MAKE HISTORY. Preserve Manitoba's Past.

Economic History Theme Study

A HISTORY OF GRAIN ELEVATORS IN MANITOBA

PART 2: THE ARCHITECTURE OF GRAIN ELEVATORS

THE ARCHITECTURE OF GRAIN ELEVATORS

The first commercial grain elevator in Western Canada, built along a railway siding, was constructed in 1878 in Niverville, Manitoba. It was an unusual 25,000 bushel round structure constructed to store and ship the surplus grain produced by German-speaking Mennonite settlers who had arrived in Southern Manitoba from Russia a mere four years earlier. This structure, however, was to be the only one of its kind.

During the later half of the nineteenth century, in Western Canada, as in the United States, grain was stored in flat warehouses because it was invariably handled and brought to market in bags. Before long, these warehouses were divided into bins into which the sacked grain was dumped after weighing. Such warehouses were typically 8 x 20 x 40 feet, and held approximately 4,000 bushels of grain. Bins were arranged on opposite sides of a central alley which provided access for handcarts on which grain was trundled from wagons, and later, on to boxcars. The system was later improved by constructing raised overhead bins into which grain could be mechanically loaded, and then spouted by gravity into waiting boxcars. Only one such early flat warehouse remains in Manitoba, and is located in Brookdale.

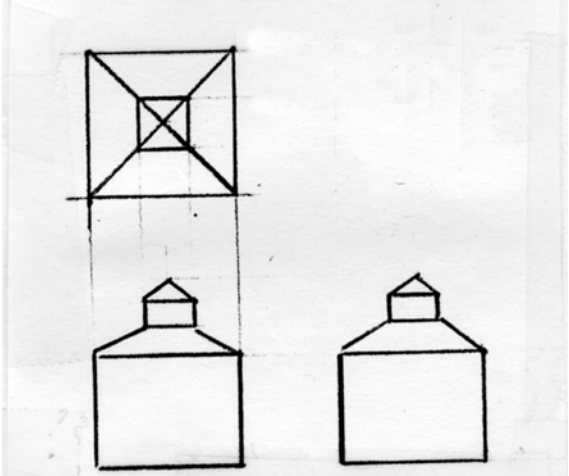
Classic prairie grain elevators, of the type which western Canadians are most familiar, were first built during the early 1880s. They generally were built according to standards set by the Canadian Pacific Railway. Such “Standard-plan” elevators offered much greater efficiency in built grain handling and larger storage capacities. These early elevators were 50 to 60 feet in height, and were powered by a steam or diesel engine. The main storage structure was constructed of dimensional lumber that, for strength, was stacked or “cribbed” with overlapping corners. This structure had a smaller receiving shed, or driveway, containing weigh scales and a receiving pit, connected to it. Bulk grain was transported from the receiving pit to the top of the structure by an endless cup conveyor, known as a leg, and allowed to flow down via a network of ducts into the various bins and pieces of equipment. Over the years, the elevators’ capacities rose but their essential forms remained relatively unchanged until the 1960s. Although there is a

broad conformity of appearance among all grain elevators, no two vintage elevators are exactly alike. This is because many were built by experienced crews without the need for plans. The first standard-plan grain elevator in Manitoba was constructed in 1881 in Gretna, by the W.W. Ogilvie Milling Company and was only recently demolished. The oldest surviving standard plan elevator is a one-hundred-year-old structure located in Elva.

The only real architectural distinction that can be drawn from vintage grain elevators is based on geometry and the massing of the main elevator structure, as is dictated by the size and location of the leg, head and bins. Accordingly, there are found to be roughly five different types of early country grain elevators, surviving to the present time. Other styles of elevators at one time existed, such as the style associated with the Manitoba Government Public Elevator Commission. However, no surviving examples of these other types are known to exist in Manitoba.

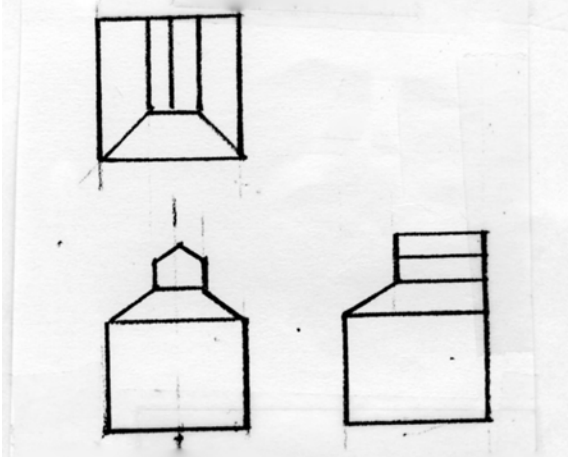
PYRAMIDAL PLAN

- Built c.1880 to c.1910
- Up to 15 000 Bushel Capacity



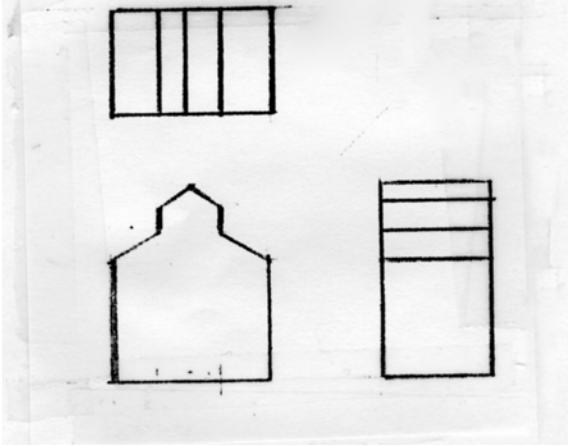
HYBRID PLAN WITH OFF-SET HEAD

- Built c.1880 to c.1910
- Up to 15 000 Bushel Capacity
- Much Rarer Design Than The Pyramidal Plan



STANDARD PLAN: SQUAT

- Built c.1880 to c.1910
- Up to 15 000 Bushel Capacity



STANDARD PLAN: MEDIUM

- Built c.1905 to c.1925
- Up to 25 000 Bushel Capacity
- The First Development of The Classic Elevator Shape

STANDARD PLAN: TALL

- Built c.1910 to c.1965
- Up to 40 000 Bushel Capacity

Medium But On A Larger Scale

- Most Elevators Built After c.1950 Belong In A Separate Category – Modern Tall – As They Have Little in Common With Pre-1950 Units. Modern Tall Are Not Considered in This Study

OTHER BUILDINGS

Every elevator had an office located nearby. The office, as well as serving as the operator's headquarters, also housed the power source (steam, gasoline or diesel engine). Usually the office was connected to the main building by a walkway or gang plank.

