our largest clocks has produced wonderful results. The pendulum rod is made of seasoned cherry wood or steel tubing compensated with zinc.

Our clocks have a simple device and indicating dial at the clock movement for correctly and easily setting the outside hands and striking of the hours.

*WE manufacture in several sizes, Automatic Illumination Regulators for governing gas jets or electric lights; the time for lighting and extinguishing the lights is adjustable to conform to the varying lengths of the nights.*

### *Installation*

We prefer to install our clocks and to send an experienced man to superintend the work. We will contract for the delivery and installation of our clocks if desired. We do not do any carpenter work or furnish dial bodies or weights except by special contract. Dial bodies as well as weights can usually be provided locally at less expense than for our factory to supply them, and the freight charges are also saved. Weights may be of small stones, gravel or sand enclosed in a wooden box, or they may be cast-iron blocks.

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*Time, Hour Strike or Quarter Chimes*



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## *Clocks for Federal Buildings*

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CUSTOM HOUSE, BOSTON, MASS.

Electrically operated clock with four dials twenty-two and one-half feet diameter and three hundred and thirty-five feet above the sidewalk. This tower and clock are visible for many miles and is one of the first landmarks to be seen from vessels entering the Port of Boston.

PEABODY & STEARNS, *Architects*

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## *Watchman's Clocks*

## *Clocks for Municipal Buildings*

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MUNICIPAL BUILDINGS, SPRINGFIELD, MASS.

Four-dial illuminated Westminster Chiming Tower Clock with special dial construction, consisting of twelve circular holes with lenses instead of figures, which lenses are illuminated at night. The large hands are simply pointers, and time is told by the location of the hands, minutes not being considered important.

PELL & CORBETT, Architects

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## *Electric Clock Systems*

## Typical Public Building Clocks

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### *Cupola of New York City old City Hall*

Showing part of  
the New Municipal Bldg.  
in left background.



Cupola restored  
after fire in 1919  
and new Howard  
Self-winding  
Tower Clock in-  
stalled.

GROSVENOR ATTERBURY  
*Architect*

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NEW YORK LIFE INS. CO., New York City, Tower Clock acts as Master for  
over 100 Electric secondary clocks in different parts of the Building.

McKIM, MEAD & WHITE, *Architects*

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CITY HALL,  
Chelsea, Massachusetts

PEABODY & STEARNS, *Architects*

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## *Schoolhouse Clocks*

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## Two Interesting Tower Clocks

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### *Still Runs on Railroad Time*



### *Seventy - Eight Years and Still Running*

This old-time clock is on the front of Boston — Fitchburg Station — corner Causeway and Charlestown Streets. The station was built in 1847. In 1850 the top floor of the Building was used for Jenny Lind Concerts.

### *A Useful Memorial*



### *Carrie Memorial*

*Brown University*

*Providence, Rhode Island*

Indiana limestone and brick tower with four 10-foot copper dials with special designed hands to match. Striking Clock with extra long, tubular, deep-toned Bell.

GUY LOWELL, *Architect*

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## *Program Bell Systems*

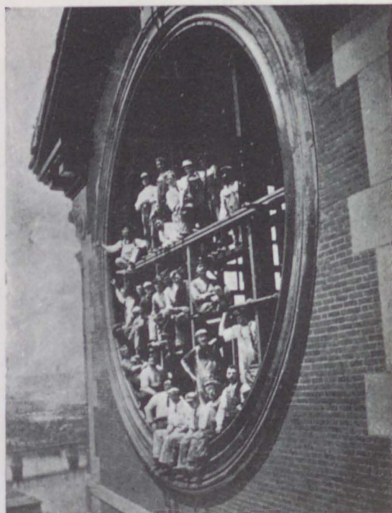
# *A Great Mill Clock—Largest in the World*

*Group Illustrating the Mammoth Tower Clock  
Ayer Mill, Lawrence, Massachusetts*

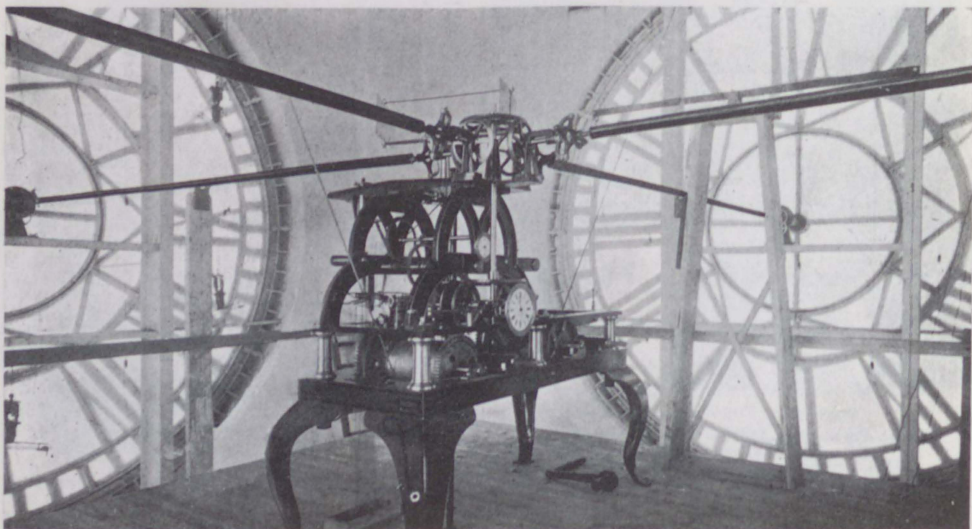
CHARLES T. MAIN, Engineer



TOWER CLOCK  
ON AYER MILL  
Lawrence  
Massachusetts



AYER MILL CLOCK DIAL  
During construction  
Diameter of Opening 22 feet—6 inches



Interior of AYER MILL SPACIOUS CLOCK ROOM

CHARLES T. MAIN, Engineer

## *Office and Work Room Clocks*

# Church, School and Community Tower Clocks



FIRST CONGREGATIONAL CHURCH, Old Lyme, Conn.  
ERNEST GREENE, Architect



TOWER CLOCK ON MODERN CALIFORNIA BUILDING — One of the stucco type



HARVEY WHEELER SCHOOL, Concord Junction, Mass., Showing 4-Dial Tower Clock on Building  
W. H. McLEAN, Architect



TOWER CLOCK USED ON A CALIFORNIA CLUBHOUSE



TOWER CLOCK, COLBY COLLEGE, Waterville, Me.

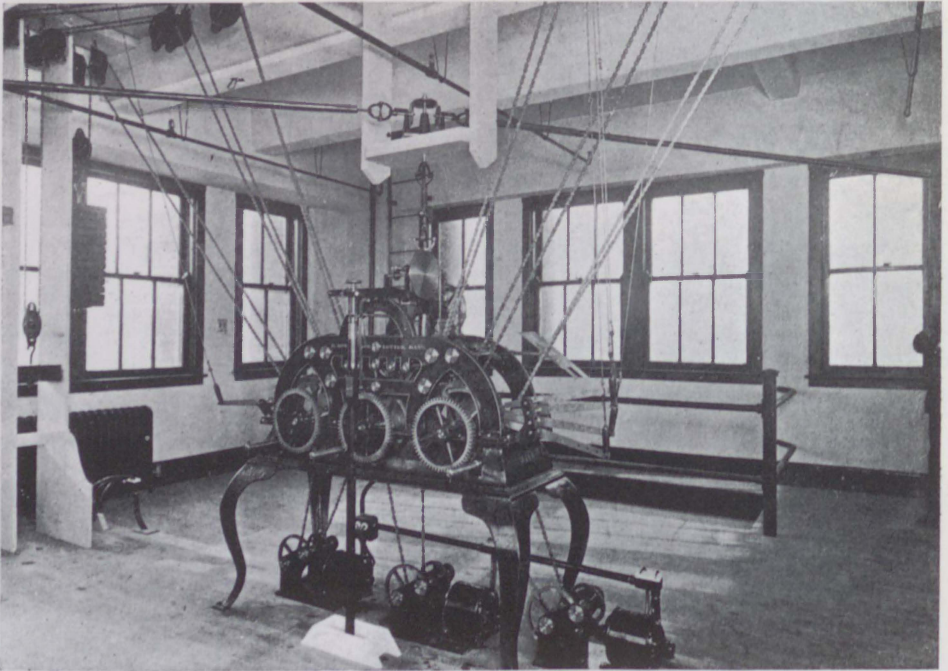
## Special Auditorium Clocks

# *Howard Chiming Clock in Tower Kimball Bldg., Chicago*



KIMBALL BUILDING, Chicago, Illinois

Huge sprinkler tank for fire protection of plant concealed in tower behind clock dials.



KIMBALL BUILDING CLOCK ROOM

The requirements in this instance were to have the entire operation of the clock and the weights between the floor and ceiling of the clock room. Sprinkler tank above, and between clock dials.

Hence, the three motors for winding the Time part, Striking, and Chiming, with the automatic Cut-out and Cut-in switches at top and bottom of weight run.

GEORGE C. NIMMONS, *Architect*

## *Automatic Motor Wound Clocks*

## A Group of Bank Clocks



Waltham, Mass.  
2-Dial Street Clock  
With sign top and  
Weather bulletin

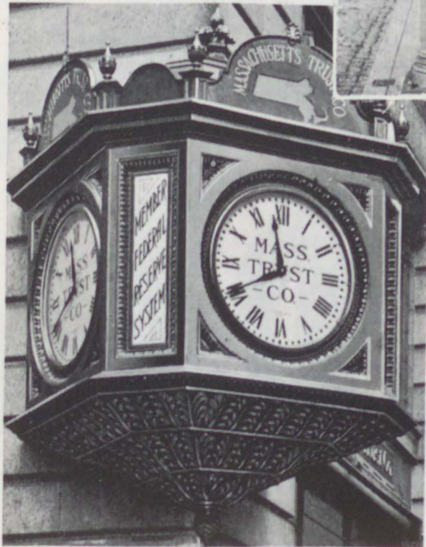
These clocks are frequently supplied with gold finish hands and numerals and black background, when illumination is not desired.



Double Dial Bracket Clock  
Illuminated Signs and Dials



Lawrence, Mass.  
2-Dial Street Clock  
with Name on Dial  
Instead of Numerals



Electrically operated  
3-Dial Illuminated  
Bracket Clock. Corner  
of building.

LLOYD'S 4-Dial  
Post Clock with  
Weather Bulletin  
Thermometer  
and Barometer



## Safe and Vault Timers



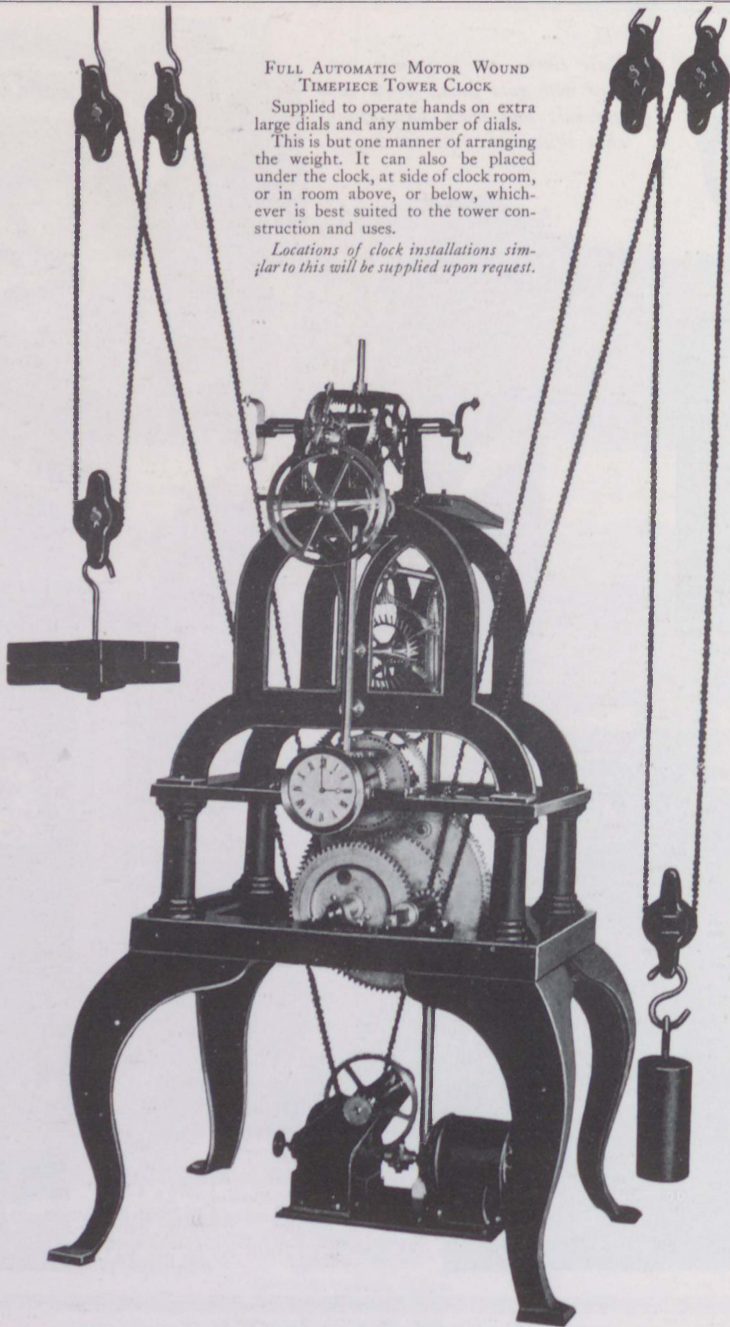
## Heavy Duty Timepiece

### FULL AUTOMATIC MOTOR WOUND TIMEPIECE TOWER CLOCK

Supplied to operate hands on extra large dials and any number of dials.

