No. 870,917. PATENTED NOV. 12, 1907.

E. WESTON.

FACTORY BUILDING.

APPLICATION FILED NOV. 2, 1901.

2 SHEETS—SHEET 1.

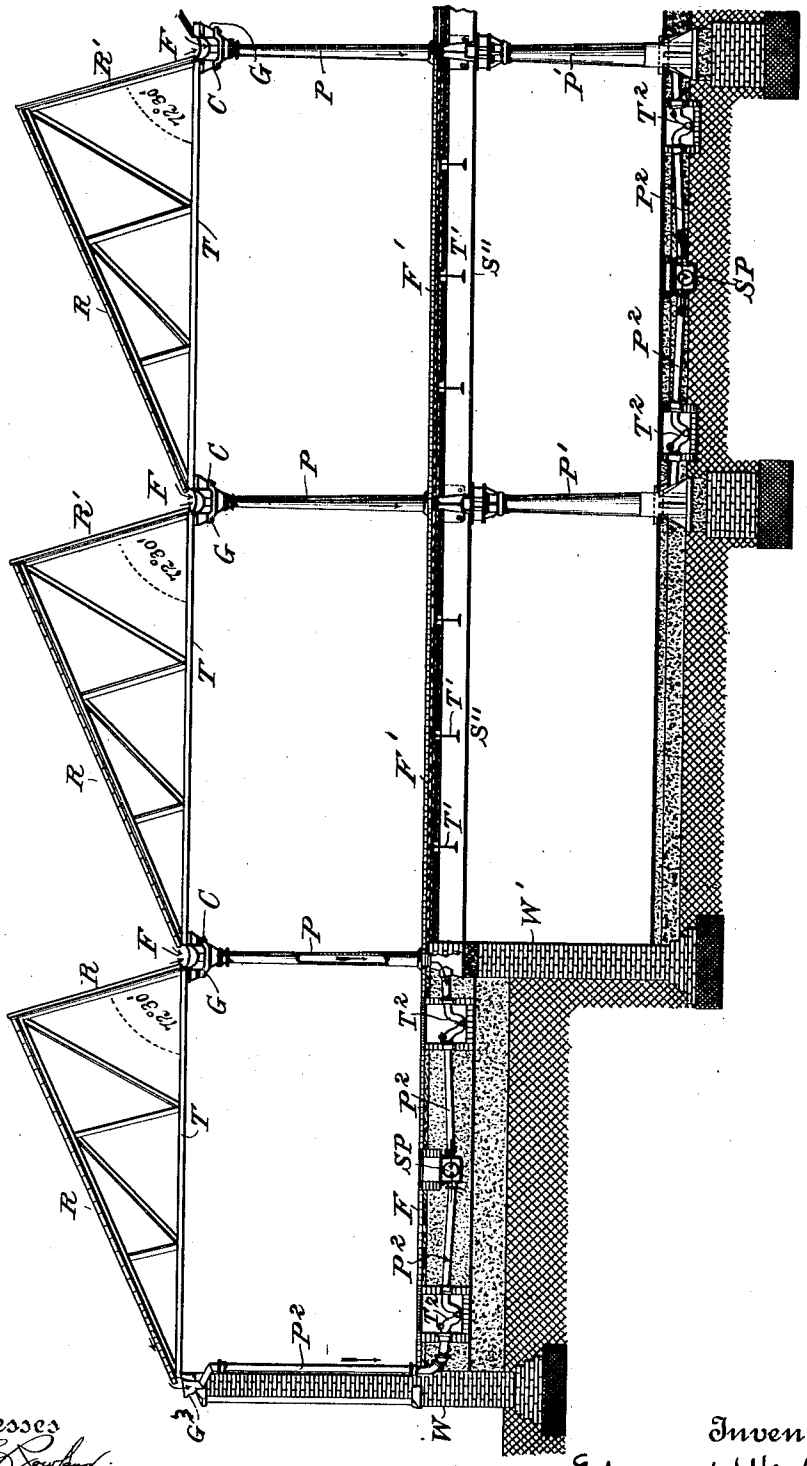


Fig. 1.