As grain production of a district increased, existing elevators were adapted to fit the new situation. Annexes were added, particularly during the years of the Second World War and the 1950s when Canada's grain production skyrocketed. These annexes were fed and emptied by horizontal screw or drag conveyors, one leading from the top of the elevator leg across the top of the annex, and another running under the bin bottoms to the back pit of the elevator. Two annex shapes familiar on the Canadian prairies were the external-frame Overgaard style of the 1940s and the taller ballroom-type design of the 1950s and 1960s. Sometimes older elevators were converted into annexes as new tall elevators with larger capacities were erected beside them. In recent years large hopper-bottom metal-bins and concrete silo designs have become the standard type of annex addition.

Other outbuildings grouped around a country elevator may have included a coal shed, a lumber shed and a feed storage shed. Most of these outbuildings, except for feed storage sheds, which were converted into fertilizer sheds, disappeared along with the function for which they were intended.

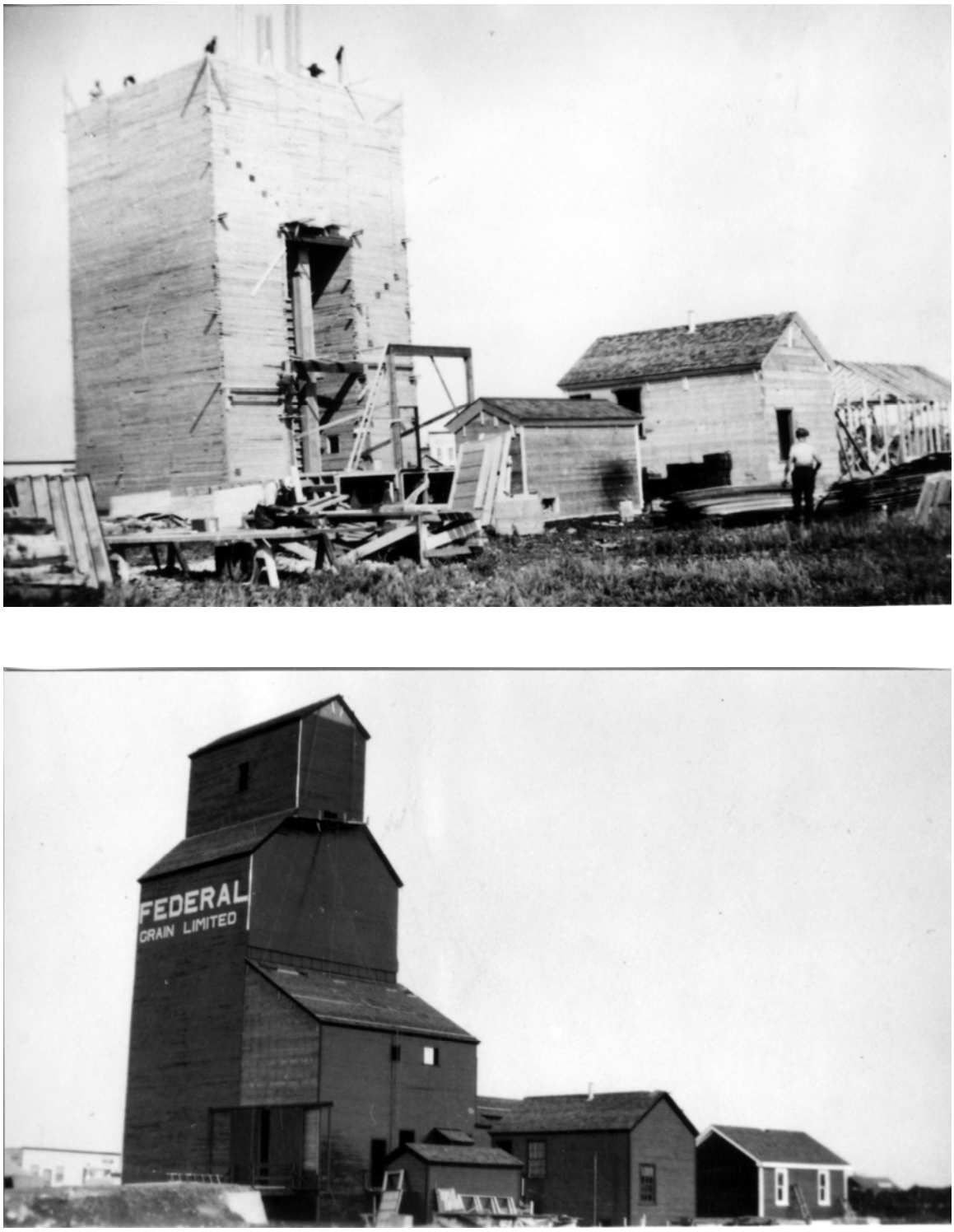
Constructed in 1878 in Niverville, this unusual structure was western Canada's first commercial grain elevator. In operation until 1904, it had a capacity of 25 000 bu. And featured horse-powered grain-handling equipment. Photo c.1911. (PAM)

Three elevators in Niverville illustrating the early sequence of elevator design. The round structure at the far right was constructed in 1878 and the left is a flat warehouse type of grain storage facility, popular during the early 1880s and 1890s. When photographed around 1911 this particular warehouse had already been 'modernized' with the addition of a cupola and a horse-powered system of belts and buckets, or elevator leg, for easier grain handling. The elevator at centre was constructed in 1904 and was typical of the square-plan or pyramidal type of commercial elevator which was popular until c.1910 and the advent of the standard plan elevator. (PAM)