This is but one manner of arranging the weight. It can also be placed under the clock, at side of clock room, or in room above, or below, whichever is best suited to the tower construction and uses.

*Locations of clock installations similar to this will be supplied upon request.*

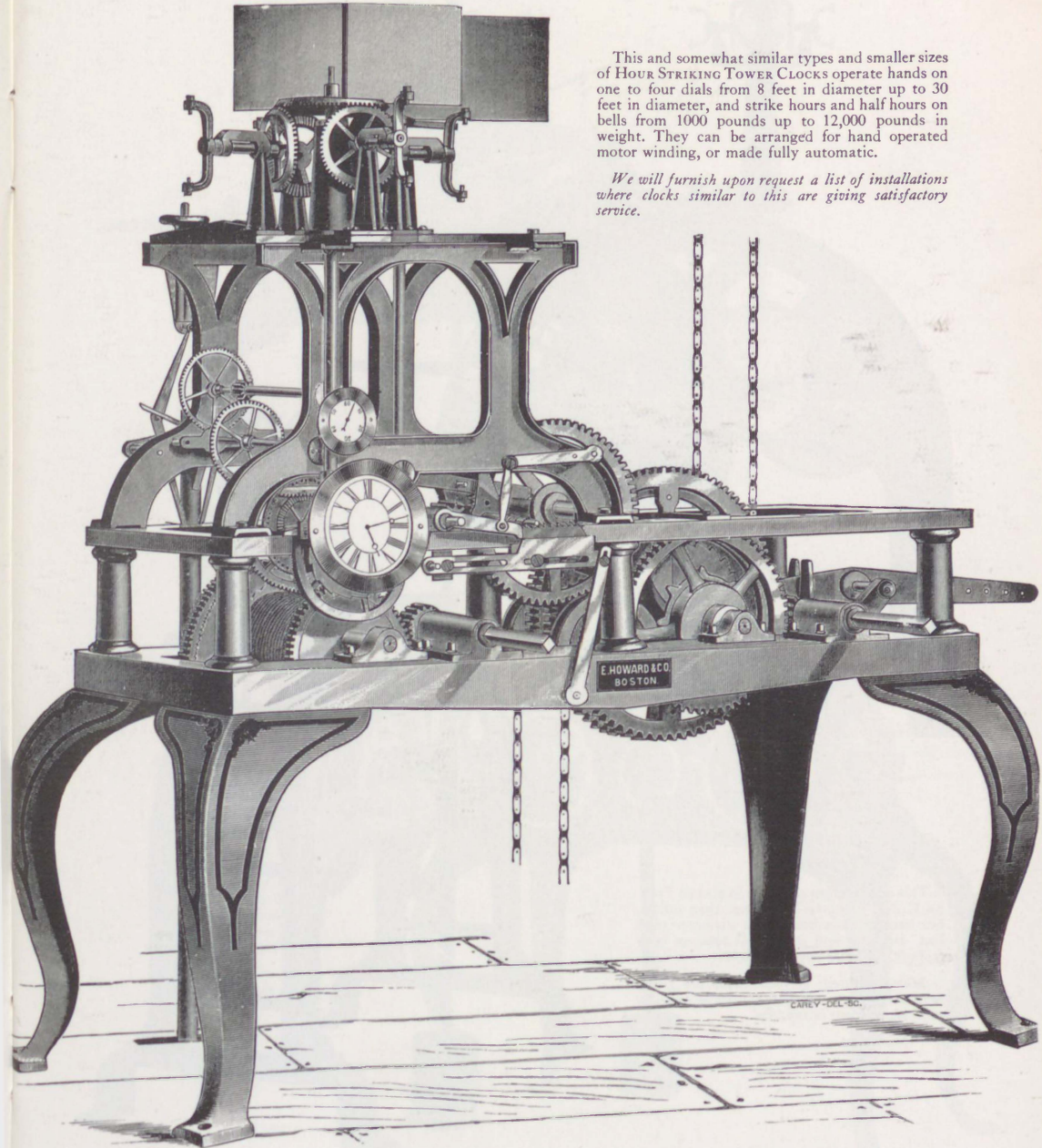


*All Tower Clocks May Have Automatic Illumination Regulator*

## Heavy Duty Hour Striker

This and somewhat similar types and smaller sizes of HOUR STRIKING TOWER CLOCKS operate hands on one to four dials from 8 feet in diameter up to 30 feet in diameter, and strike hours and half hours on bells from 1000 pounds up to 12,000 pounds in weight. They can be arranged for hand operated motor winding, or made fully automatic.

*We will furnish upon request a list of installations where clocks similar to this are giving satisfactory service.*

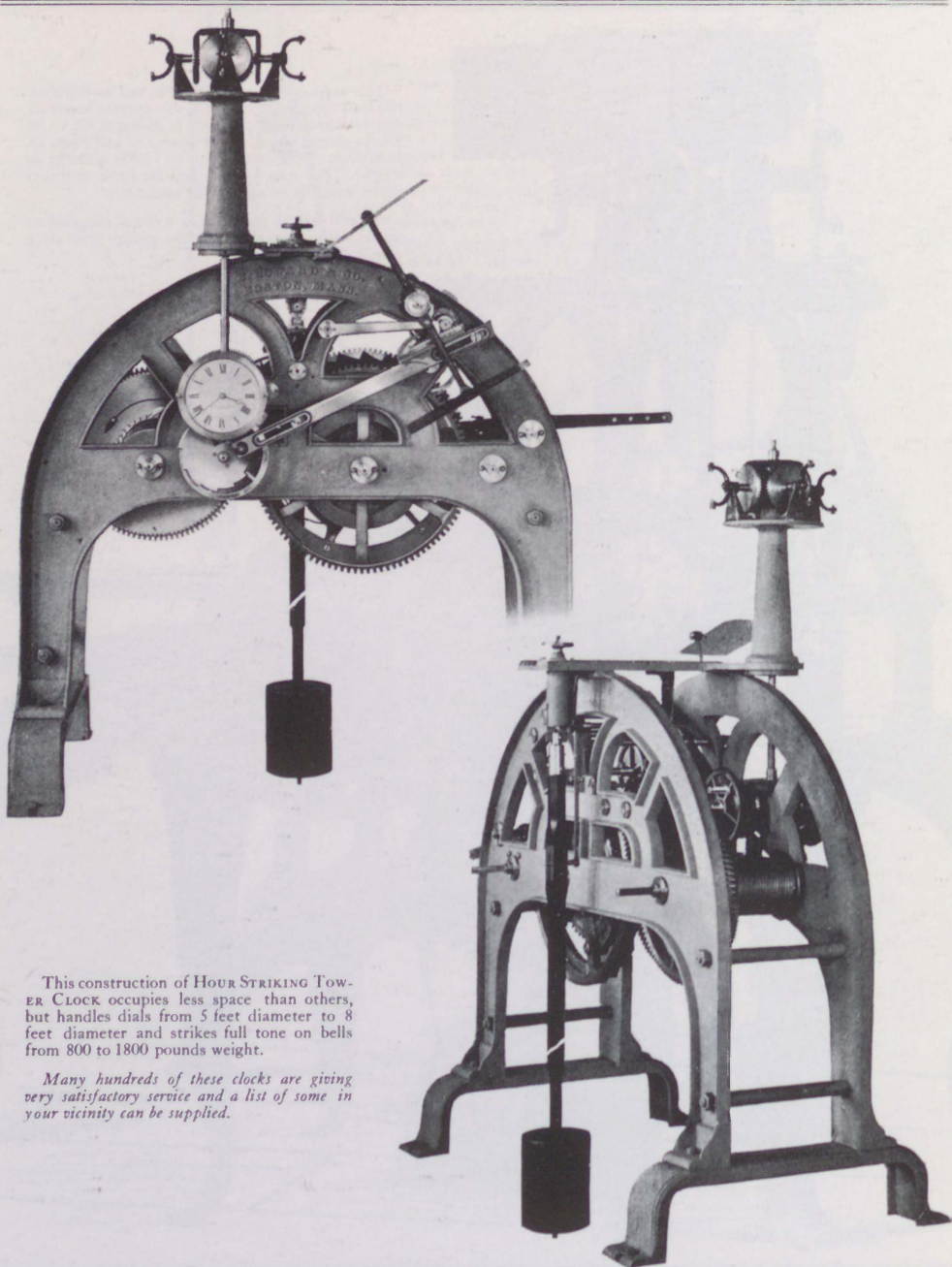


*Quality Is Our Watchword*

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## *A Medium Size for Average Towers*

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This construction of HOUR STRIKING TOWER CLOCK occupies less space than others, but handles dials from 5 feet diameter to 8 feet diameter and strikes full tone on bells from 800 to 1800 pounds weight.

Many hundreds of these clocks are giving very satisfactory service and a list of some in your vicinity can be supplied.

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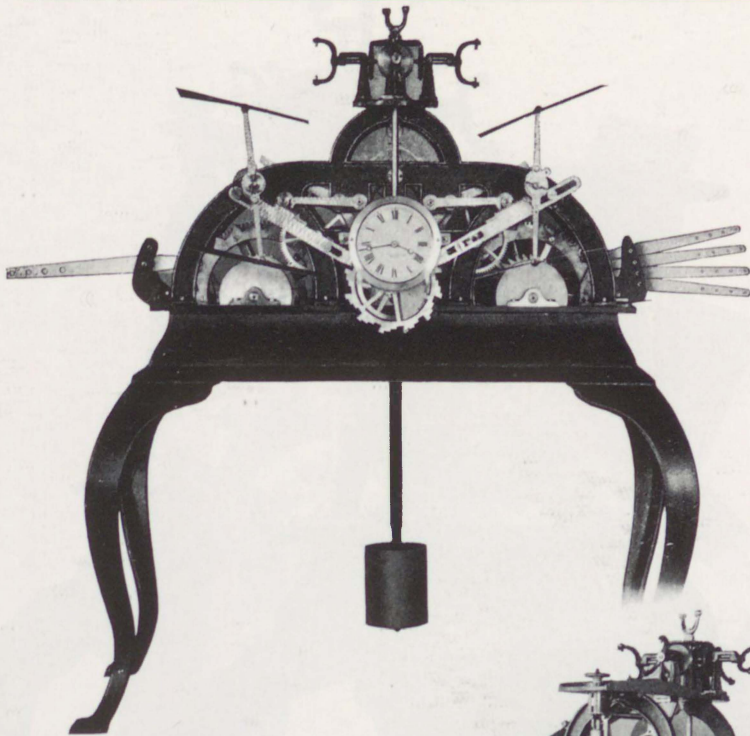
*Angelus Striking Machines May be Added*

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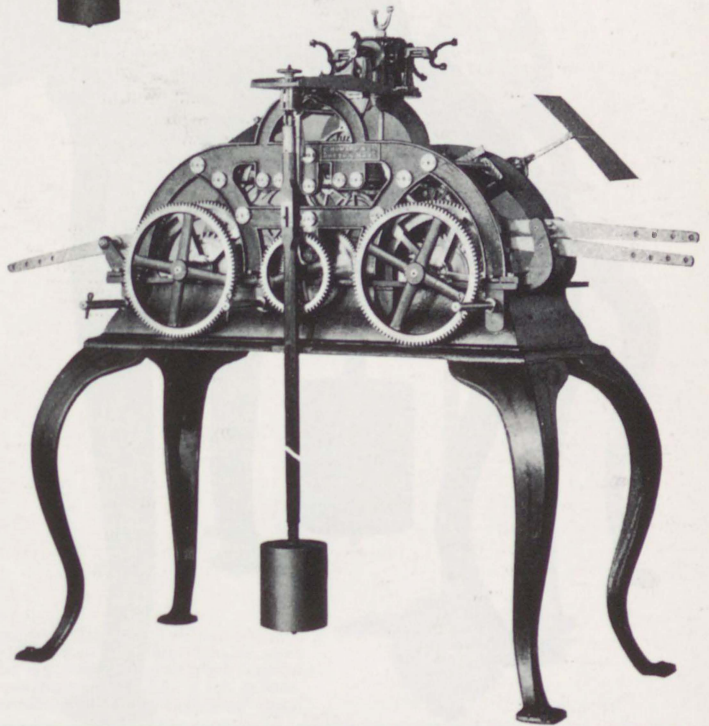
## Hour—Quarter Strike—Or Full Chimes

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This type, a QUARTER STRIKING TOWER CLOCK, is made in four different sizes for dials ranging from 3 feet up to 15 feet in diam.; they are made to strike hours on bells from 500 pounds up to 8000 pounds weight—and Quarters can be struck on two bells; or Westminster Chimes on four bells, corresponding in weight with the hour bell used.