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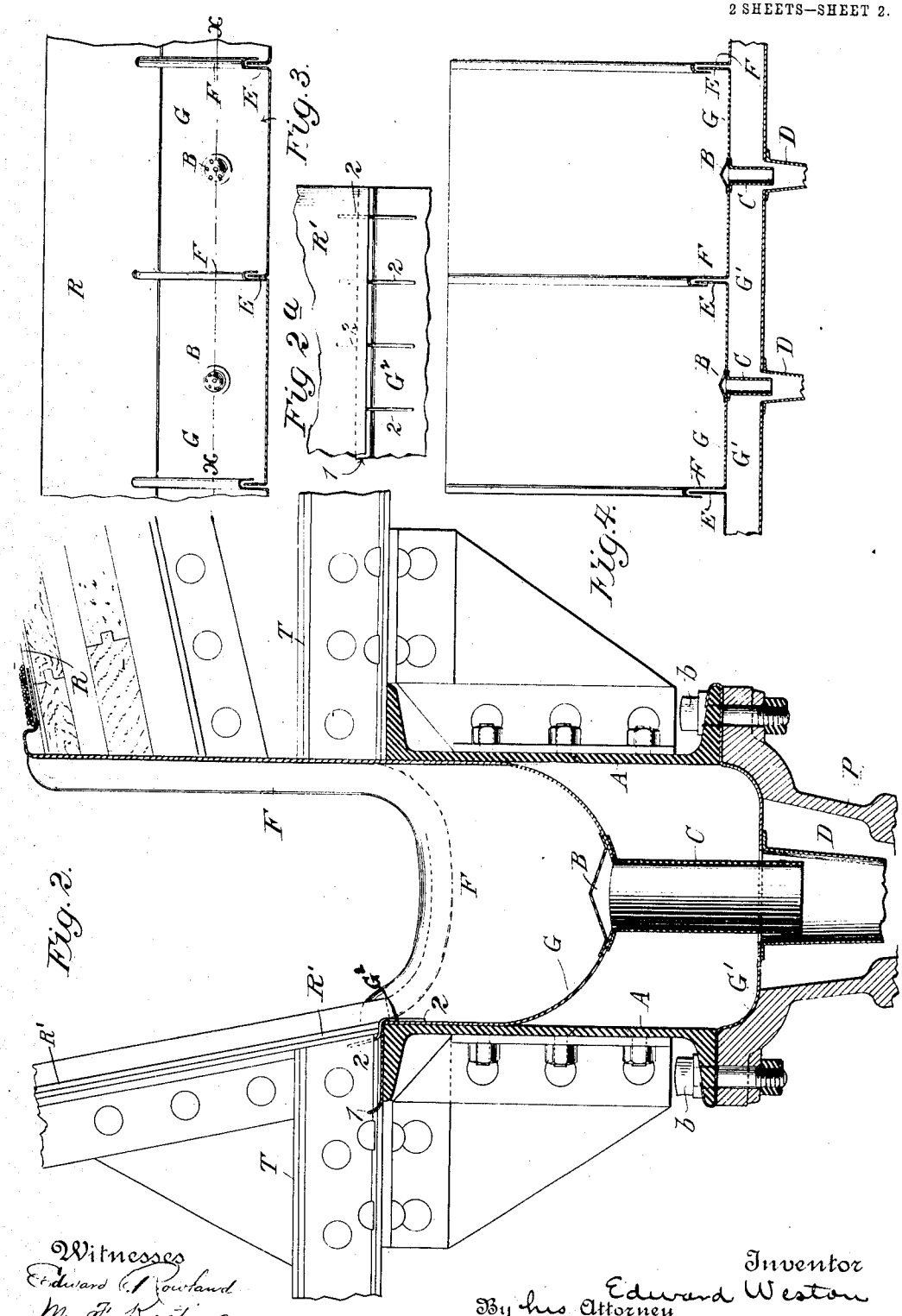
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UNITED STATES PATENT OFFICE.

EDWARD WESTON, OF NEWARK, NEW JERSEY.

FACTORY BUILDING.

No. 870,917. Specification of Letters Patent. Patented Nov. 12, 1907.

Application filed November 2, 1901. Serial No. 81,201.

To all whom it may concern:

Be it known that I, EDWARD WESTON, a subject of the King of Great Britain, residing at Newark, in the county of Essex and State of New Jersey, have made a new and useful Invention in Factory Buildings, of which the following is a specification.