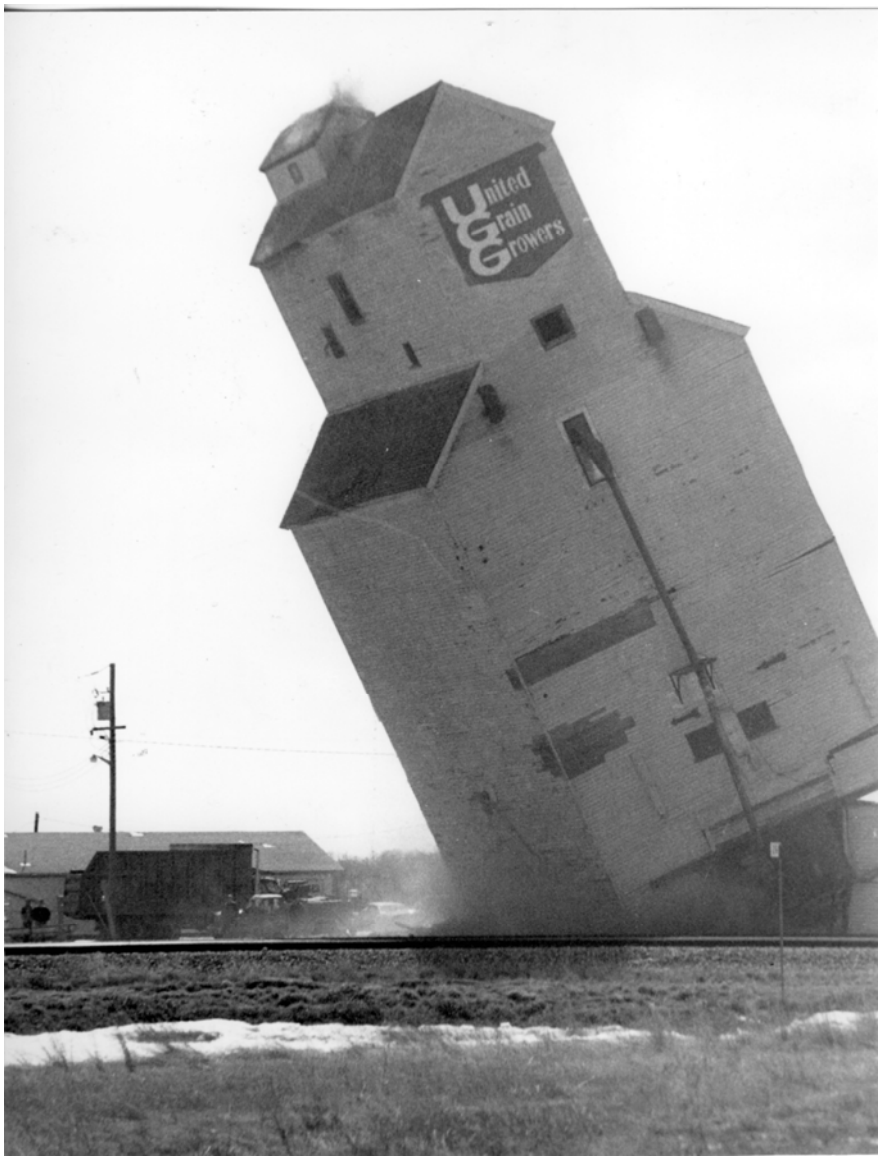
A row of early flat warehouses in Virden, c.1885. It is interesting to note that even at this early stage, all of these structures had already been enlarged, or were in the process of being expanded. (PAM)

The Arborg Co-operative Elevator Association, Pool No. 155, c.1960. Note the unusual location of the 1940s style Overgaard annex, in this case positioned to the side, rather than in front or at back, of the main structure. (PAM)

A row of five elevators at Ninga, three standard plans and one pyramidal. When photographed in 1955, all were in excellent condition. None of these structures have survived. (PAM)



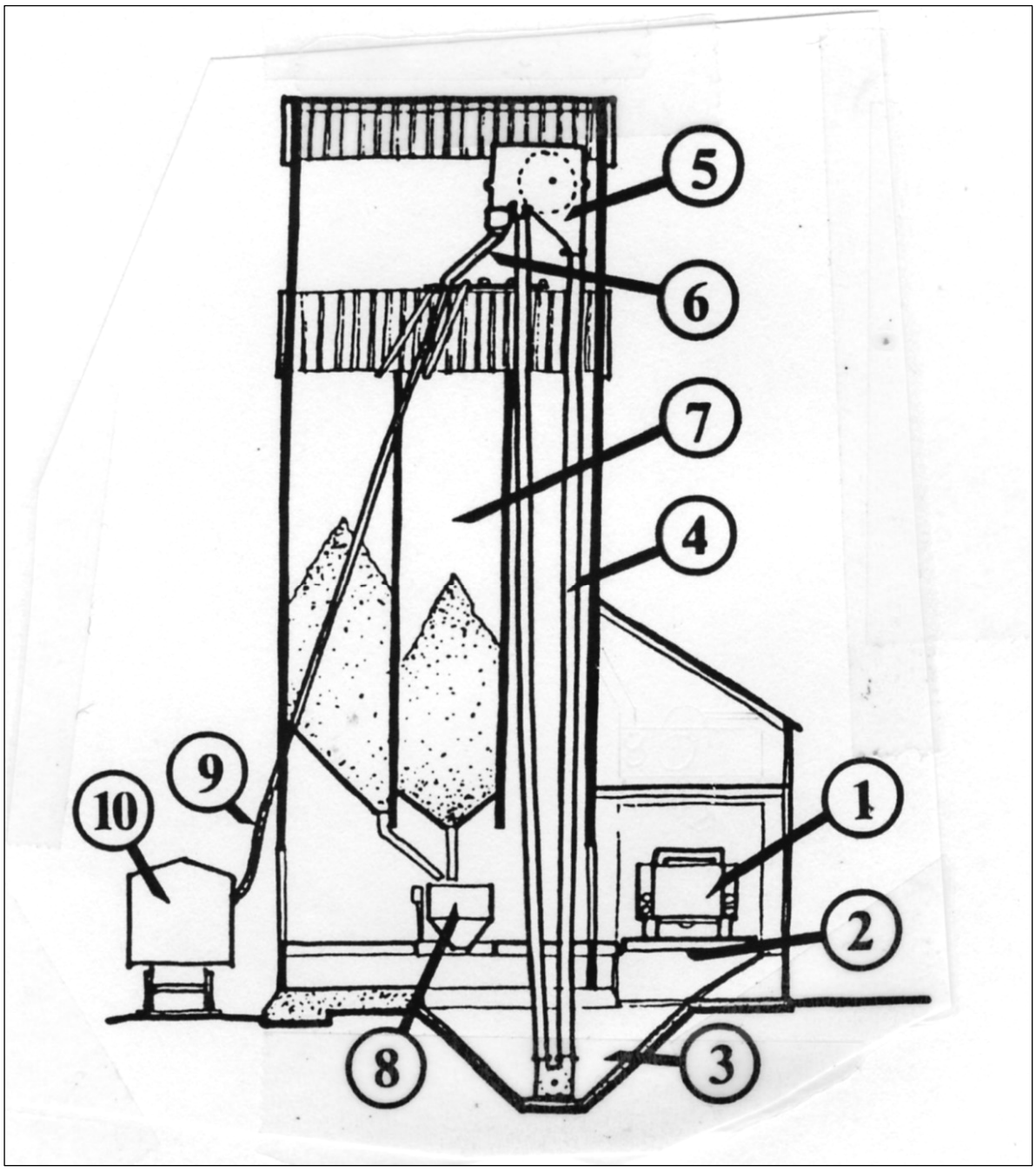
Construction of the Federal Grain Company elevator at Broad Valley c.1939. By this date, all elevators being constructed had tall entrance driveways to permit the unloading of grain from farm trucks fitted with hydraulic box hoists. Note also the presence of several small storage buildings adjacent to the office. (M. Roche photo)