*Reference can be made to many of these installations.*



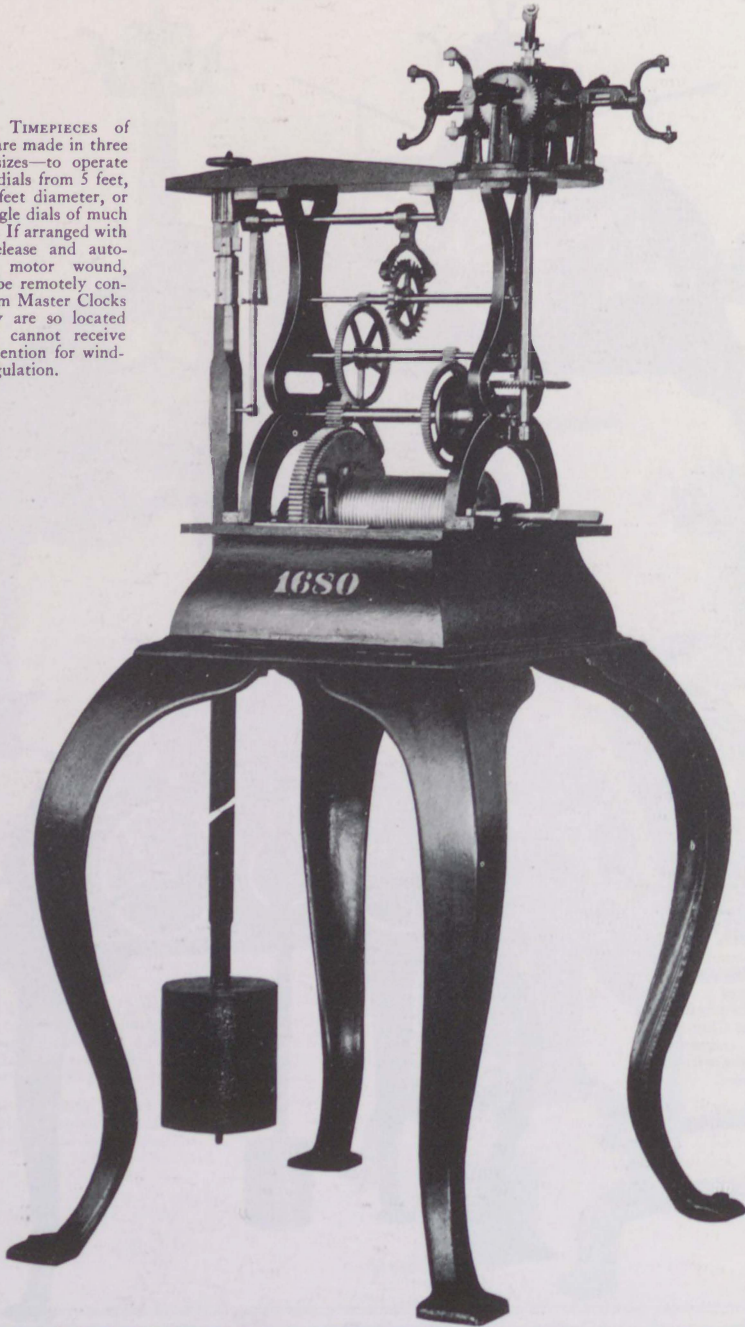
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*All Clocks Can Have Short Pendulums if Necessary*

## *Timepiece Only*

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TOWER TIMEPIECES of this type are made in three different sizes—to operate hands on dials from 5 feet, up to 15 feet diameter, or handle single dials of much larger size. If arranged with electric release and automatically motor wound, they can be remotely controlled from Master Clocks when they are so located that they cannot receive weekly attention for winding and regulation.



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*Made in Sizes to Suit Conditions*

*Smallest Regular Striking Tower Clock Made*

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This small size STRIKING TOWER CLOCK has a capacity of four dials up to 5 feet diameter, and a bell under 600 pounds weight. When supplied with automatic motor winding it can be completely installed in a comparatively small space.

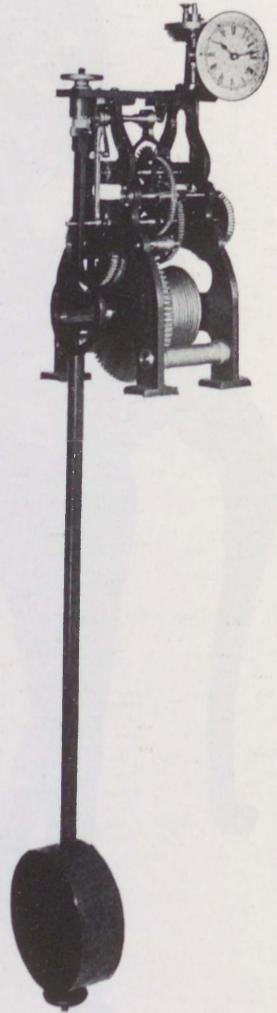
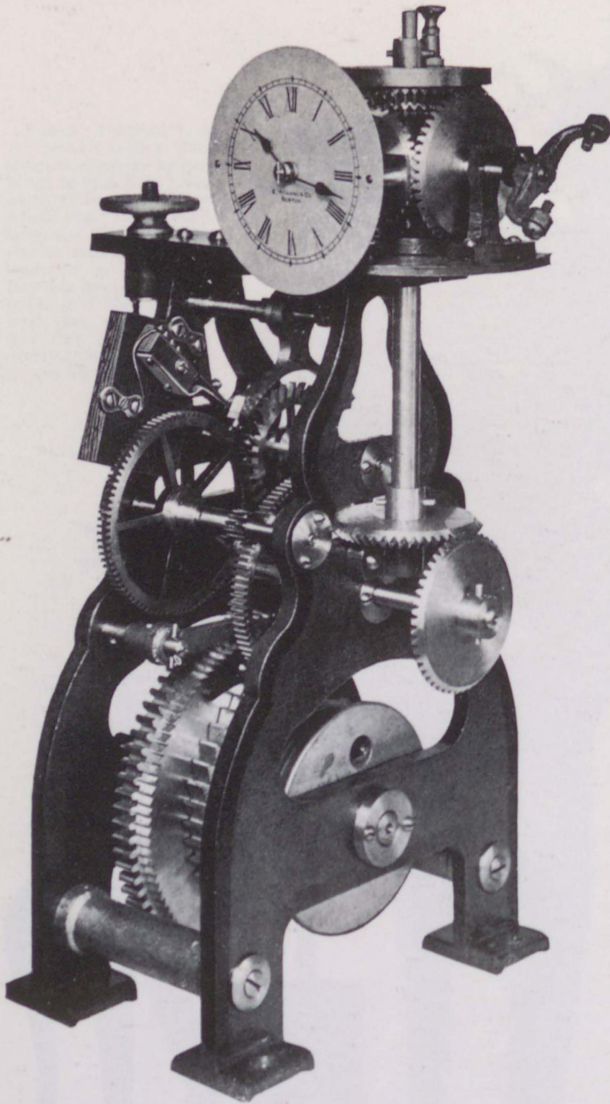
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*For Use Where Space is Limited*

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## *A Small Timepiece*

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This small size TOWER TIMEPIECE is made up to use in Post or Street Clocks, and for single, double, or four-dial installation, where dials are 48 inches or less in diameter. With protected dials and equipped with minute contact, it makes an excellent master clock for School or Municipal Buildings. Can be mounted on Bench, Shelf or Stand, and made automatic motor wound, and enclosed in small cupboard.

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*Circuit Closers May be Attached to Any Tower Clock*

# Four Methods of Installation

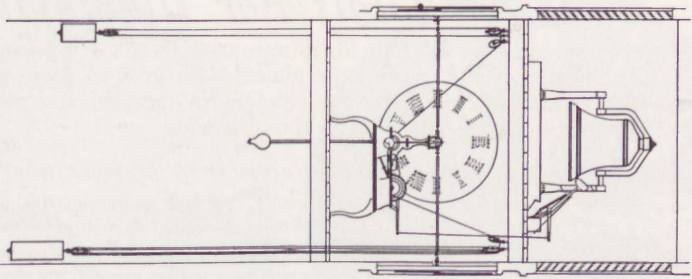


Diagram  
Plate No. One

Showing clock in position with dials opposite the clock, and the bell above clock and dials.

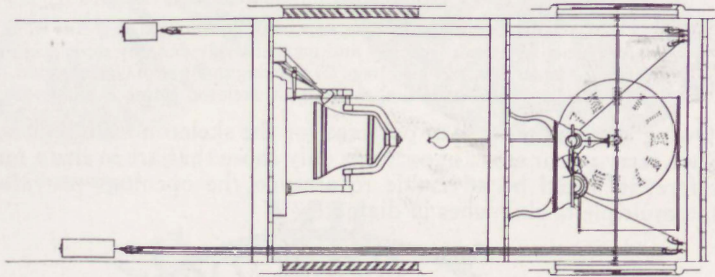


Diagram  
Plate No. Two

Showing clock in position with the dials opposite the clock, and the bell below clock and dials.

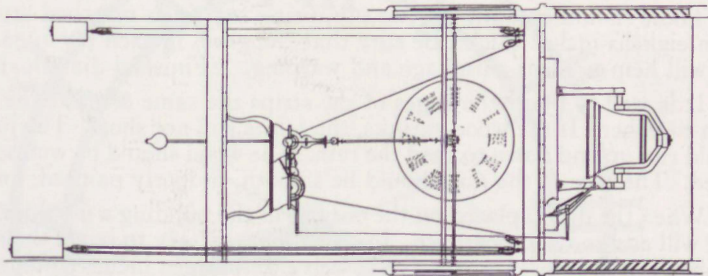


Diagram  
Plate No. Three

Showing clock in position with the dials above the clock, and the bell above the clock and dials.

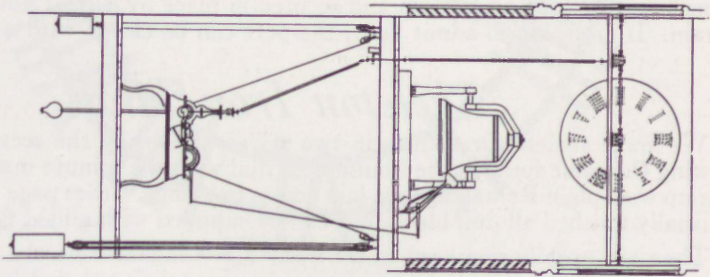


Diagram  
Plate No. Four

Showing clock in position with the dials above the clock, and the bell between clock and dials.



## *Dials of all Kinds*

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### *Glass Dials For Illumination*

**W**E recommend that all dials for illumination over forty-two inches in diameter be of the skeleton iron frame type glazed with ground plate glass. The expansion and contraction caused by the changes in temperature materially increase the liability of breaking large single-piece glass dials.

*The advantages of using the skeleton iron frames are:*

*First.* The breaking of a section of glass only, makes it quite inexpensive to replace it, and a section is no more liable to get broken than a dial made from one whole sheet of glass.

*Second.* When figures are painted on the glass they are short-lived, as the storms, heat and cold soon wear them off. Figures, when fastened by cement, are very apt to come off; when fastened on by drilling holes through the dial, the glass is materially weakened.

*Third.* When figures and hands to a sectional illuminated dial are to be painted, or the hands removed, it can be easily and inexpensively done by removing one or more of the outer sections of glass. (See page 23 showing manner of construction.) The method of mounting an illuminated dial made with skeleton frame is shown on page 24.

Owing to great expense of patterns for the skeleton frames on sectional illuminated dials, we carry in our stock of patterns only those that are in size a multiple of six inches. Therefore, it would be advisable to arrange the openings provided in the tower for dials, a multiple of six inches in diameter.

### *Wood Dials*

These should be built up two ply, using four-inch matched stock from one-half to seven-eighths inches thick. Be sure that the grain in each ply runs the opposite way—this will help prevent shrinkage and warping. (Finished dial illustrated page 23.)

It is well to paint the edges of the strips the same color as the dial, before putting them together. If the wood shrinks, the joints will not show. The joints on the face side should run up and down to shed the rain. The wood should be well seasoned and securely nailed. The face of the dial should be smooth, properly painted, and smalted.