My invention has for its objects:—First, to provide means for the drainage of the roofs of buildings of the "saw tooth" type and in such manner as to distribute the same at numerous points beneath the roof, thereby practically proportioning the individual drainage gutters and pipes of the system to the amount of water that each section of the roof is expected to receive during a maximum rain fall. Second, to so locate all of the drainage pipes of such buildings that they are practically wholly within the interior thereof and, therefore, not subjected to the effects of radical changes of temperature, particularly in winter time when any water which might stand in them would freeze. Third, to provide means for conveying away any moisture which may condense on the inner surface of the roof of a building so as to prevent damage from drip thereof. Fourth, to provide supplemental gutters, beneath the roof-gutters, located wholly within the building and so arranged that there is no danger of over-flow into the building from the roof-gutters, and also that all tendency to interior drip from condensation is avoided.

For a full and clear understanding of my invention such as will enable others skilled in the art to construct the same, reference is had to the following specification and accompanying drawings, in which

Figure 1 is a longitudinal sectional view taken through a part of a building of what is known as the "saw tooth" type, some of the essential features of novelty of my invention being illustrated as applied thereto, the supporting pillars and roof-trusses being shown in elevational view, one of said pillars being broken away about its middle for the purpose of showing its hollow construction and its connection with the drainage pipes of the building. Fig. 2 is an enlarged detail view illustrating the essential feature of my novel form of duplex or double gutter and also the manner of supporting the same upon two channel irons and the upper end of one of the hollow supporting pillars or posts of the building, said parts being shown in sectional view; the ends of two adjoining roof-trusses resting upon the upper surfaces of the channel irons, together with angle irons for securing them to the channel irons being shown in elevational view. Fig. 2^a is an enlarged detail plan view illustrating my novel means for carrying or conveying away to the gutters any moisture which may condense on the inner surface of the roof of a building and in such manner as to prevent damage from drip. Fig. 3 is a detail plan view illustrating my novel form of expansible gutter. Fig. 4 is a sectional view taken on the line x—x Fig. 3 illustrating also the arrangement of the duplex or double gutters shown in enlarged transverse sectional view in Fig. 2.

Referring now to the drawings in detail W, W^1 represent respectively the walls of a one story building of the "sawtooth" type with a basement, and P, P, P, P^1, P^1, P^1, are hollow supporting pillars or posts for the lower members T of the roof-trusses and the floor F^1. T, T^1 being metal joists which are supported by horizontal beams S″ S″ on the top of the pillars or posts P^1.

R, R, R, represent the roof and R^1, R^1, R^1 illuminating areas of the building, all supported directly by the trusses T, the valleys between the roof and illuminating areas affording the necessary drainage to the roof gutters, as will be described later on. The building, as is customary with this type, stands with the illuminating areas R^1, R^1, R^1 of the roof facing the north and said areas are so proportioned preferably as to give the desired illuminating effects for the floor space F^1 to be illuminated, it being essential in the use of my invention that the angle of the illuminating areas R^1 with the horizon shall be substantially equal to the height of the sun on the 21st of June in the latitude where the building is constructed, this angle being in a building constructed by me at Waverly Park, Essex county, State of New Jersey, U. S. A. about 72° 30′ as indicated in dotted lines, it being apparent that when these areas are inclined at this angle there is no time of the year at which the direct rays of the sun will enter the building for any important length of time.

I will now describe those features of the building illustrated in the drawings which embody my invention, the same relating to the manner of draining or conveying away the water from the roof.

Referring now to Figs. 2 to 4 inclusive, the adjoining ends of the lower members T of the roof-trusses rest respectively upon channel irons A, A, secured by bolts *b*, *b*, to the upper ends of the hollow pillars or posts P, P, as clearly shown in Fig. 2 of the drawings, and above each line of hollow pillars or posts P, P, between each part of the roof R and illuminating area R^1 constituting the usual valley of this type of buildings, is located my novel form of duplex or double gutter G, G^1, said gutter being constructed preferably of sheet copper, the outer or exposed gutter G having one lateral edge secured between the member T of the roof-truss and the top of one channel iron A, and the other lateral edge thereof under the roof R. This outer or exposed gutter G is made in sections, as clearly illustrated in Figs. 3 and 4 of the drawings. The length of each section corresponds preferably to the distance between the pairs of hollow pillars or posts P, P, P, P, and the ends

thereof overlap each other, as shown at E and F Figs. 3 and 4, so as to render it expansible and, therefore, self adjustable for variable degrees of temperature. The edges of the gutters located under the illuminating roof areas R^1 of the building are turned upward, as indicated at 1, so as to constitute a drainage surface for carrying away the drip of any moisture which may condense upon the inner surfaces of said areas.