A sight being repeated with increasing frequency during the past few decades – the destruction of yet another early standard elevator. This UGG elevator was constructed in Pipestone in 1928 and was one of two in the community demolished in the matter of minutes on March 19, 1992. (Photo: The Reston Recorder, Vol. 87, No. 34, April 1, 1992)

THE BASIC WORKINGS OF A GRAIN ELEVATOR

Whatever the final form that the bins, leg and head take, the essential internal workings of all early standard plan grain elevators are the same. A cup-belt is used to elevate the grain, while gravity, harnessed through ducts and spouts, is used to bring it down. The following diagram and photographs illustrates the basic processes at work inside all grain elevators.

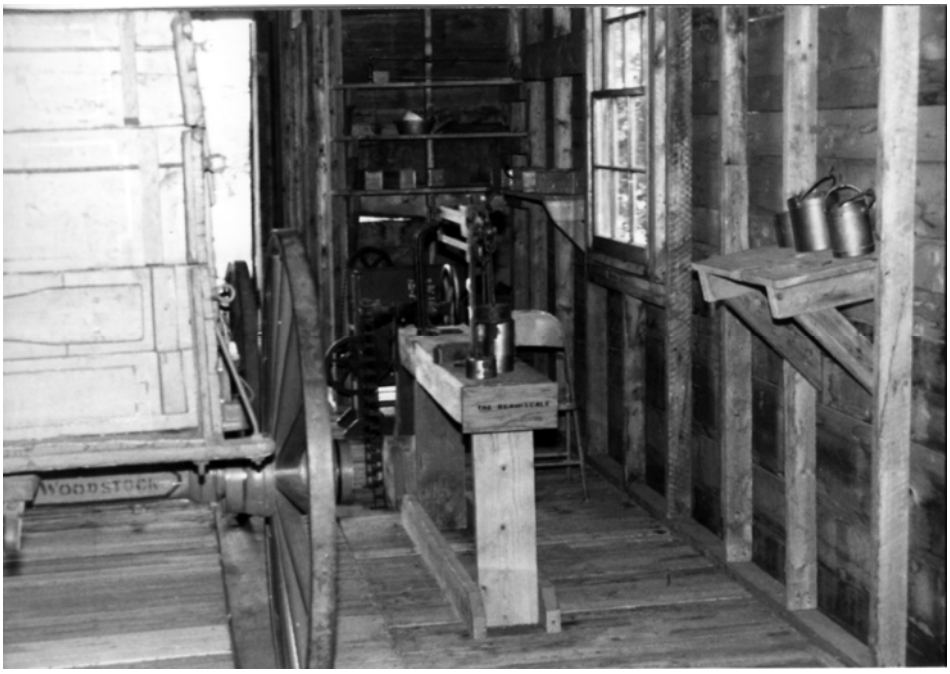


When receiving grain at an elevator, the loaded grain truck enters a driveway (1) and the entire truck is weighed on a platform scale (2), and then tilted so the grain empties through a grate in the driveway floor and into the pit (3). The grain is then lifted to the top of the elevator by the leg (4), a vertical conveyor belt with cups attached. At the head (5) the grain passes through a distributor (6) that deposits the grain into a selected grain bin (7).

To ship grain, the contents of a selected grain bin is allowed to flow into a hopper scale (8) where it is weighed, dumped into the pit (3) and lifted by the leg to the distributor (6). The grain flows down the direct spout (9) and into the waiting rail car (10).

A typical elevator driveway. The receiving-pit grate can be seen at left and the platform-scale balance-beam at centre. The doorway on the right leads to the elevator office, accessed via an open walkway. (Inglis 245.L.2)

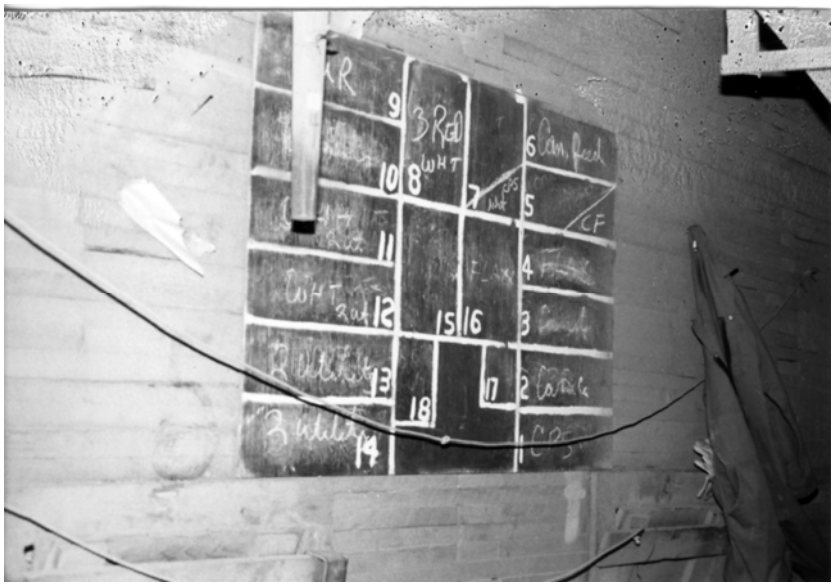
A rare surviving example of an early grain 'kicker'. This device was used to clean samples of grain being delivered to determine the amount of 'screenings' and other foreign material present. This in turn determined the dockage to subtract from the weight of the grain delivered. (Barnsley 726.L.2)



Most early elevators had wagon-hoists built into the receiving platform to speed the unloading process. These were usually powered by a hand-operated cranking mechanism which lifted the front end of the wagon allowing the grain to flow freely out the back into the receiving pit. The only known surviving example is located in the former Austin Pool elevator, now situated at the Manitoba Agricultural Museum (Austin 25.L.2). Later hoists were much larger, hydraulic powered, units (Inglis 245.L.2).