When the dial is placed on the outside of the building a moulding around the outside edge will add to its appearance. In case it is necessary to reach the hands any time from the inside of the tower, a port from twelve to fourteen inches square should be cut in the dial about six inches to the right of its center. This port should be closed with a piece of lumber bevelled top and bottom and secured in place by a cleat down the back to keep out rain. If desirable to admit light, the port can be closed with a glazed sash.

### *Skeleton Iron Dials*

We make skeleton iron dials in two styles, one being the sectional cast-iron dial, following the same form as the illuminated dial with the minute marks; the other being made up with plain Roman figures, laid across two rings. (See page 23.) Skeleton dials are usually finished all dull black, but can be supplied with gilded figures.

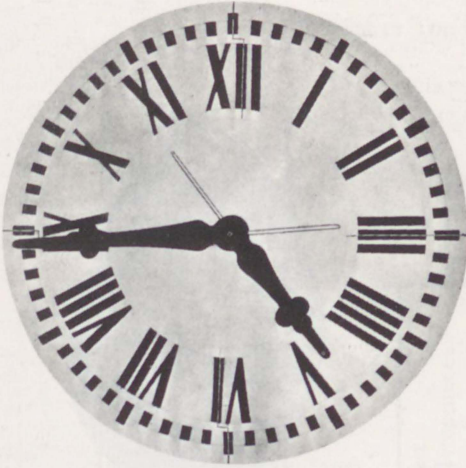
They are usually mounted to set away a few inches from the tower wall, and are generally used where it is desired to have something different and less conspicuous than a plain dial.

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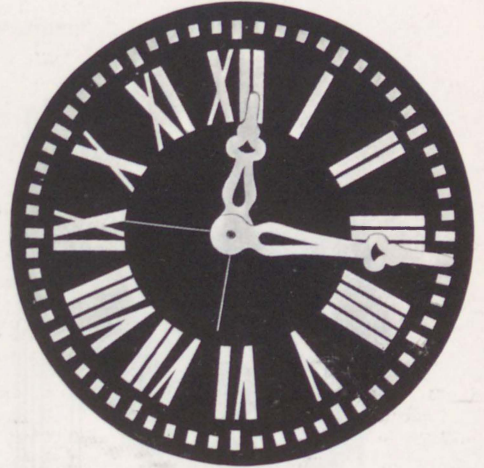
### *Special Dials and Hands*

## Three Typical Dials

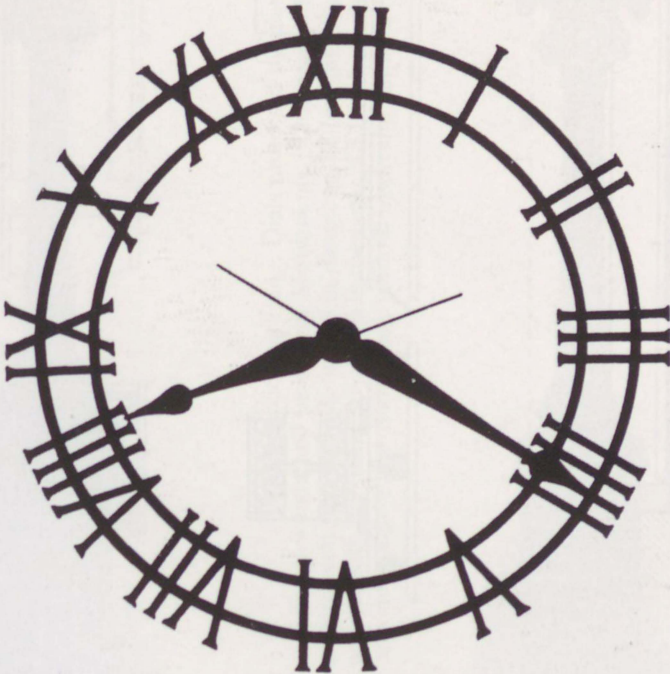
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SECTIONAL IRON AND GLASS DIAL  
FOR ILLUMINATION



WOOD DIAL—BLACK SMALTED BACKGROUND,  
GILDED FIGURES AND HANDS



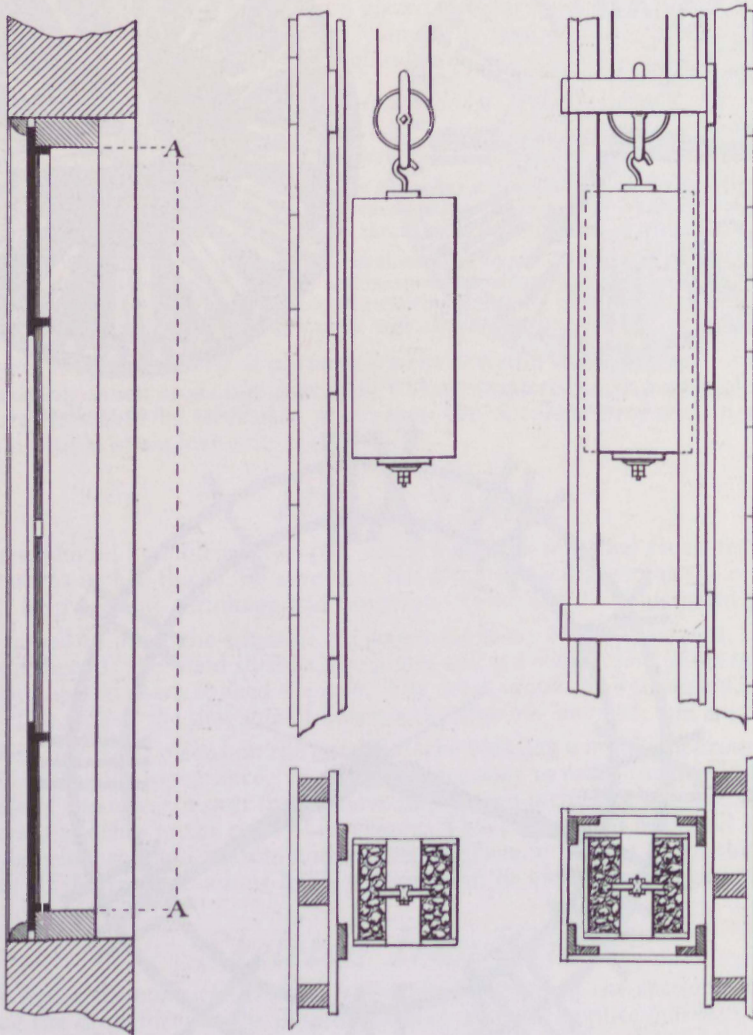
METAL SKELETON DIAL  
USED ON BUILDINGS WHERE NO OPENING HAS BEEN PROVIDED FOR CLOCK DIALS.

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*Special Dials When Required*

# *Typical Dial Installation and Weight Run*

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*Motor Winding Is Very Satisfactory*

# Post or Sidewalk Clocks

Sign or Top Ornament



ILLUMINATED DIAL

Posts of solid cast iron. Dials protected by plate glass.  
Finest weight and pendulum Movements. Guaranteed fine Timepieces.  
One pattern with two dials, 36 inches in diameter, 12 feet high from base to centre of dials.  
One pattern with two dials, 40 inches in diameter, 15 feet high from base to centre of dials.  
The ornament above the dials is left plain to insert the name of firm and number of street.



DAY DIAL

# POST OR SIDEWALK CLOCK

SIGN ORNAMENT



One pattern with two dials, 36 inches in diameter, 12 feet high from base to center of dials.

One pattern with two dials, 40 inches in diameter, 15 feet high from base to center of dials.

The ornament above the dials is left plain, to insert the name of firm, or number of street.

*POST OR SIDEWALK CLOCK*

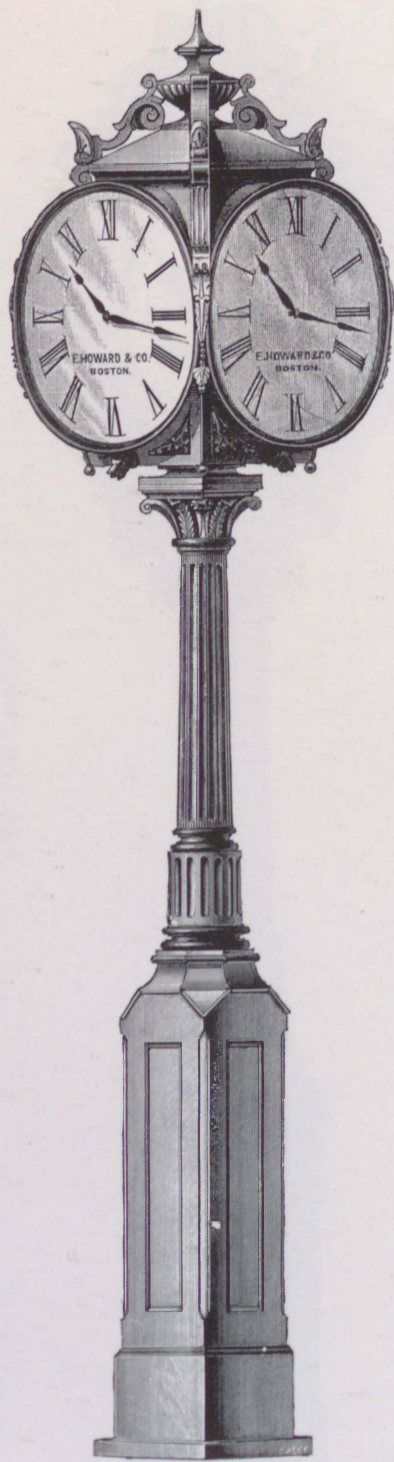
*FANCY TOP ORNAMENT*



One pattern with two dials, 36 inches in diameter, 12 feet high from base to center of dials.

One pattern with two dials, 40 inches in diameter, 15 feet high from base to center of dials.

*POST OR SIDEWALK CLOCK*



One pattern with four dials, 30 inches in diameter, 12 feet high from base to center of dials.

One pattern with four dials, 36 inches in diameter, 15 feet high from base to center of dials.

No. 76 BRACKET CLOCK



This Clock is constructed with the view that it is to be erected in a position where it will be exposed to the weather. It has two iron dials, each 36 inches in diameter, with glass over them. The movement is placed between the dials, and is wound and set without opening the case.

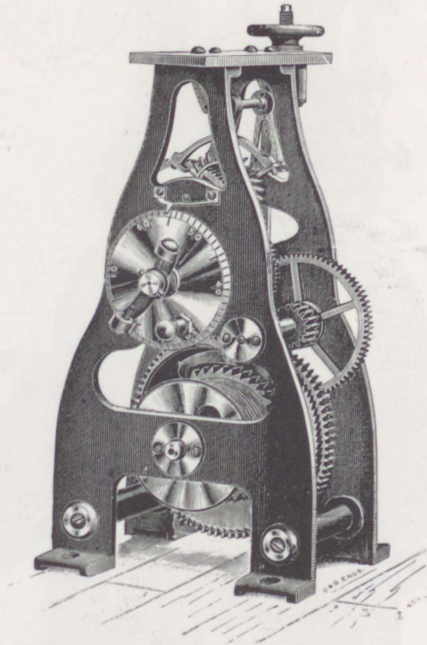


# No. 90 BRACKET CLOCK



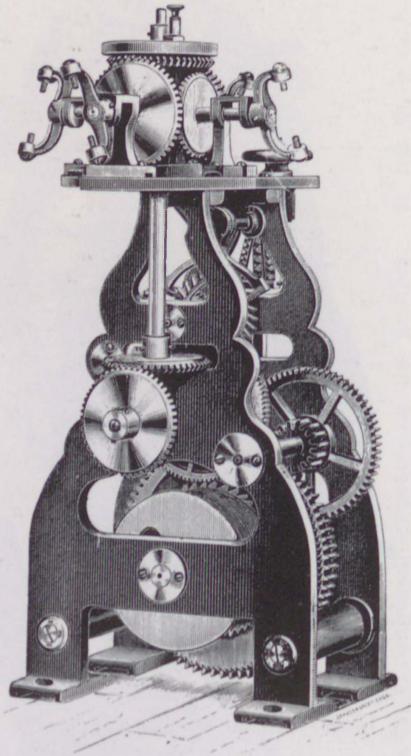
This Clock is constructed to withstand exposure to the weather. It has three dials, two of which are 36 inches, and one 20 inches in diameter, each protected by French plate-glass. The hands to the three dials are all driven by the same movement, located between the two largest dials. It is wound and set without opening the case.