G^2, G^2 are copper or similar metal strips, bent as shown in Fig. 2^a, and adapted to rest directly upon the angular edge of the gutter G and beneath the lower edges of the glass of the illuminating areas R^1, 2, 2, 2, being corrugations in said metal strips for the purpose of allowing any moisture which may run down the inner surface of the illuminating areas or which may drip from such areas into that portion of the additional gutter formed by the upturned edge 1 to pass directly into the gutter and be carried away, as will be described later on.

If preferred, in place of corrugated metal strips G^2 I may permit the edges of the illuminating areas to rest directly upon drops of solder on the upper surface of the up-turned portion 1 of the gutter G, thus doing away with the corrugated strips G^2, or short metal rods or wires may supplant the corrugated strips.

C is a downwardly depending nozzle and B a strainer there being one of each of said parts at the middle of each sectional part of the outer or exposed gutter G. The free ends of the nozzles C extend downward into nozzles D in a supplemental gutter G^1, the lateral edges of which are secured between the top of the pillars or posts P and the lower flanges of the channel irons A when the bolts *b* are put in place, the arrangement being such that said supplemental gutter G^1 is located wholly within the building and extends the entire width thereof beneath the outer or exposed gutter G. The hollow pillars or posts P are connected respectively at their lower ends to drainage pipes P^2, P^2 running to sewer pipes SP which in turn are connected to a main or exit sewer, not shown, but connected preferably with the street sewer or outlet. These drainage pipes P^2 are provided with traps T^2 T^2 of well known form located at points beneath the floor and readily accessible, as clearly illustrated in Fig. 1 of the drawings.

It is to be further noted that the pipes P^2 P^2 in the basement are connected directly with the lower ends of the hollow pillars or posts P^1, P^1, the upper ends of which are in alinement with and connected to the lower ends of the hollow pillars or posts P. G^3 represents an exterior gutter for that portion of the roof R at the end of the building, said gutter being connected directly to one of the drainage pipes P^2 running directly to the system, as clearly shown in Fig. 1. This gutter G^3 may, if preferred, be of the same structure as are the other gutters already described, although I have illustrated it in the drawings as of ordinary or well known form, the location of the gutter near the end wall not making it absolutely essential that the same precaution should be taken as to the presence of moisture, as is required in the body of the building proper where the other gutters are located.

As above indicated the sections of the outer or exposed gutter G are preferably of substantially the same length as the distance between the pillars or posts P, the overlapping parts E, F, however, being at the middle of the sections and the strainers B and nozzle C located directly above the upper ends of the hollow pillars or posts P, P, P^1, P^1. The gutters G, G^1 may have a definite pitch or fall in opposite directions to the nozzles C and D, dependent upon the length of the sections. For ordinary purposes, however, where the pillars P, P are not more than 20 ft. apart I find in actual practice that little or no pitch or fall is necessary. This matter, however, will, of course, be regulated by the architect or builder. By thus arranging a series of hollow supporting pillars or posts P, P, P^1, P^1 in a building and distributing them over substantially equal areas thereof and providing a series of drainage gutters located as described, so that the equal surface areas of the roof of the building are provided with drainage means proportional to the areas to be drained, I am enabled to accomplish a result which has not, in so far as I am aware, heretofore been obtained in the drainage of the roofs of buildings; namely, to carry away the water from all parts of the roof in the least possible time and avoid, therefore, any undue collection thereof in the gutters, or any danger of overflow therefrom. Such a system also avoids much of the trouble now due to the freezing of water in the roof drainage systems of existing types of buildings, owing to the fact that the water is so quickly conveyed away after it once reaches the gutters, and also because if the gutters and pipes are proportioned to the largest amount of water which they are at any time liable to be called upon to convey, there will never be a time where water will stand or remain long enough to be frozen. With the arrangement of supplemental gutters G^1 also I accomplish an important result in that I avoid any possibility of damage from leakage or an over-flow from the exterior gutter under any condition of weather and also in that in view of the fact that this supplemental gutter is wholly within the building and; therefore, is of the same temperature as the interior thereof at all times, I avoid absolutely any possibility of drip from condensed moisture upon the surface of the water conveying gutter. I also avoid absolutely any danger of damage from drip due to condensed moisture upon the inner surface of the illuminating areas by conveying such moisture direct to the gutter and to drainage pipes located at various points in the building.