Two views of a typical elevator leg. A distributor control-wheel was located above the front access hatch. It controlled the distributor spout, located at the top or 'head' of the leg, which directed the flow of grain from the leg into the various holding bins or pieces of equipment, such as the grain cleaner or mixing-hopper. The steel rod with the twin handles, located at the base of the leg in the photo at left, controlled the flow of grain from the receiving pit into the leg 'boot' where it was picked up by the cup-belt and carried to the elevator head. The access hatch permitted the agent to monitor the amount being carried by the cup-belt. (top: Inglis 245.L.2; bottom: Barnsley 726.L.2).

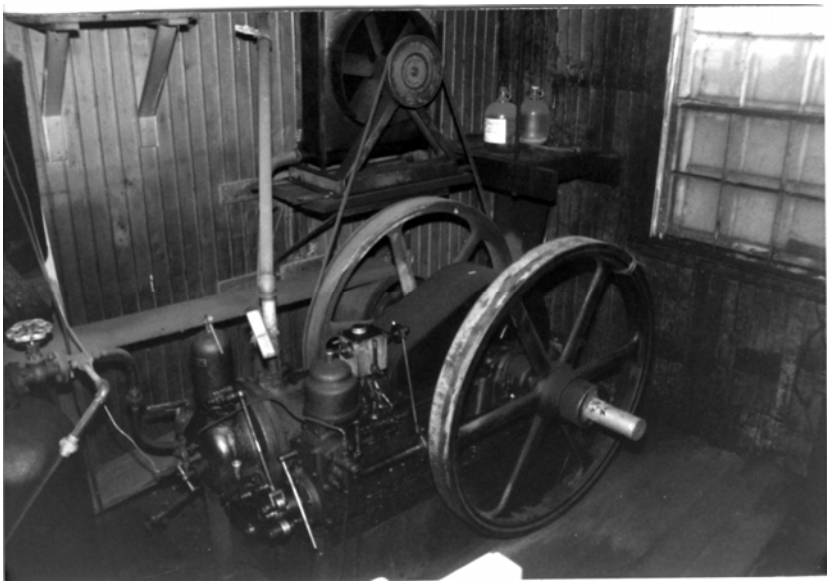
A rare example of an original wooden man-lift. The unit operated on a system of counter-balancing weights and provided the elevator agent with quick and easy access to the elevator head. Later examples, though similar in design, were constructed of steel. (Lenore 291.L.1)



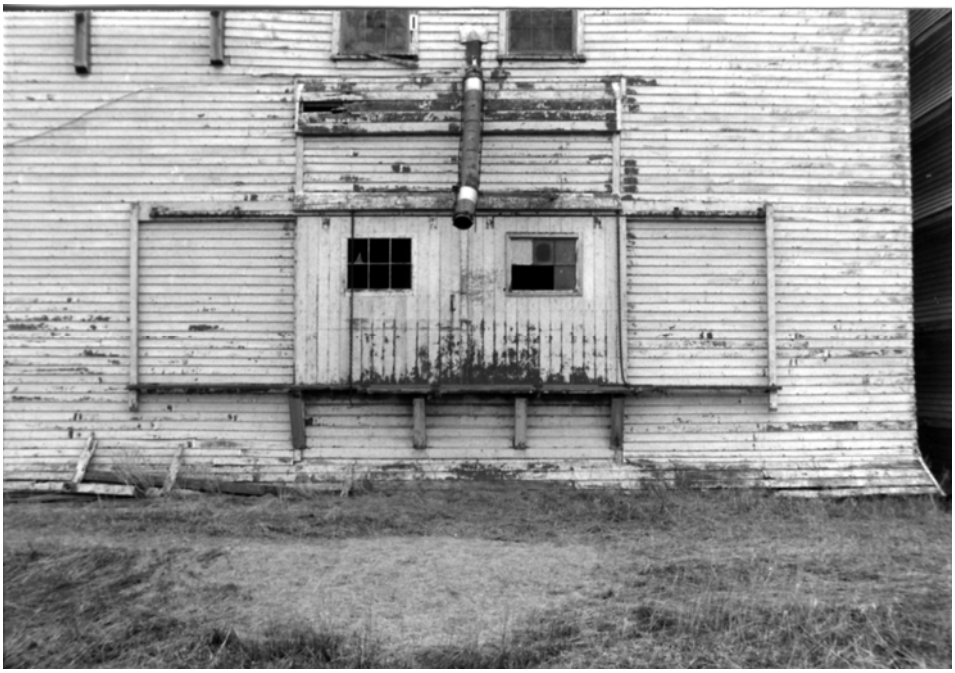
The bin blackboard, used to keep track of bin contents, was a simple but important fixture in all country elevators. (Spirling 528.L.1)

All elevator bins were constructed using the crib-wall construction technique. This consisted of stacked 2 X 4s which overlapped at the corners. Though exceedingly strong, such crib-wall bins were braced at regular intervals by steel rods. The bin bottoms were sloped to facilitate efficient grain flow. Most elevators contained between 12 and 16 bins of various capacities. (Barnsley 726.L.2)

Mixing-hopper and hopper-scale located in the shipping alley. Grain about to be loaded onto a waiting boxcar is first directed to the hopper-scale where it is 'batch' weighed before dropping down into the leg boot. From here it is transported by the cup-belt up to the leg head and directed to the car-spout which leads to loading platform at the rear, or track, side of the structure. (Barnsley 726.L.2)



A rare surviving example of a Model Z Fairbank one-cylinder diesel engine. Such units provided power to most country elevators during the early decades of the century. For fire prevention purposes, these engines were located in the elevator office rather than the elevator itself. Power was transferred to the elevator by use of a belt-drive or drive-shaft located beneath the office walkway. (Barnsley 726.L.2)



Two views of a car-spout. Some elevators had the car-spout located entirely on the exterior of the building, while in other cases only the bottom end of the duct was exposed. (top: La Rivière 282.L.2; bottom: Lenore 291.L.1)

