

A. L. MOORSHEAD.
 TRAIN SHED.
 APPLICATION FILED MAR. 30, 1909.

953,633.

Patented Mar. 29, 1910.

4 SHEETS—SHEET 1.

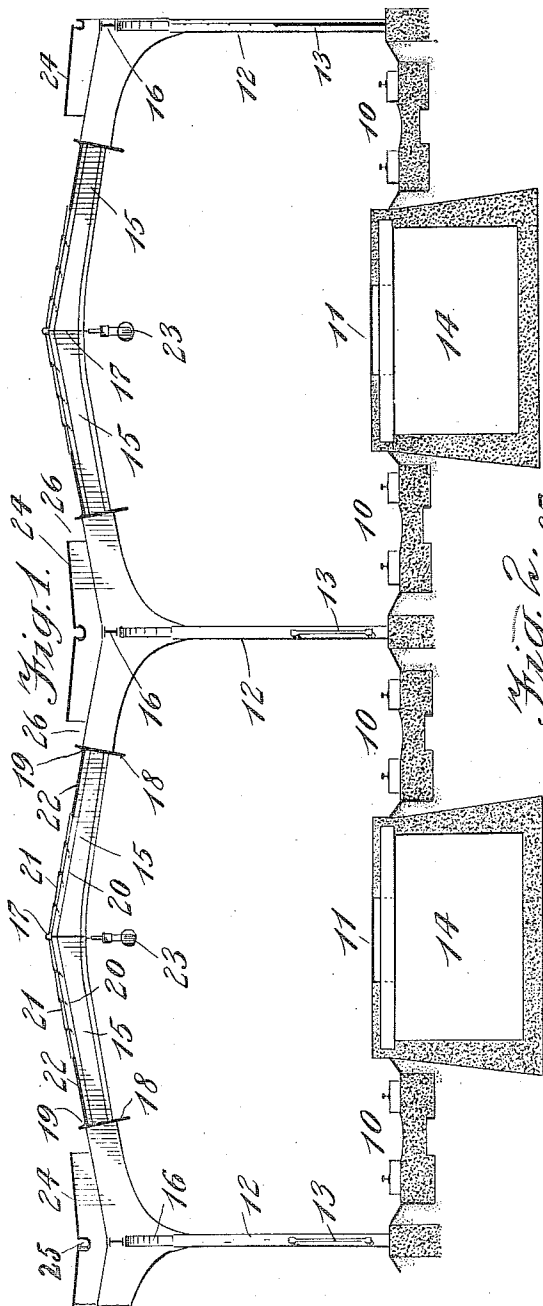


Fig. 1.

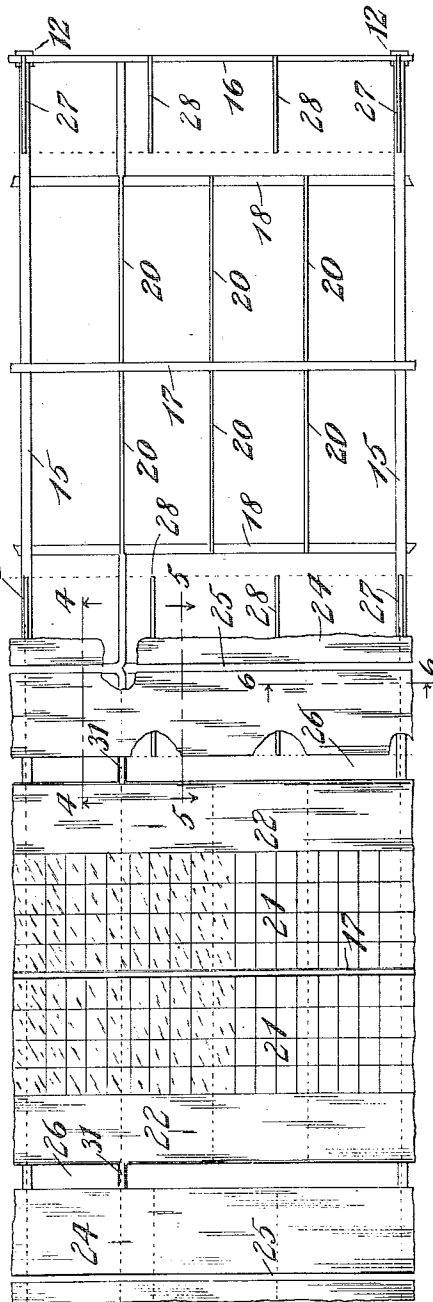


Fig. 2.