## *TIMEPIECE*



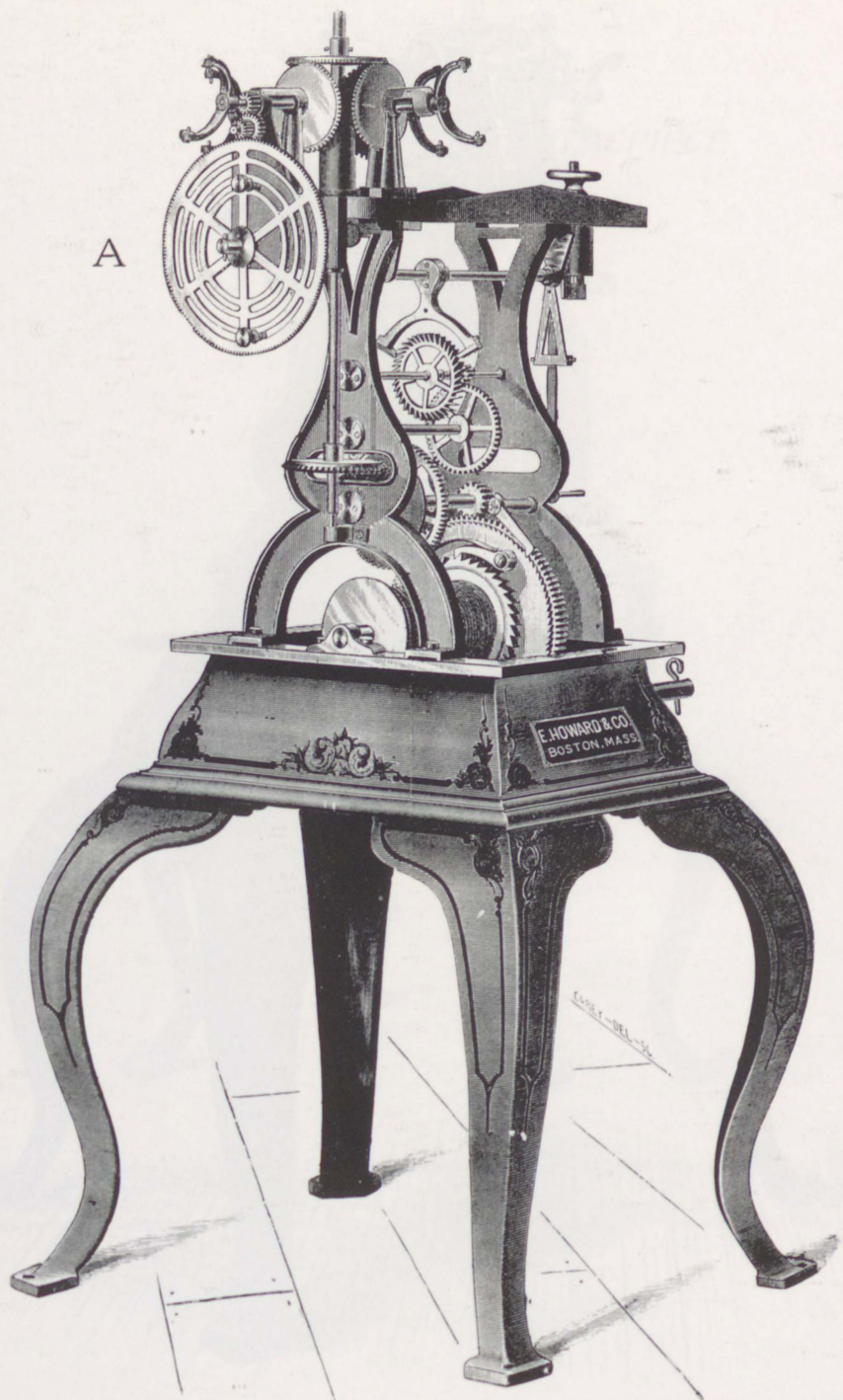
This Clock is adapted to driving the hands to one dial only. By special construction, however, of some of its parts, it can be made to drive the hands to four dials. Its capacity is to drive the hands to dials as large as four feet in diameter when protected from the weather, or three feet in diameter when exposed.

## *TIMEPIECE*



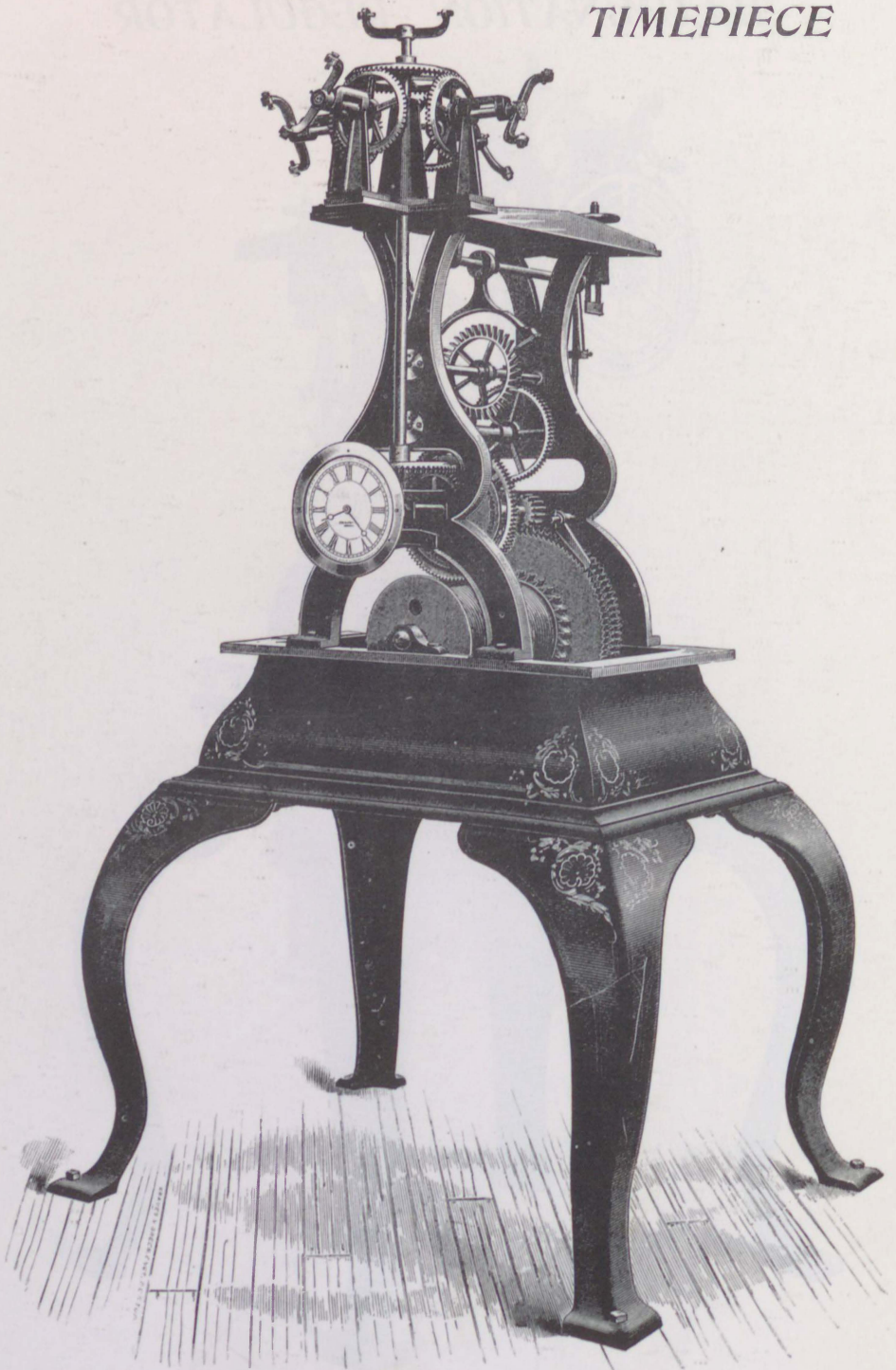
This model of movement is designed to drive the hands to dials as large as five feet in diameter.

# ILLUMINATION REGULATOR



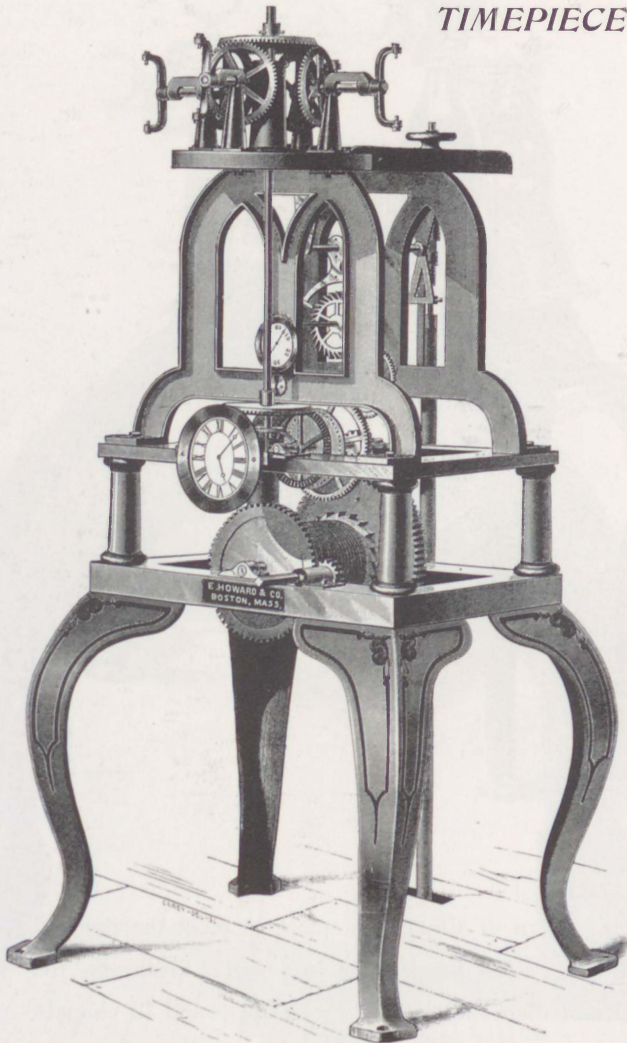
In the above cut at "A" is shown the Illumination Regulator attached to a movement.

# TIMEPIECE



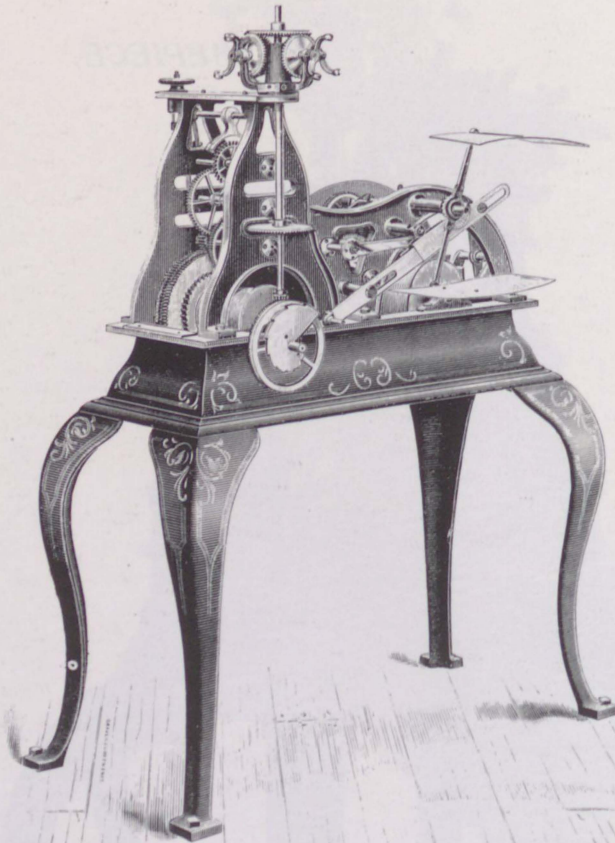
Of this and similar models, there are several sizes and grades, adapted in their capacities to driving the hands for dials ranging from 3 feet to 15 feet in diameter.