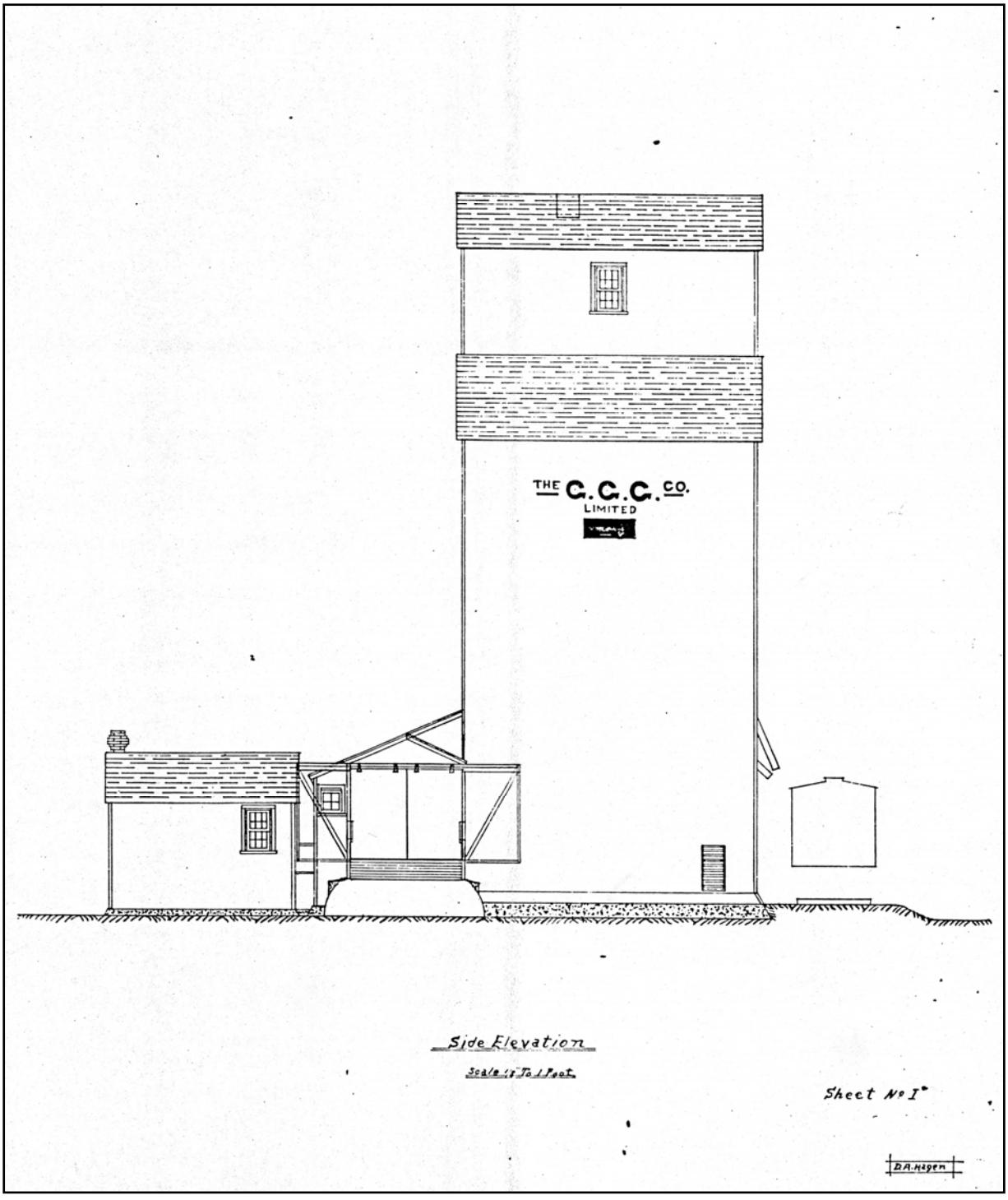
By the turn-of-the-century, grain-cleaning units were being installed in most country elevators. These were located either above the main driveway or above the mixing-hopper in the shipping alley. Wooden ducts directed the dust and screenings into special holding bins, or directly into a waiting wagon. Beginning in the 1950s, force-air or pneumatic dust collection systems were installed in most elevators, which included the installation of a network of metal ducts and collection bins. (top: Barnsley 726.L.2; bottom: Lenore 291.L.1)