Witnesses:

W. J. Baird
W. J. Baird

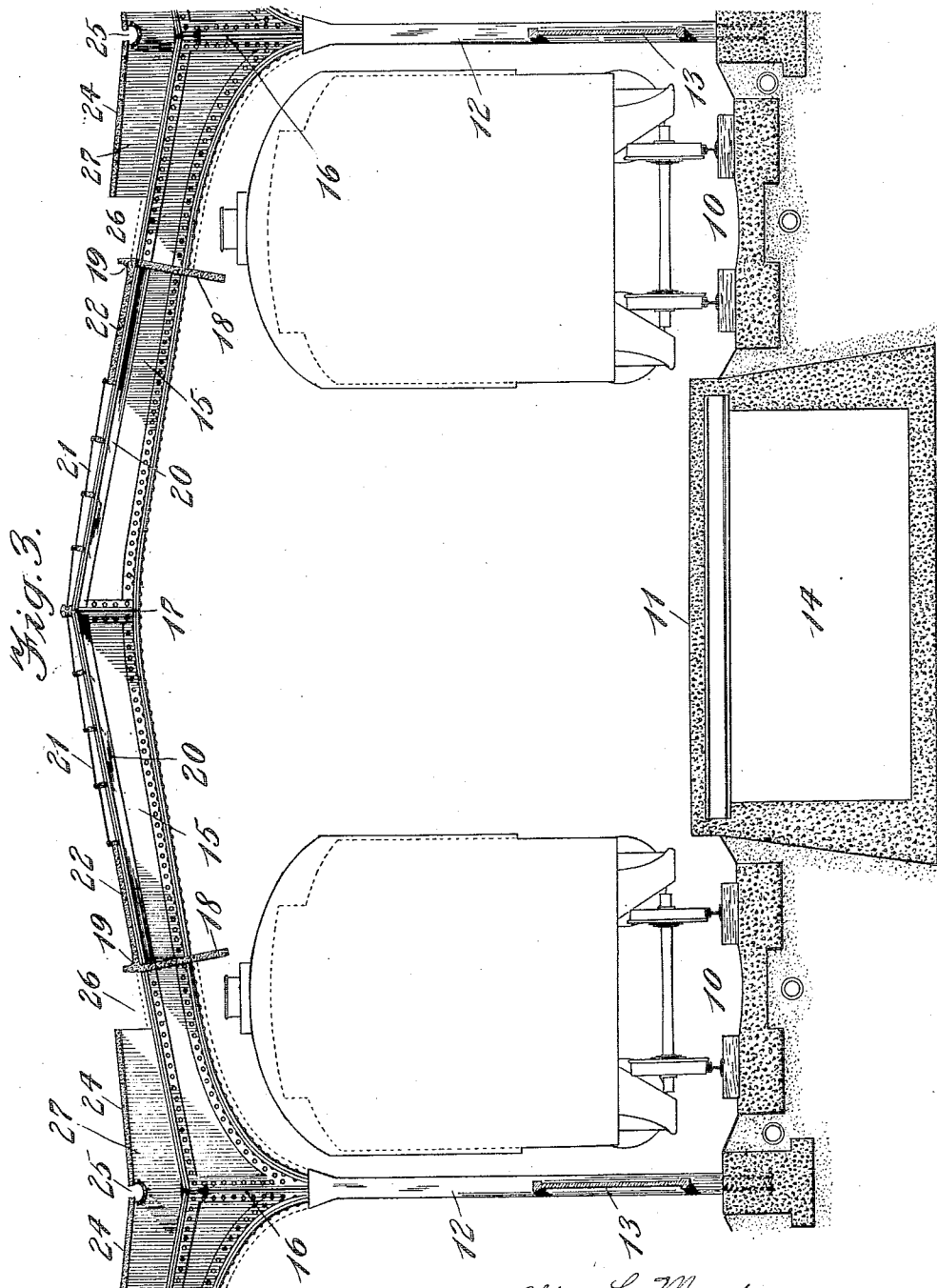
Alfred Lee Moorshead Inventor

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4 SHEETS—SHEET 2.



Witnesses:

C. W. Fairbank
J. A. Handenberg

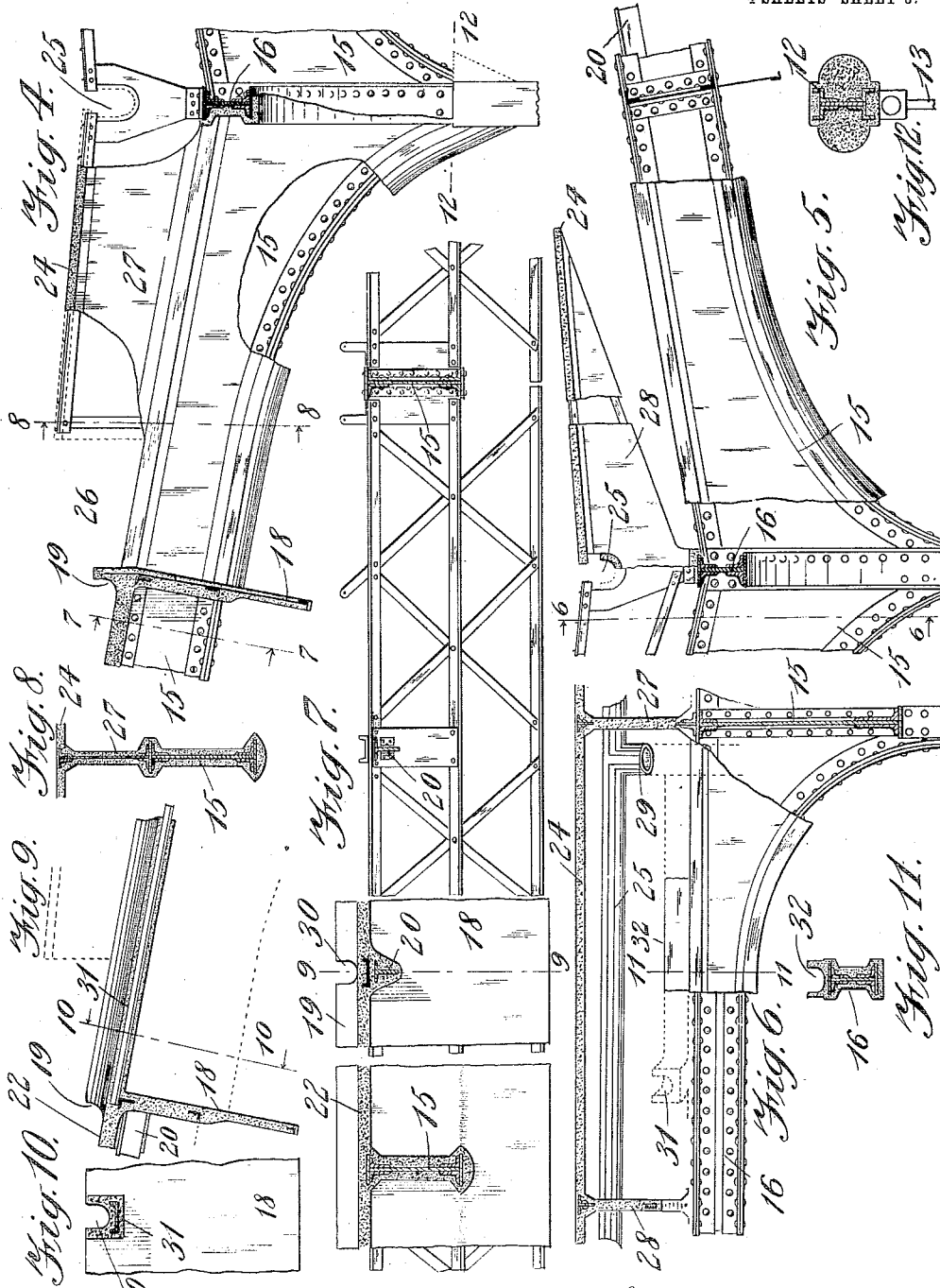
Alfred Lee Marshhead Inventor

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4 SHEETS—SHEET 3.



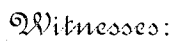
Witnesses:

C. W. Fairbank
 J. E. Crandall

Alfred Lee Moorshead Inventor

953,633.

4 SHEETS—SHEET 4.



B. O. Fairbank
J. H. Handenberg

Alfred Lee Murchie (Inventor)

UNITED STATES PATENT OFFICE.

ALFRED LEE MOORSHEAD, OF ARLINGTON, NEW JERSEY.

TRAIN-SHED.

953,633.

Specification of Letters Patent. Patented Mar. 29, 1910.

Application filed March 30, 1909. Serial No. 486,735.

To all whom it may concern:

Be it known that I, ALFRED LEE MOORS-
HEAD, a citizen of the United States, and a
resident of Arlington, in the county of Hud-
son and State of New Jersey, have invented
a new and Improved Train-Shed, of which
the following is a full, clear, and exact de-
scription.

This invention relates to certain improve-
ments in train sheds for covering the track
at terminals or way stations, and more par-
ticularly to that type of train shed in which
the roof or roof sections are disposed at only
a short distance above the tops of the cars
or locomotives, and in which there are or
may be provided openings through the roof
and extending longitudinally of the train
shed and over the tracks to permit smoke
and gases escaping from the smoke stack of
a locomotive to pass directly to the outside
atmosphere.

In railway stations in which there are a
plurality of parallel tracks, it is customary
to arrange these tracks in pairs, each pair
of tracks being separated from the next suc-
ceeding pair by a platform. Thus, each
platform serves the two tracks upon oppo-
site sides thereof.

In all of the train sheds heretofore de-
signed and with which I am familiar, either
a large arched roof or dome is employed,
which covers all of the tracks and plat-