## *TIMEPIECE*



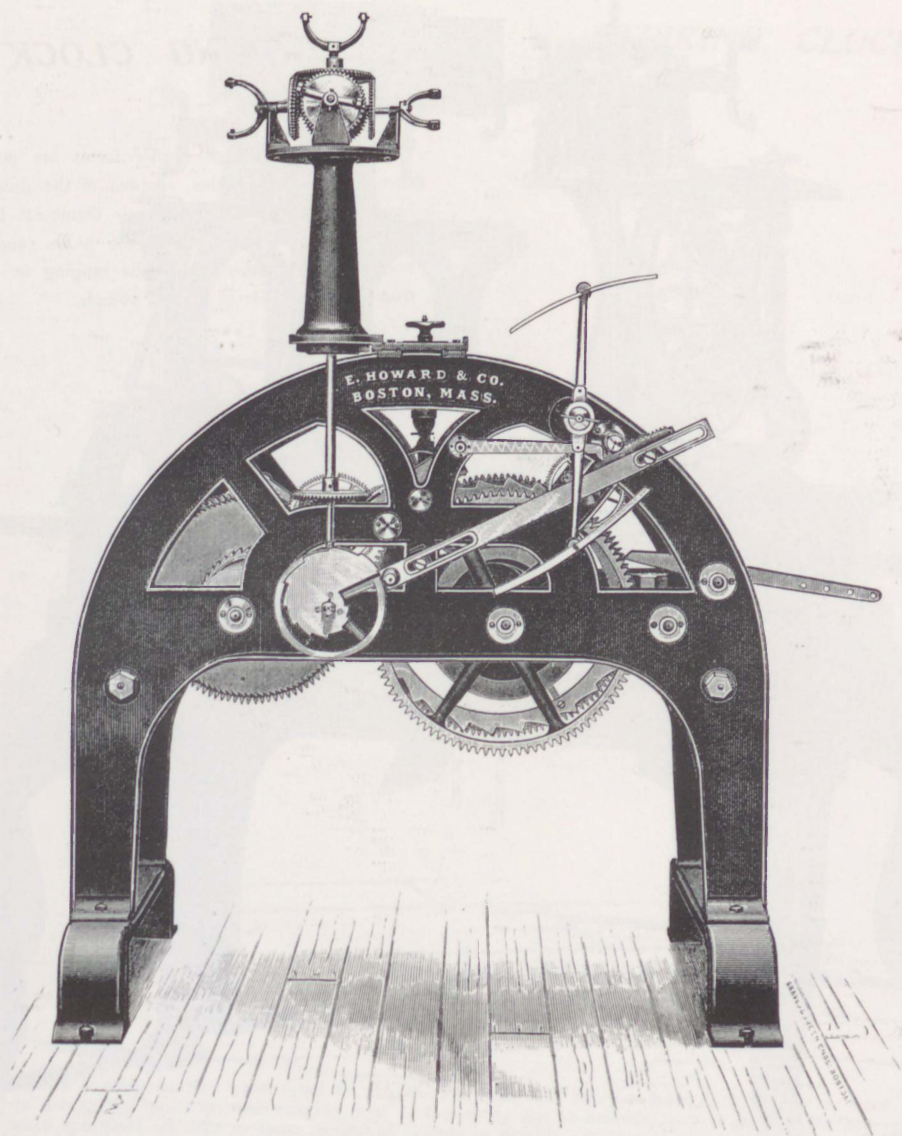
This Clock is made so strong and rigid that it will stand loading to the safety point of the cord on which the weight is suspended. This Clock is extra large and heavy in all the parts where strength and size are required to do good service where large dials are required, and will give continued good service with dials as large as 25 feet in diameter, when the conditions are not unfavorable. It is governed by a two-seconds' pendulum, and is a remarkably fine time-keeper.

## STRIKING CLOCK



This pattern of Clock was made to meet the demand for a striking clock adapted in size and capacity to the room, size of dials, and bells such as are found in chapels, and on private estates. Its capacity is to operate the hands to dials ranging in size from 24 inches to 48 inches, and to bring the tone out of bells weighing from 200 pounds to 450 pounds.

# STRIKING CLOCK

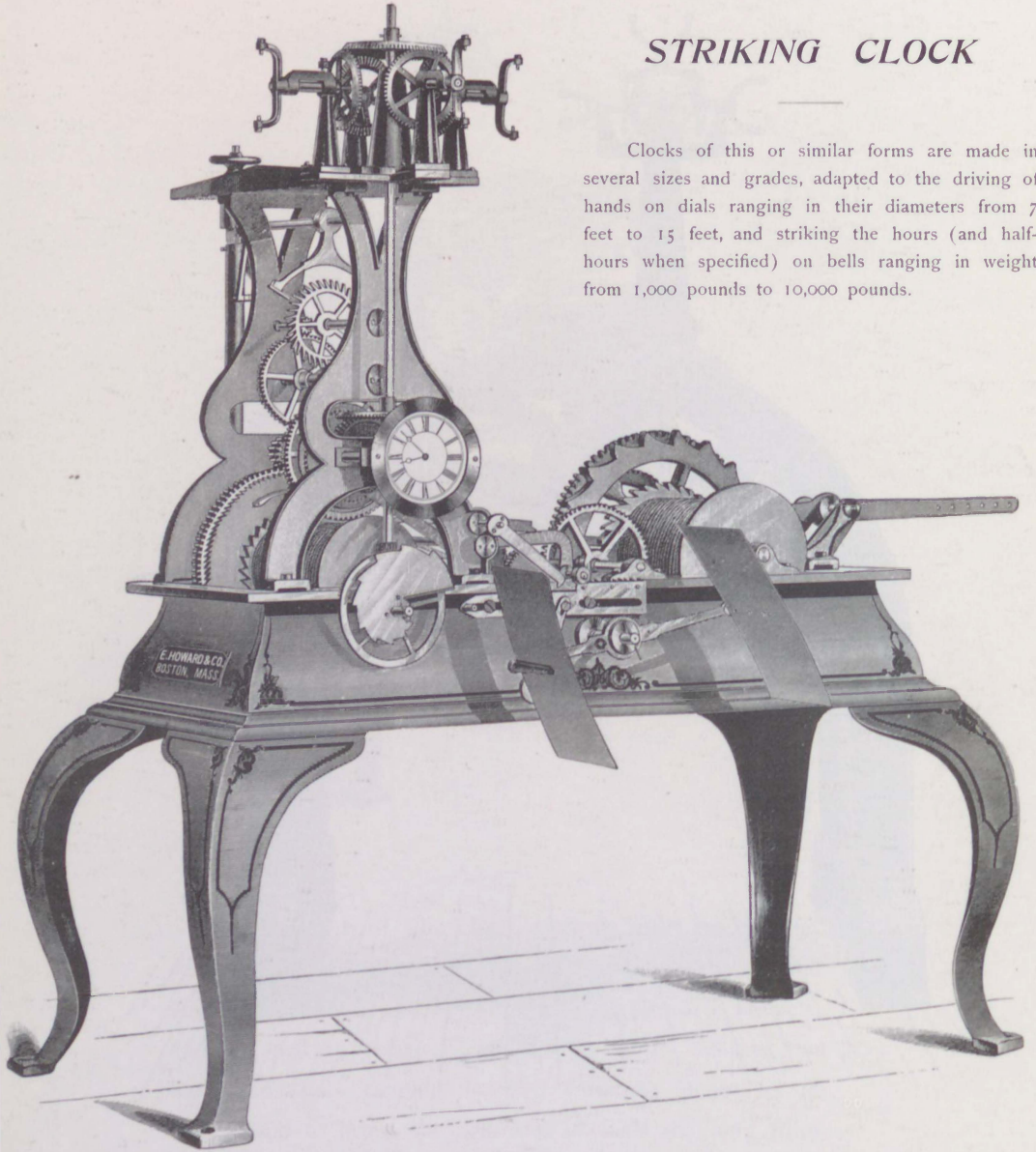


Clocks of this or similar forms are made in several sizes and grades, adapted to the driving of hands on dials ranging in their sizes from 4 feet to 8 feet in diameter, and striking the hours (and half-hours when specified) on bells ranging in weight from 500 pounds to 2,500 pounds.

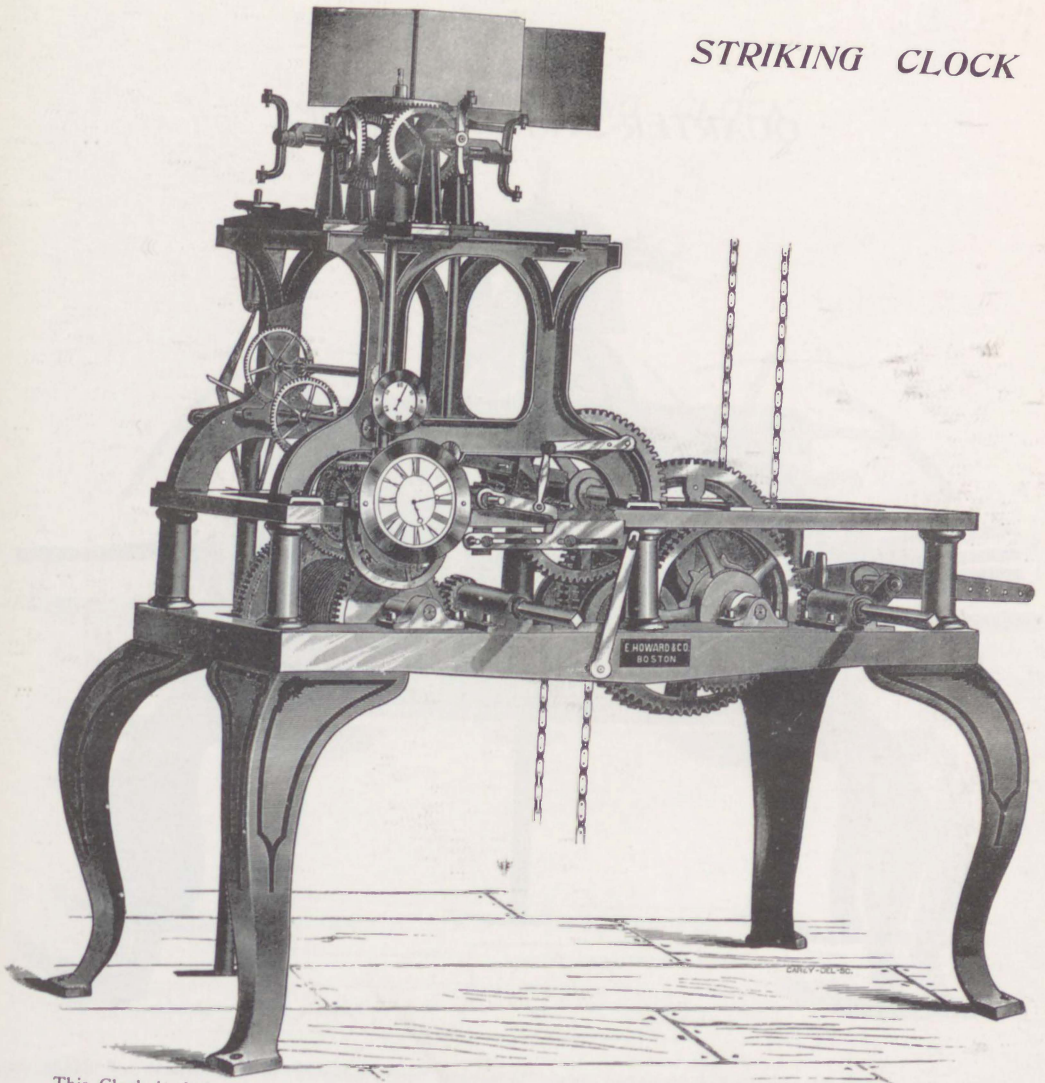


## STRIKING CLOCK

Clocks of this or similar forms are made in several sizes and grades, adapted to the driving of hands on dials ranging in their diameters from 7 feet to 15 feet, and striking the hours (and half-hours when specified) on bells ranging in weight from 1,000 pounds to 10,000 pounds.