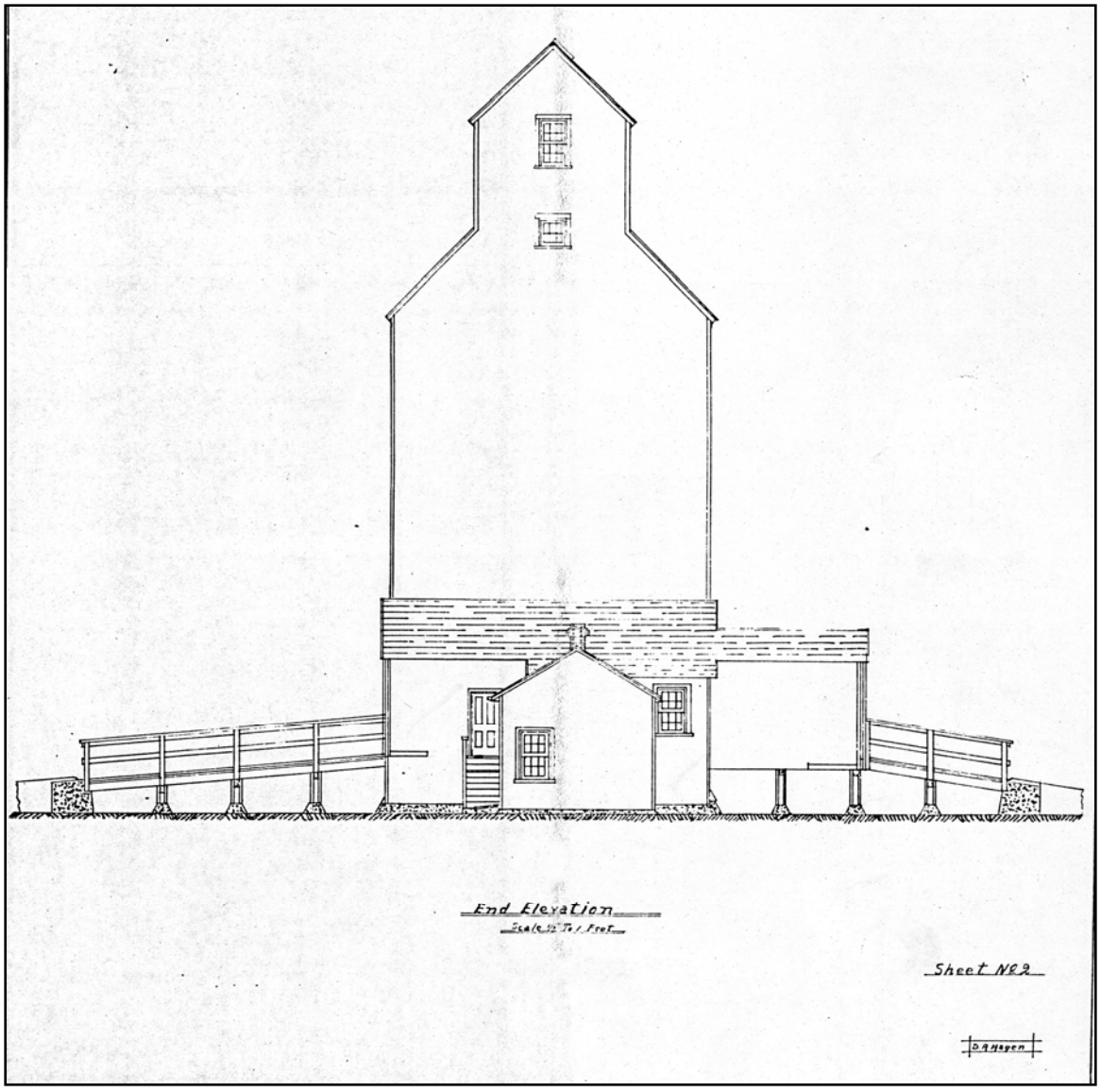
STANDARD ELEVATOR PLAN 1917

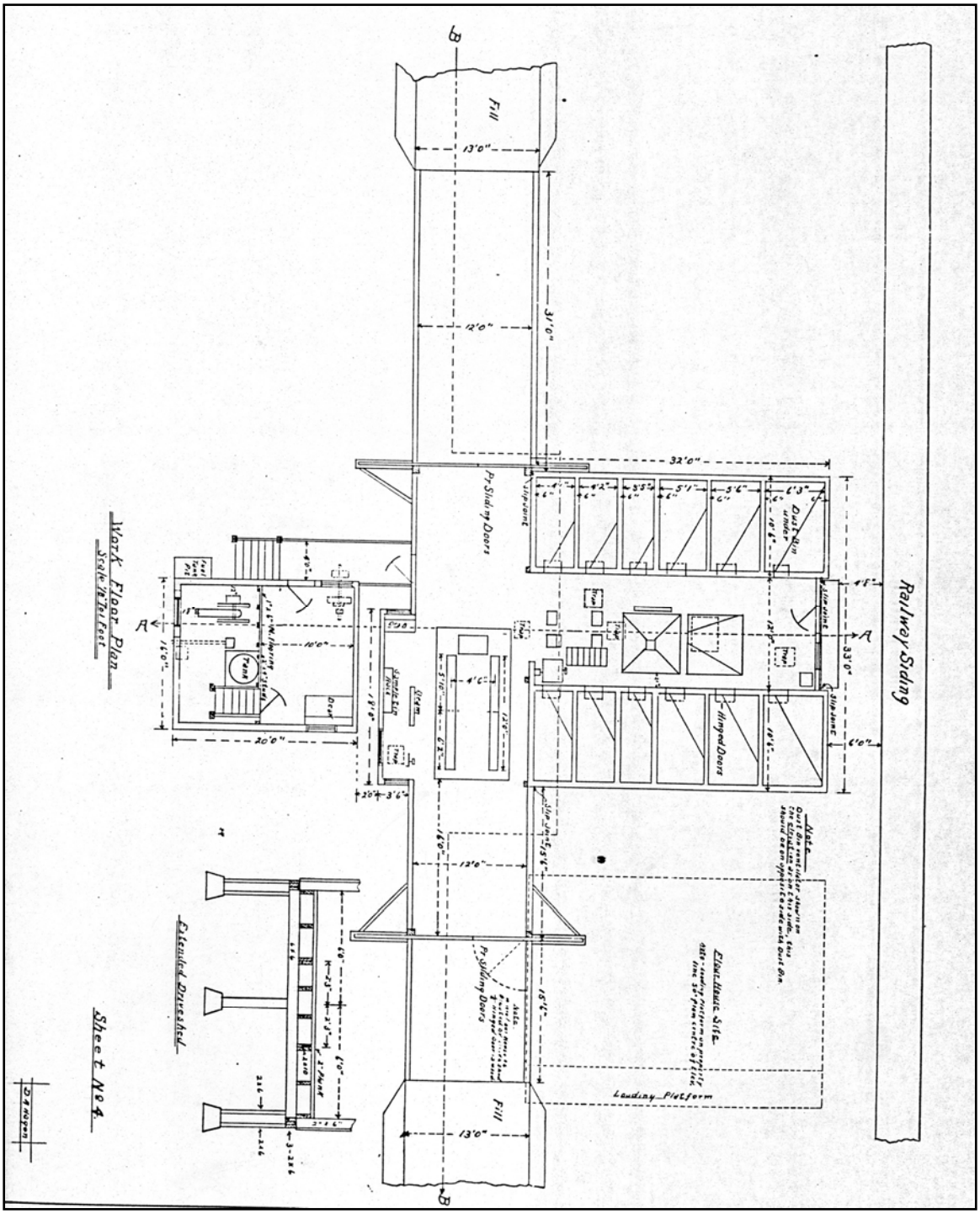
THE GRAIN GROWERS GRAIN CO.