forms, or the roof is made up of a series of
roof sections supported by columns ar-
ranged along the center line of the plat-
forms. In my improved train shed, I ar-
range the columns or supporting posts be-
tween the two tracks of the successive pairs,
so that the platforms will be entirely free
and unobstructed and the available plat-
form space greatly increased. The columns
serve not only for supporting the roof but
also serve as the posts for fences or parti-
tions to prevent persons crossing the tracks
from one platform to another. The weight
of the roof is transferred from the platforms
to the space between the tracks, so that sub-
ways may be built beneath the platforms
and used for the conveyance of freight or
baggage, or provided with tracks on which
local trains may be run. The high portions
of the roof come over the platforms, so that
snow or rain falling on the roof drains away
from the center of the platform rather than
toward it, and the downtake pipes for the
rain water come between the platforms

rather than over them, and, therefore, in
case of leakage or overflow, the platforms
are not flooded. The portions of the roof
over the platform may be formed of an un-
obstructed skylight, and as this skylight is
at the high portion of the roof, the minimum
quantity of water will run over the glass
during a rain storm. There are no columns
in the platform to cast conflicting shadows
when artificial light is resorted to, and thus,
a number of artificial lights may be used in-
dependently of the number of posts or col-
umns. The roof sections are provided with
longitudinally-extending smoke outlet ducts,
and from the inner margin of each duct,
next the platform, depends a baffle plate or
wall, while the portion of the roof sloping
upward from the row of columns to the
outer margin of the duct is unobstructed be-
neath.