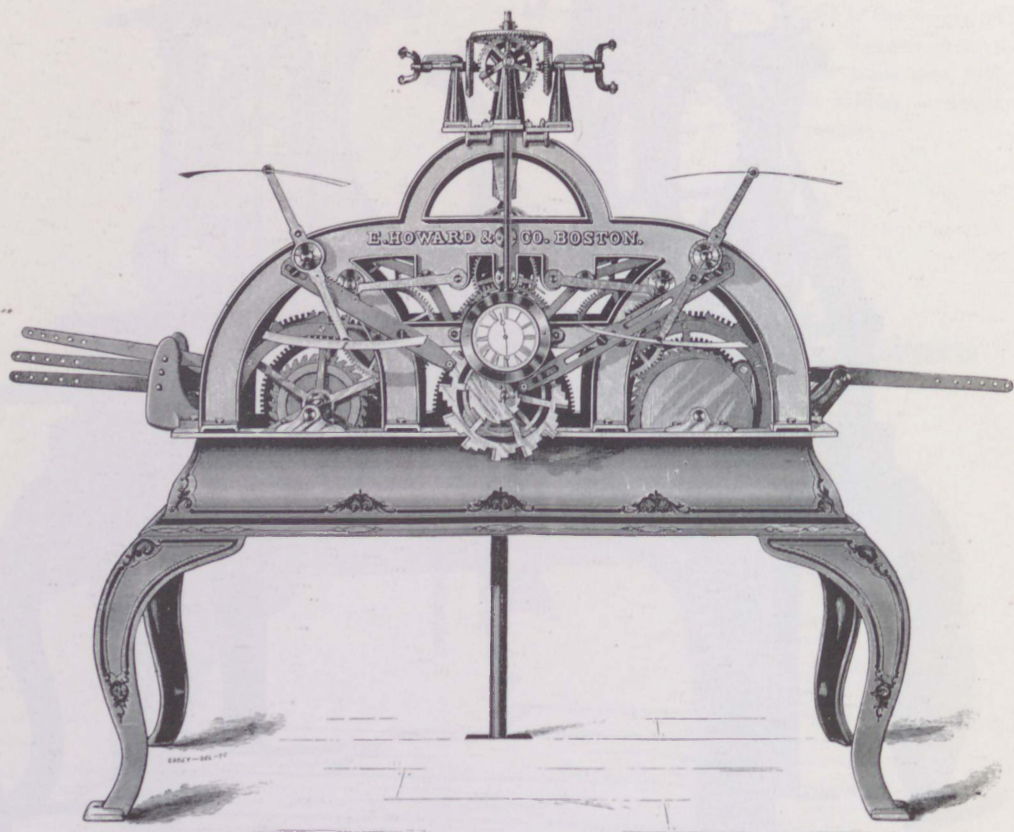


## STRIKING CLOCK



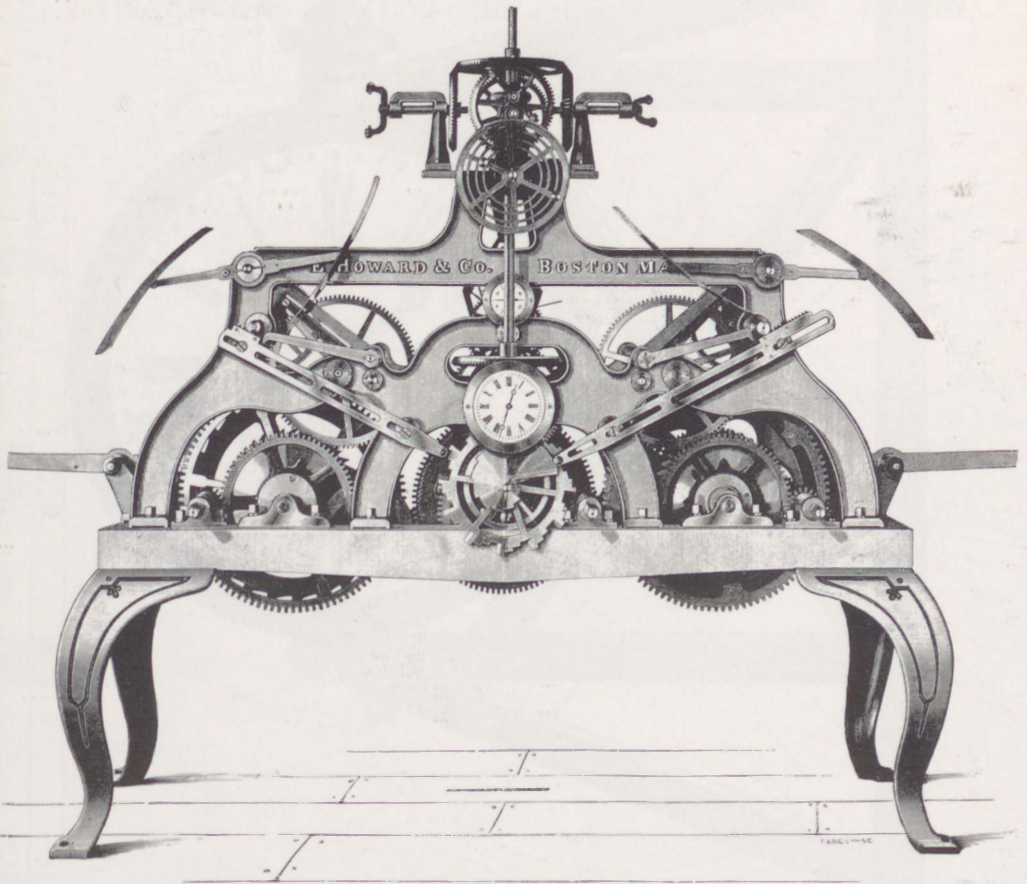
This Clock is designed and constructed for the heaviest work that has yet been demanded of a clock, and is adapted to driving the hands on dials ranging from 12 feet to 25 feet in diameter, and to striking the hours (and half-hours when specified) on bells as large as 10,000 pounds in weight. It is so arranged that by a special construction of the striking part it will bring the full tone out of a 15,000-pound bell.

## QUARTER-STRIKING CLOCK



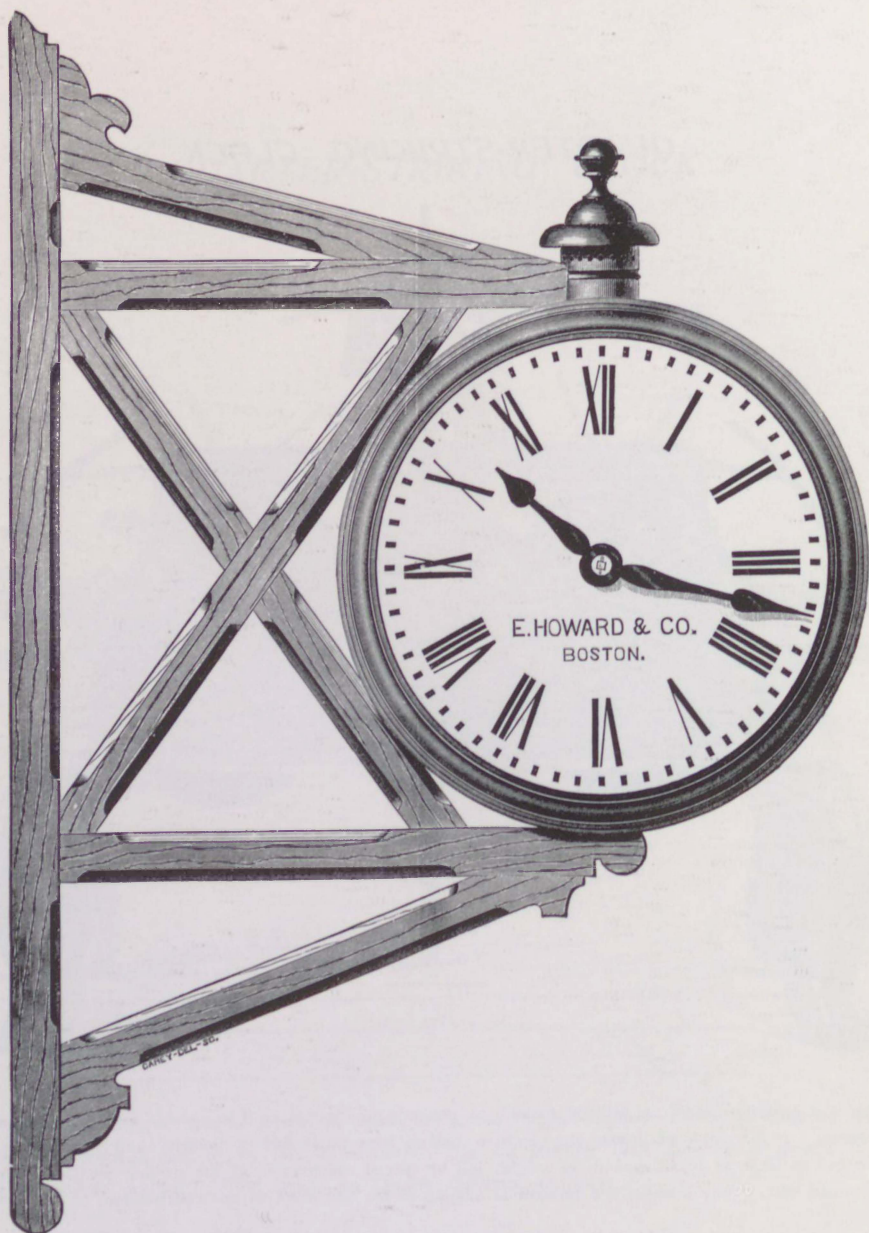
Clocks of this or similar forms are made in several sizes, adapted to the driving of hands on dials ranging from 2 feet to 15 feet in diameter, and for striking bells ranging in weight from 150 pounds to 10,000 pounds. (See article on Quarter Strikers, on page 8.)

## QUARTER-STRIKING CLOCK



This is a powerful Clock, and without doubt is as perfect a time-keeper as it is possible for human ingenuity and skill to devise. It is capable of driving the hands to dials as large as 25 feet in diameter, and bringing out the full tone of a bell as large as 10,000 pounds in weight, and by special construction of the striking part will fully vibrate a 15,000-pound bell. (See remarks and testimonial relating to the first clock of this construction, on page 76.)

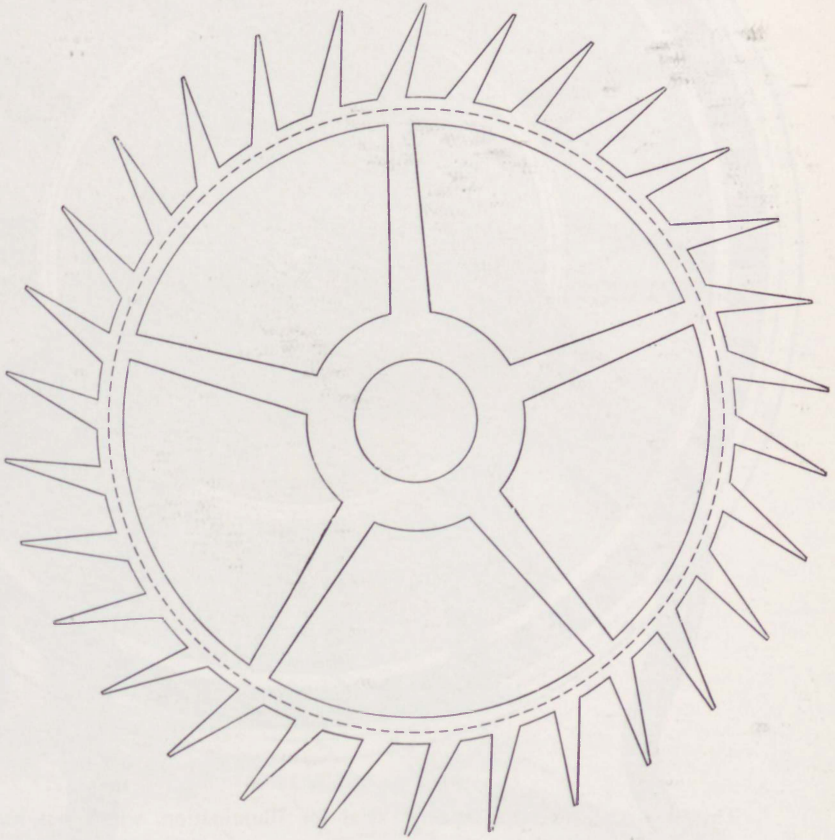
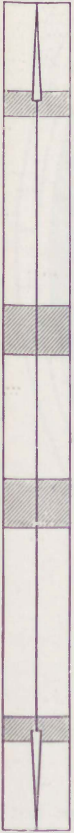
## No. 78 BRACKET CLOCK




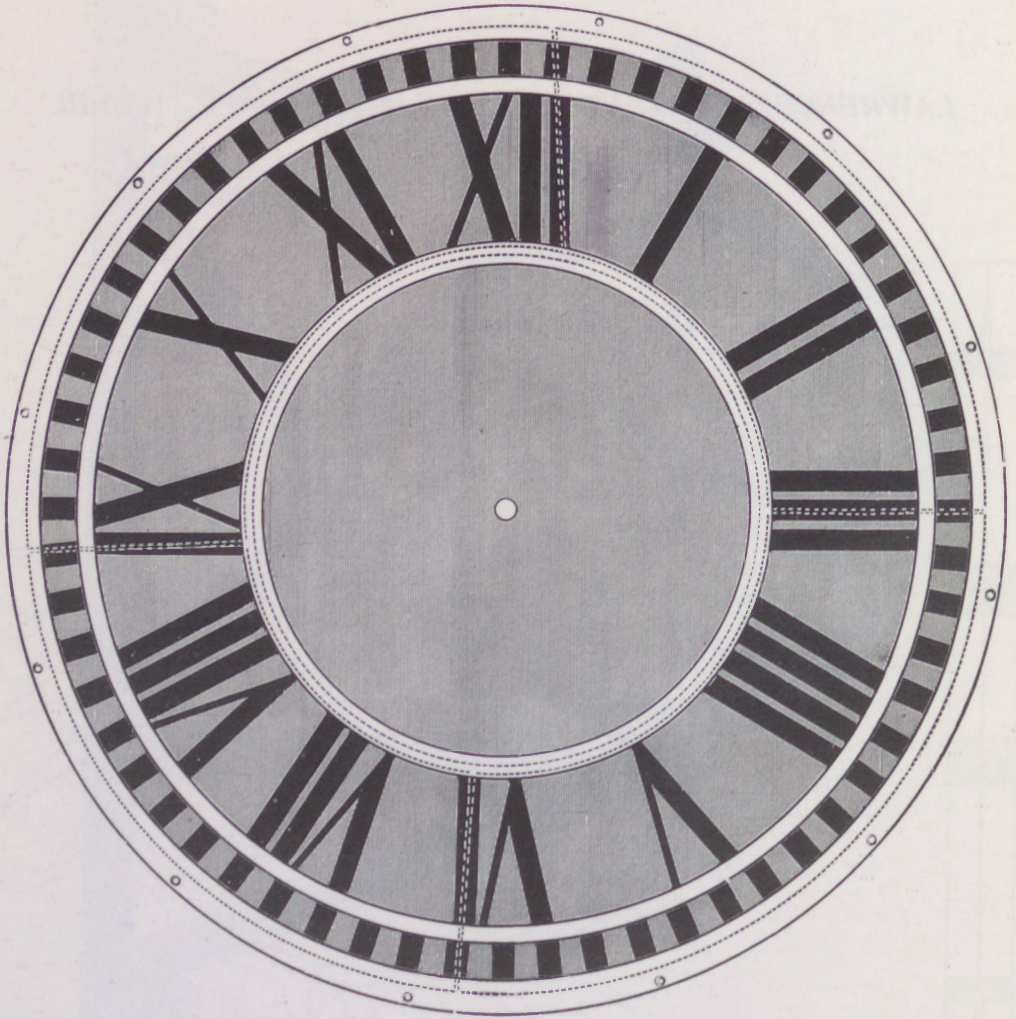
This Clock is constructed with two dials, 36 inches in diameter, and the hands are driven by a timepiece located within the building on which the bracket is mounted. It is specially designed for places where it is not exposed to storms, as the dials are not protected by glass. It is subject to a wide variation in the size of its dials.