I do not limit my claims to all of the details of construction hereinbefore described and illustrated in the accompanying drawings, nor especially to the use thereof in connection with a building of the "saw tooth" type, as many of the features hereinbefore described might obviously be utilized in connection with building construction generally and individual parts of the structure might be departed from to a certain extent and still come within the scope of my claims hereinafter made. To illustrate, in place of the hollow pillars or posts P, P^1, what is known in the art as latticed pillars, or any well known pillar or support, might be substituted therefor and an ordinary drainage pipe, either inclosed therein or secured thereto and connected to the gutters in substantially the manner hereinbefore described, such matters being well within the skill of those versed in the art. It is also obvious that where the roof structure is made entirely of glass or of such material as would ordinarily condense moisture on the interior thereof, under variable changes of

temperature, my novel arrangement for conveying away condensed moisture may be applied, it being obvious that in the structure shown the portion R, R of the roof being of wood or equivalent material, no condensed moisture would be found on the inner side thereof. This feature of my invention relates generically to means for conveying away all condensed moisture which may accumulate upon the inner surface of the roof of a building and by and through drainage pipes located at various points therein, whether such means be connected in the manner shown and described directly to the gutter G, or to the supplemental gutter G^1.

Having thus described my invention what I claim and desire to secure by Letters Patent of the United States is:—

1. A building of the "saw-tooth" type provided with roof-gutters located in the valleys between the roof sections; and supplemental gutters located beneath said roof-gutters; in combination with means located beneath the lower edges of the illuminating areas for conveying the condensed moisture from the inside of such areas to the gutters, substantially as described.

2. A building of the "saw-tooth" type provided with roof-gutters located in the valleys between the roof sections; in combination with supplemental gutters located beneath said roof-gutters, and means for conveying the condensed moisture from the inner surfaces of the illuminating areas into the roof-gutters; together with hollow pillars or posts for conveying all of the water from said gutters to drainage pipes in the body of the building, substantially as described.

3. A building of the "saw tooth" type having the roof thereof supported by hollow pillars or posts; in combination with roof-gutters constructed in sections with their ends overlapping, said gutters being sustained between channel irons sustained at their opposite ends upon the hollow pillars or posts and with their lower surfaces all in a common plane, the arrangement being such that each section of the roof is provided with means for draining it and so proportioned as to effectually drain it at all times, substantially as described.

4. A building of the "saw-tooth" type having the roof-trusses thereof supported on parallel channel irons or beams sustained at their ends by hollow pillars or posts; in combination with sectional roof-gutters supported between the inner faces of said channel irons and provided with nozzles or openings for discharging the water into the hollow pillars; together with drainage pipes into which the hollow pillars discharge such water, substantially as described.

5. A building of the "saw tooth" type having the roof trusses thereof supported on channel irons or beams carried by hollow pillars or posts; in combination with sectional roof-gutters and supplemental gutters supported also by the channel irons or beams and adapted to receive any over-flow or drip from the roof-gutters, substantially as described.

6. A building of the "saw tooth" type having the roof thereof supported upon channel irons or beams carried by hollow pillars or posts; in combination with sectional roof-gutters and supplemental gutters also supported by the channel irons or beams and adapted to receive any over-flow or drip from the roof-gutters, said supplemental gutters being located wholly within the building, substantially as described.

7. A building having the roof-trusses thereof supported on parallel channel irons or beams sustained at their ends by hollow pillars or posts; in combination with roof-gutters supported between the inner faces of said channel irons; together with drip-gutters, one for each roof-gutter, supported by the lower flanges of said channel irons, both of said sets of gutters being provided with nozzles or openings adapted to discharge the collected water directly into the hollow pillars or posts, substantially as described.

8. A building having hollow supporting pillars and a series of duplex channel irons secured to the upper ends thereof; together with roof-trusses sustained upon the upper surfaces of the channel irons, and gutters secured between the inner faces thereof, substantially as described.

9. A building having hollow supporting pillars and a series of duplex channel irons secured to the upper ends thereof; together with roof-trusses sustained upon the upper surfaces of the channel irons, and outer and supplemental gutters secured between the faces of said channel irons, substantially as described.

10. A building having hollow supporting pillars and a series of duplex channel irons secured to the upper ends thereof; together with roof-trusses sustained upon the upper surfaces of the channel irons, and sectional gutters secured between the inner faces thereof; in combination with supplemental gutters secured below the first-named gutters and adapted to prevent the accumulation of condensed moisture within the building, substantially as described.

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

EDWARD WESTON.

Witnesses:
C. J. KINTNER,
W. H. YAUGER.