Reference is to be had to the accompany-
ing drawings, forming a part of this speci-
fication, in which similar characters of ref-
erence indicate corresponding parts in all
the figures, and in which—

Figure 1 is a vertical section through a
train shed constructed in accordance with
my invention, said section being taken at
right angles to the tracks; Fig. 2 is a top
plan view of a portion of the train shed, a
part of the roof being broken away; Fig. 3
is a vertical section through one unit of my
improved shed and showing the same on a
larger scale; Fig. 4 is a vertical section
taken at right angles to the plane of the
roof and showing the portions directly
above the supporting columns, said section
being taken approximately on the line 4—4
of Fig. 2; Fig. 5 is a section similar to Fig.
4, but taken approximately on the line 5—5
of Fig. 2; Fig. 6 is a vertical section taken
on the line 6—6 of Fig. 5, the position in the
roof being indicated approximately by the
line 6—6 of Fig. 2; Fig. 7 is a longitudinal
section taken on approximately the line 7—7
of Fig. 4, and showing the structural details
of one of the depending baffle walls; Fig. 8
is a vertical section on the line 8—8 of Fig.
4; Fig. 9 is a vertical section through the
baffle wall and on approximately the line
9—9 of Fig. 7; Fig. 10 is a face view of the
baffle wall, and constituting an end view of
the parts shown in Fig. 9; Fig. 11 is a sec-
tional detail on the line 11—11 of Fig. 6;
Fig. 12 is a transverse section on the line
12—12 of Fig. 4; Fig. 13 is a vertical section

through a modified form of roof and showing the portions above the row of supporting columns; Fig. 14 is a longitudinal section on the line 14—14 of Fig. 13; Fig. 15 is a longitudinal section on approximately the line 15, 15 of Fig. 13; Fig. 16 is a sectional detail on the line 16—16 of Fig. 14; Fig. 17 is a side elevation of the lower portion of one of the supporting columns and showing the fence or wall supported thereby; and Fig. 18 is a top plan view of the parts shown in Fig. 17.

The views illustrate portions of a terminal or way station, in which the tracks 10 are arranged in pairs, and the platforms 11 extend lengthwise of the station between the several pairs of tracks. The roof of the train shed is supported on rows of posts or columns 12, each row being disposed between the two tracks of a pair, and constituting part of a suitable fence or partition 13. Beneath each platform I may provide a subway 14 extending lengthwise thereof. The platforms constitute roofs or ceilings for the subways and may be formed in whole or in part of glass, to admit light to the subway from above and obviate the necessity for artificial illumination. The adjacent rows of posts are disposed upon opposite sides of the intermediate platform, and the roof, which is supported by these posts, is formed of a series of roof sections, each roof section extending over a platform and being supported by the two opposite rows of posts. As many units or roof sections are provided as there are platforms, and all of these units or roof sections are substantially alike. Each roof section or unit includes a plurality of pairs of rafters 15, the two rafters of each pair being supported at their outer and lower ends upon the posts, and in engagement with girders 16 extending lengthwise of the row of posts. The upper ends of the rafters meet at a ridge plate 17 disposed centrally over the platform. The rafters are placed at such a height that an ordinary locomotive or car may pass beneath them at their lower ends and adjacent the posts or columns, but the distance between the rafters and the tops of the smoke stacks and car roofs, is reduced to the minimum for safety. Extending lengthwise of the roof and connecting adjacent rafters 15, is a plate or baffle 18. This plate extends lengthwise of the roof and may lie in substantially a vertical plane, but preferably the plate stands at a slight angle with its lower edge inclined away from the adjacent row of posts or columns. The upper edge of the plate may, if desired, extend a slight distance above the upper edge of the rafters, so as to form with the adjacent roof, a gutter or trough 19 for rain water. The plate extends downwardly below the lower edges of the rafters, so as to form a depending

baffle. The plate is disposed above the corresponding track and is adjacent the center line of the track, but at a short distance at the side thereof toward the platform. The details of the roof between the two plates or baffles 18, 18 of each section, may be varied somewhat but preferably I connect the ridge plate 17 to each baffle plate 18 by a plurality of purlins or sub-rafters 20, which may be of a great deal lighter construction than the main rafters.