**LAWRENCE'S PATENT SELF-OILING ESCAPE WHEEL**

*Patented July 10, 1883*

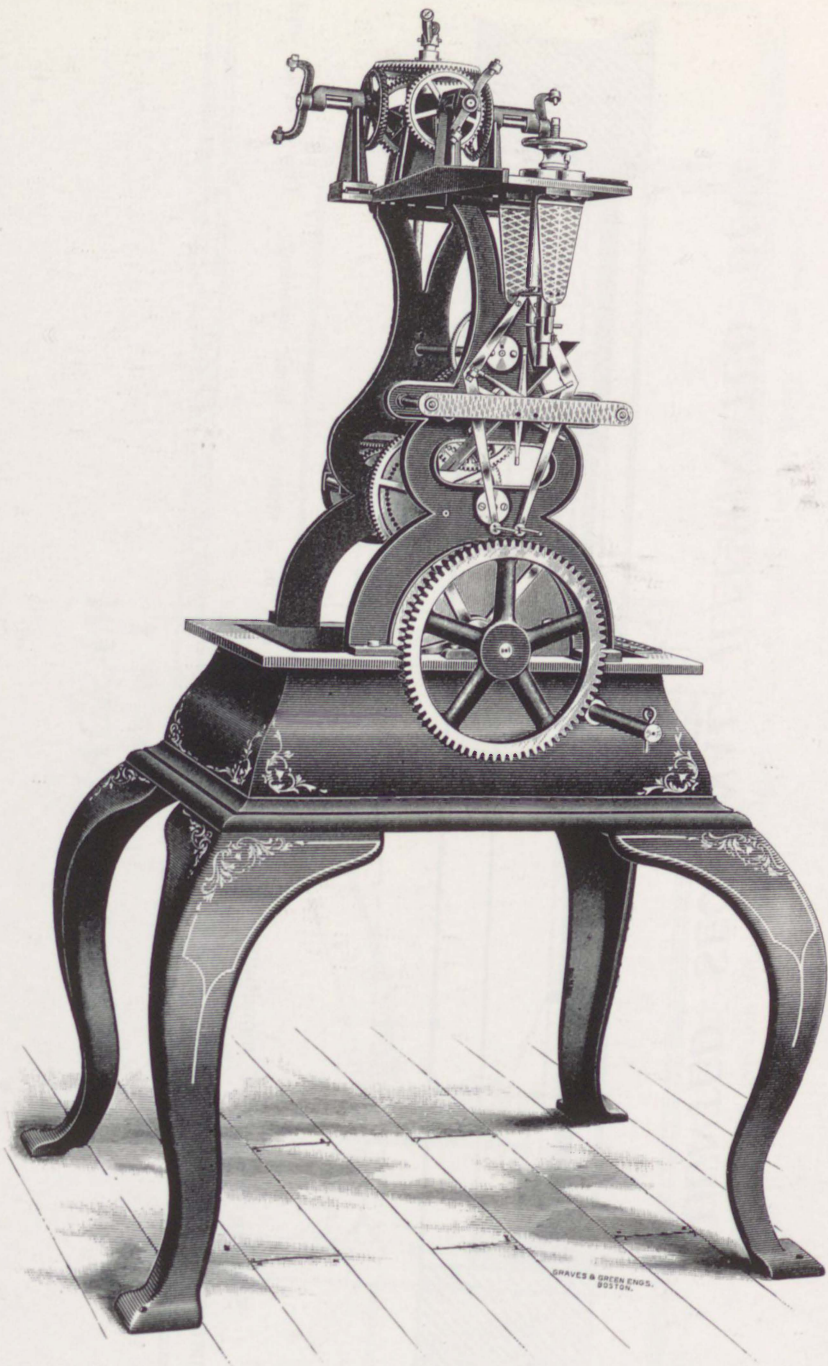


 The sizes of the dials given in the price list refer to the measurements between these points.



This cut represents our special Dial for Illumination, which has many advantages not found in dials made of thick glass in a single plate.

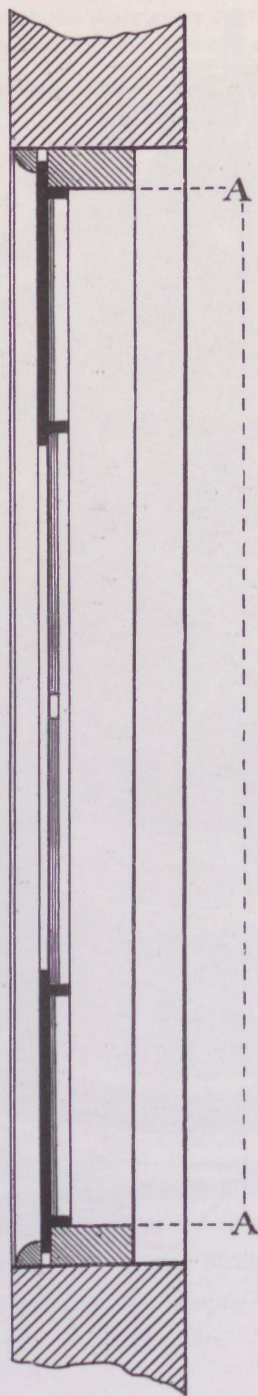
We manufacture these dials in sizes ranging from three feet six inches upwards, each increase in size being six inches or its multiple. (See page 6.)



The above cut shows the Dennison Gravity Escapement as applied to a Timepiece.



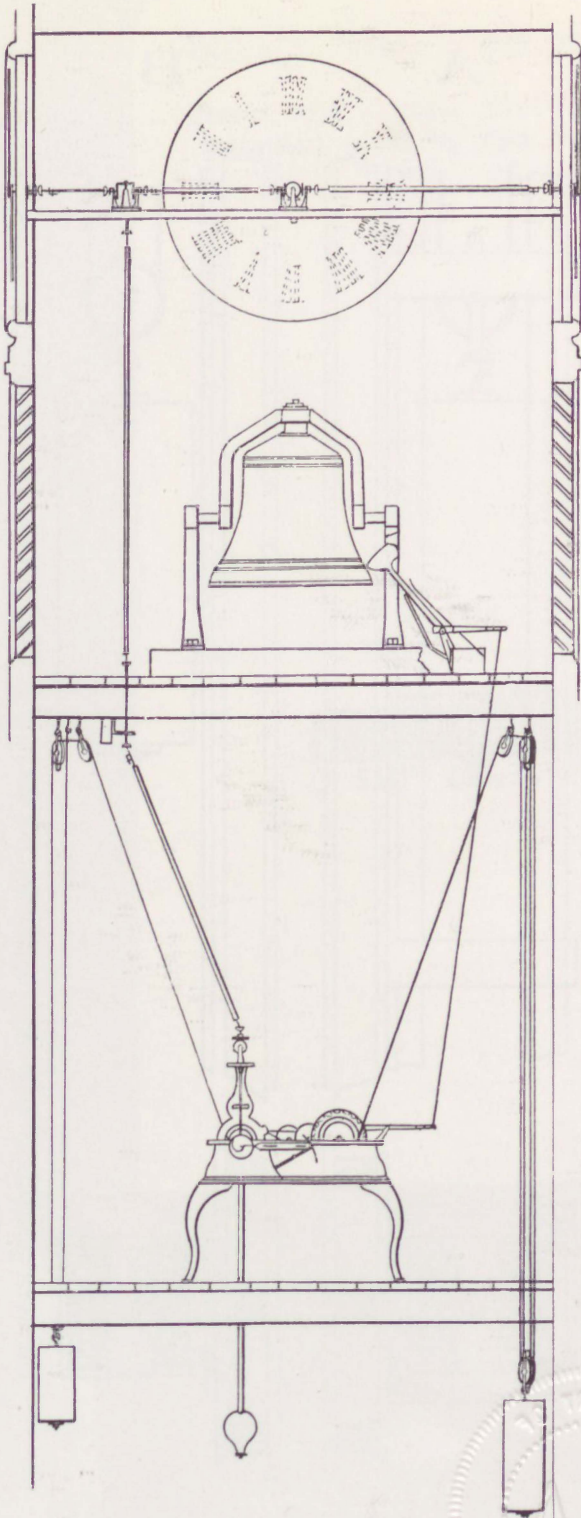
# MOUNTED SECTIONAL ILLUMINATED DIAL



Showing method of mounting a sectional illuminated dial in a stone or brick opening. The seating and quarter-round moulding to be of wood.

# DIAGRAM

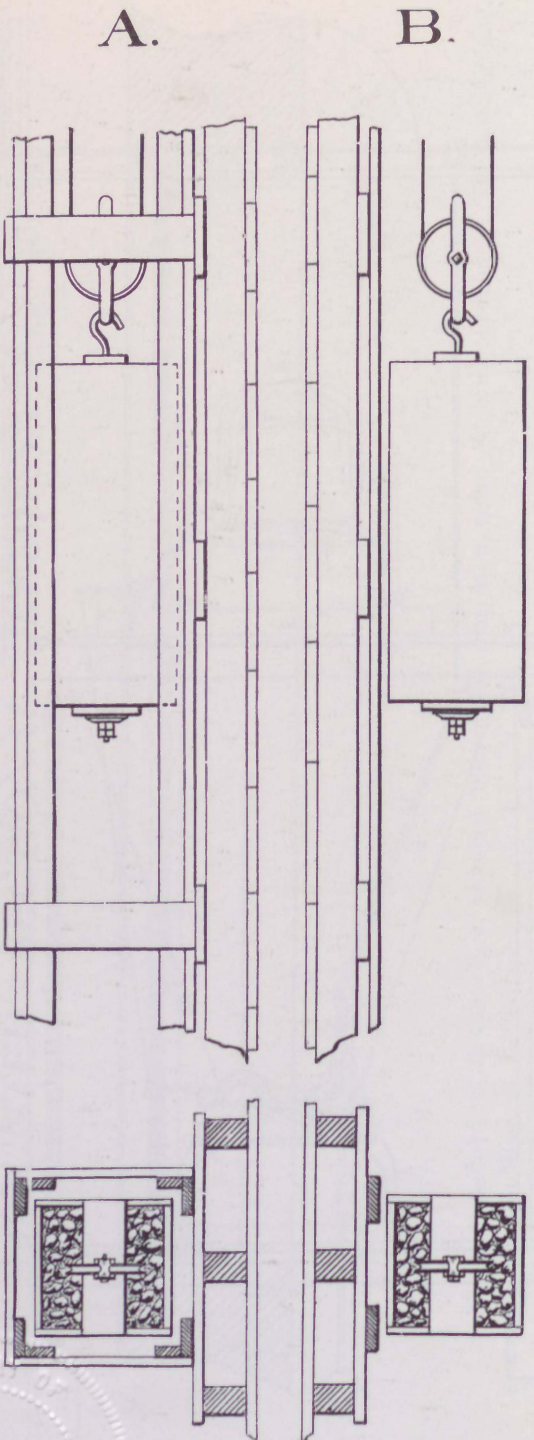
PLATE No. 4



Showing Clock in position with the dials above the clock, and the bell between clock and dials.



# WEIGHT RUNS



The usual manner of constructing guides for the weights, and also the manner of making and mounting the weights when made of boxes filled with sand, stones, or bits of iron, is shown in the accompanying cut.