Between the two baffle plates 18, 18, are skylights 21 covering the entire area over the platform. The skylights need not extend entirely to the baffle plates 18, but, instead, I may interpose any ordinary form of impervious roofing 22 extending from the lower edge of the skylight section to the baffle 18, and forming with the latter the trough 19.

At night, the platforms may be illuminated by any suitable form of lamps or other illuminating means 23, suspended from the roof along the ridge plate.

Between the baffle 18 of one roof section and the baffle 18 of the next adjacent roof section, that is, the part over the row of columns, I provide a roofing formed of two roof portions 24, 24, downwardly inclined toward each other and separated by a central rain water trough 25. These two roof portions are both spaced above the rafters, so that each roof portion 24 is out of alignment with and approximately parallel to the roof portion 22 upon the opposite side of the baffle 18. The outer edge of each roof portion 24 is spaced from the upper edge of the adjacent baffle 18, so as to leave therebetween an opening, duct or passage 26, centrally disposed over the track and extending lengthwise of the shed. The roof portion 24 and the baffle 18 are approximately at right angles to each other, and the smoke stack of the locomotive comes at one side of the baffle 18 and below the roof portion 24, so as to deliver directly toward the outlet passage or duct 26. The smoke stack of the locomotive thus acts like an ejector nozzle between the converging baffle and roof, so that the escape of smoke and gases from the smoke stack automatically draws in steam, heated air, or smoke within the train shed toward the outlet passage 26 and ejects them to the outside atmosphere. Furthermore, any smoke or gases which collect beneath the roof portions 24 will, in their natural tendency to rise, travel along the under sides of said roof portions and escape directly to the atmosphere. There is no obstruction whatsoever on the under side of these roof portions, and the free edges thereof are at a higher elevation than the upper edges of the baffles, which in itself facilitates the escape of smoke. The baffles 18 not only prevent the smoke issuing from the

smoke stack from passing outwardly beneath the skylight portions, but in case a wind is blowing transversely of the track, it may enter one duct or passage 26 and blow beneath the roof portions 24 and out the next duct or passage, to aid in the removal of smoke from the train shed. The other baffle 18 will prevent any transverse wind from blowing the smoke from one smoke stack out beneath the portion of the roof over the platform.

For supporting the roof portion 24, I provide over each rafter 15 a vertically-extending partition or wall 27 of a length substantially equal to the total width of the two adjacent roof portions 24, 24. The rafters are spaced apart a considerable distance, and as the plates 27 are located only over these rafters, I provide additional supporting means for the roof sections 24 intermediate the plates. This means includes a plurality of brackets or T-shaped plates 28 resting upon the girders 16 and having their lower edges extending upwardly diagonally to the outer edges of the roof sections 24. Each plate 28 (see Figs. 5 and 6) may be considered as comprising two triangular brackets, each having an approximately horizontal edge beneath the roof portion 24, a vertical edge extending upwardly from the girder, and a diagonal edge extending from the girder upwardly and outwardly to the free edge of the roof portion.

The rain water which falls on the roof portions 24 collects in the center trough 25, while the rain water which falls on the skylights and roof portions 22 collects in the gutters 19. To conduct off this rain water, the trough 25 may be inclined downwardly from each alternate post to the intermediate posts, and at the low points, that is, at each alternate post, it may be provided with a downtake pipe 29, as shown particularly in Fig. 6. The upwardly-extending edges of the baffles 18 may be provided with openings 30 therethrough at intervals along the length thereof, and from each opening a trough or conduit 31 (see Figs. 6, 9 and 10), may extend across the smoke outlet passage or duct 26 to the girder and there unite with a trough or conduit 32 (see Figs. 6 and 11) extending along the top of the girder to the downtake pipe 29. This downtake pipe 29 is located adjacent one of the posts and may extend down along the side of the post to the base of the latter to deliver the water to the sewer or dispose of it in any other suitable manner.

In the specific form of train shed illustrated in Fig. 3, the roof portions 24 are located approximately in a plane parallel to the roof portions 22 and at a higher elevation, and these last-mentioned roof portions are in the same plane as the skylights 21. The roof portions 24 are spaced above the

upper edges of the rafters, while the roof portions 22 and the skylights are supported substantially in the plane of the upper edges of the rafters. I may, if desired, arrange the roof sections at opposite edges of the smoke outlet, in substantially the same plane and drop them down to the plane of the lower edges of the rafters.

In Figs. 13 to 16, inclusive, I have illustrated a slightly different form of roof, in which the same posts, girders, rafters and skylights are employed, but in which a wall 33 extends downwardly from the lower edge of the skylight 21^a to the lower edge of the rafters 15^a, and there connects with a roof section 22^a disposed substantially in the plane of the lower edge of the rafters. A baffle 18^a extends downwardly from the lower edge of the girders and its upper edge extends above the roof section 22^a a sufficient distance to form a trough 19^a. At intervals along the length of this trough, the baffle is provided with an opening 30^a, through which the water may reach a short trough 31^a, bridging across the smoke outlet 26^a. Extending outwardly from the girder 16^a are roof sections 24^a, substantially in the plane of the roof sections 22^a and spaced from the baffles to leave the smoke outlets. These roof sections slant downwardly toward the girders 16^a and serve not only to protect the portions of the car roofs and the train shed between the tracks, but also to receive the rain water from the troughs 31^a and deliver it to a downtake 29^a. To prevent the wind from blowing snow off the roof sections 24^a, the latter, adjacent their outer edges, if desired, may be provided with a plurality of upwardly-extending posts or bars 34, which support a series of substantially parallel wires 35. These wires are sufficient to cause slight eddies in the wind and cause a bank or ridge of snow to accumulate at this point and prevent its blowing over the edge of the roof section.

It is, of course, understood that the girders, rafters, columns, baffles, roof sections, &c., may be constructed of any suitable material and held together in any suitable or approved manner. In the form illustrated, I provide a framework of structural steel including plates, angle irons, bars, &c., suitably riveted together, and the entire iron-work covered with concrete. Even in the combined steel and concrete structure illustrated, the details of the steel-work and the arrangement of the concrete may be varied. Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In a low-roofed railroad train shed; in combination with a series of pairs of railroad tracks and platforms extending between the several successive pairs; a series of rows of posts or columns, a row being dis-

posed between the two tracks of each pair of tracks and midway between said platforms, whereby the platforms are unobstructed by columns, and a roof supported by said posts or columns, consisting of a plurality of sections, each section spanning a single platform and the two tracks at opposite sides thereof, having its highest region over the center of its platform and thence sloping downward at both sides to the two rows of supporting columns.

2. In a low-roofed railroad train shed; in combination with a series of pairs of railroad tracks and platforms extending between the several successive pairs; a series of rows of posts or columns, a row being disposed between the two tracks of each pair of tracks and midway between said platforms, whereby the platforms are unobstructed by columns, and a roof supported by said posts or columns, consisting of a plurality of sections, each section spanning a single platform and the two tracks at opposite sides thereof, having its highest region over the center of its platform and thence sloping downward at both sides to the two rows of supporting columns, and each roof section having a skylight portion in its high part directly over its platform.

3. In a low-roofed railroad train shed; in combination with a series of pairs of railroad tracks, platforms extending between the several successive pairs, and longitudinally extending subways beneath said platforms and of which said platforms form the roofs; a series of rows of posts or columns, a row being disposed between the two tracks of each pair of tracks and midway between said platforms, whereby the platforms are free of the weight of columns or roof, and a roof supported by said posts or columns, consisting of a plurality of sections, each section spanning a single platform and the two tracks at opposite sides thereof.

4. In a low-roofed railroad train shed; in combination with a series of pairs of railroad tracks, platforms extending between the several successive pairs, and longitudinally extending subways beneath said platforms and of which said platforms form the roofs, said platforms having transparent portions for illuminating said subways; a series of rows of posts or columns, a row being disposed between the two tracks of each pair of tracks and midway between said platforms, whereby the platforms are unobstructed and free of the weight of columns or roof, and a roof supported by said posts or columns, consisting of a plurality of sections, each section spanning a single platform and the two tracks at opposite sides thereof and having a skylight portion directly over the platform.

5. In a low-roofed railroad train shed; in combination with a series of pairs of rail-

road tracks and platforms extending between the several successive pairs; a series of rows of posts or columns, a row being disposed between the two tracks of each pair of tracks and midway between said platforms, whereby the platforms are unobstructed by columns, the members of said rows being connected by means constituting them fences, and a roof supported by said posts or columns, consisting of a plurality of sections, each section spanning a single platform and the two tracks at opposite sides thereof.

6. In a low-roofed railroad train shed; in combination with a series of pairs of railroad tracks and platforms extending between the several successive pairs; a series of rows of posts or columns, a row being disposed between the two tracks of each pair of tracks and midway between said platforms, and a roof supported by said posts or columns, consisting of a plurality of sections, each section spanning a single platform and the two tracks at opposite sides thereof, having its highest region over the center of its platform and thence sloping downward at both sides to the two rows of supporting columns, each section having two longitudinally extending ventilating ducts disposed directly over the corresponding two tracks, the inner margin of each duct, next the platform, having a depending baffle adapted to prevent smoke and gases issuing from the stacks of locomotives on the corresponding track entering beneath the portion of the roof section over the platform, and the portion of the roof section sloping upward from the row of supporting columns to the outer edge of each duct being unobstructed beneath, whereby smoke rising under such portion escapes freely through the duct.

7. In a low-roofed railroad train shed; in combination with a series of pairs of railroad tracks and platforms extending between the several successive pairs; a series of rows of posts or columns, a row being disposed between the two tracks of each pair of tracks and midway between said platforms, and a roof supported by said posts or columns, consisting of a plurality of sections, each section having two longitudinally extending ventilating ducts disposed directly over the corresponding two tracks, the inner margin of each duct, next the platform, having a depending baffle adapted to prevent smoke and gases issuing from the stacks of locomotives on the corresponding track entering beneath the portion of the roof section over the platform, and the portion of the roof section between the outer margin of the duct and the corresponding row of columns being unobstructed beneath and disposed in a plane different from that of the portion of the roof section at the inner side of the duct and with its inner edge, constituting the

outer margin of the duct, at a greater elevation than the inner margin of the duct, so that transverse currents of air may displace smoke and gases beneath said portion.

5 8. In a low-roofed railroad train shed; in combination with a platform and two tracks at opposite sides thereof; a roof section spanning said platform and tracks and having two longitudinal ventilating ducts disposed directly over said tracks, the inner
10 margin of each duct, next the platform, having a depending baffle inclined inward toward the platform.

15 9. In a low-roofed train shed; in combination with a platform and two tracks at opposite sides thereof; a roof section spanning said platform and tracks and having two longitudinal ventilating ducts disposed directly over said tracks, said section having its

highest part over the center of the platform 20 and thence sloping downward in both directions to the inner margins of said ducts, the portions of the roof section at the outer sides of said ducts also sloping downward in the same direction but in a higher plane, down- 25 take from the outer margins of these portions, and conduits discharging from the inner margins of said ducts across beneath said portions and thence down.

In testimony whereof I have signed my 30 name to this specification in the presence of the subscribing witnesses.

ALFRED LEE MOORSHEAD.

Witnesses:

CLAIR W. FAIRBANK,
DONALD J. DORLAND,
LEON G. LORIMER.