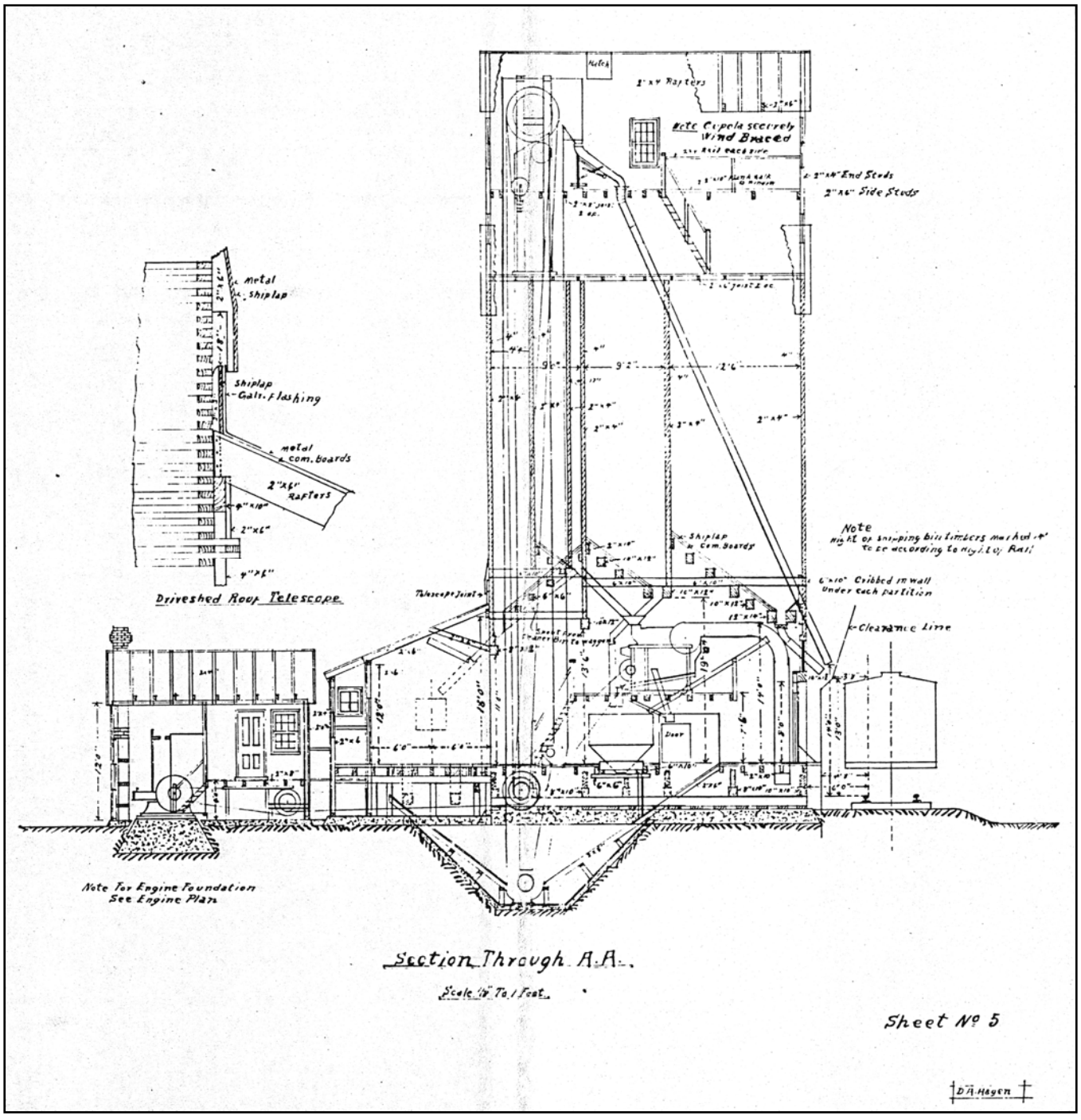
LIMITED

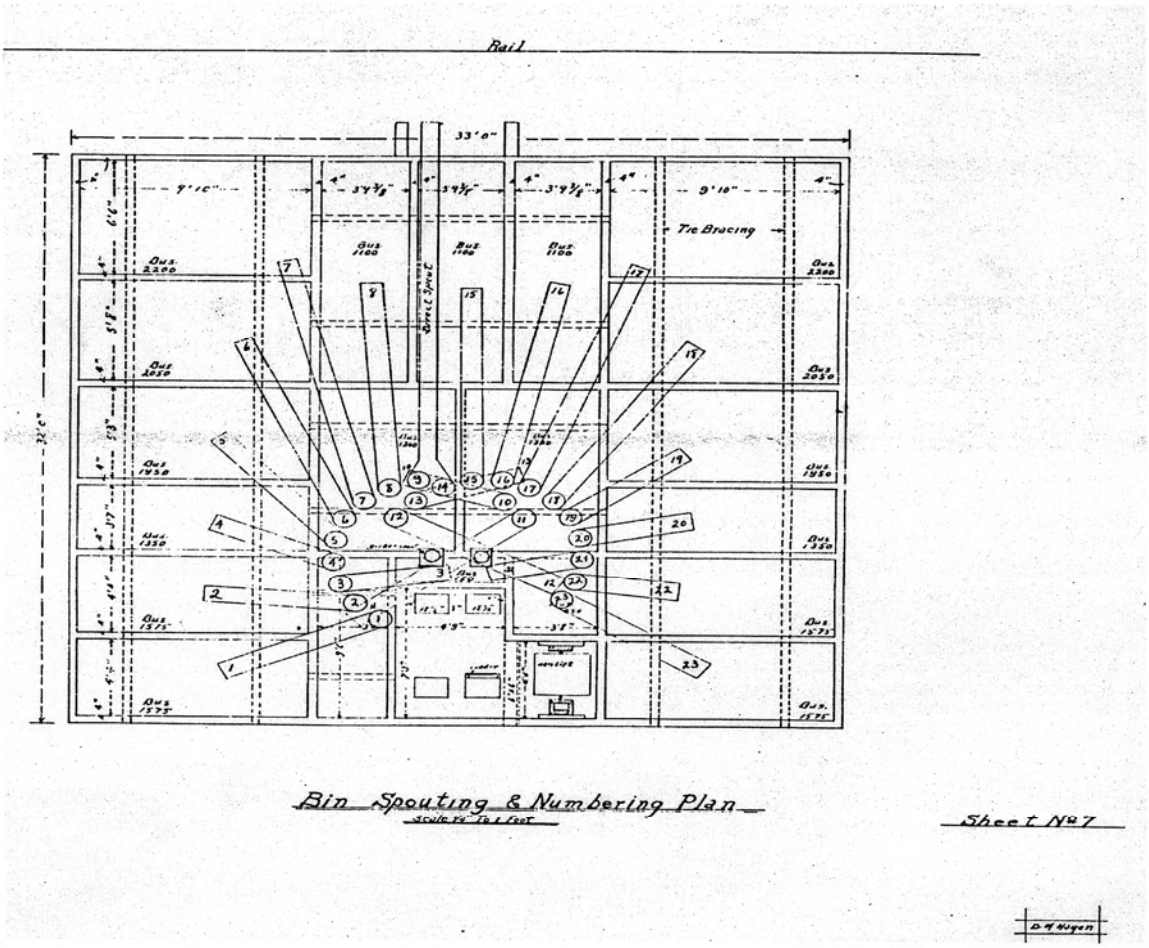
WINNIPEG MAN

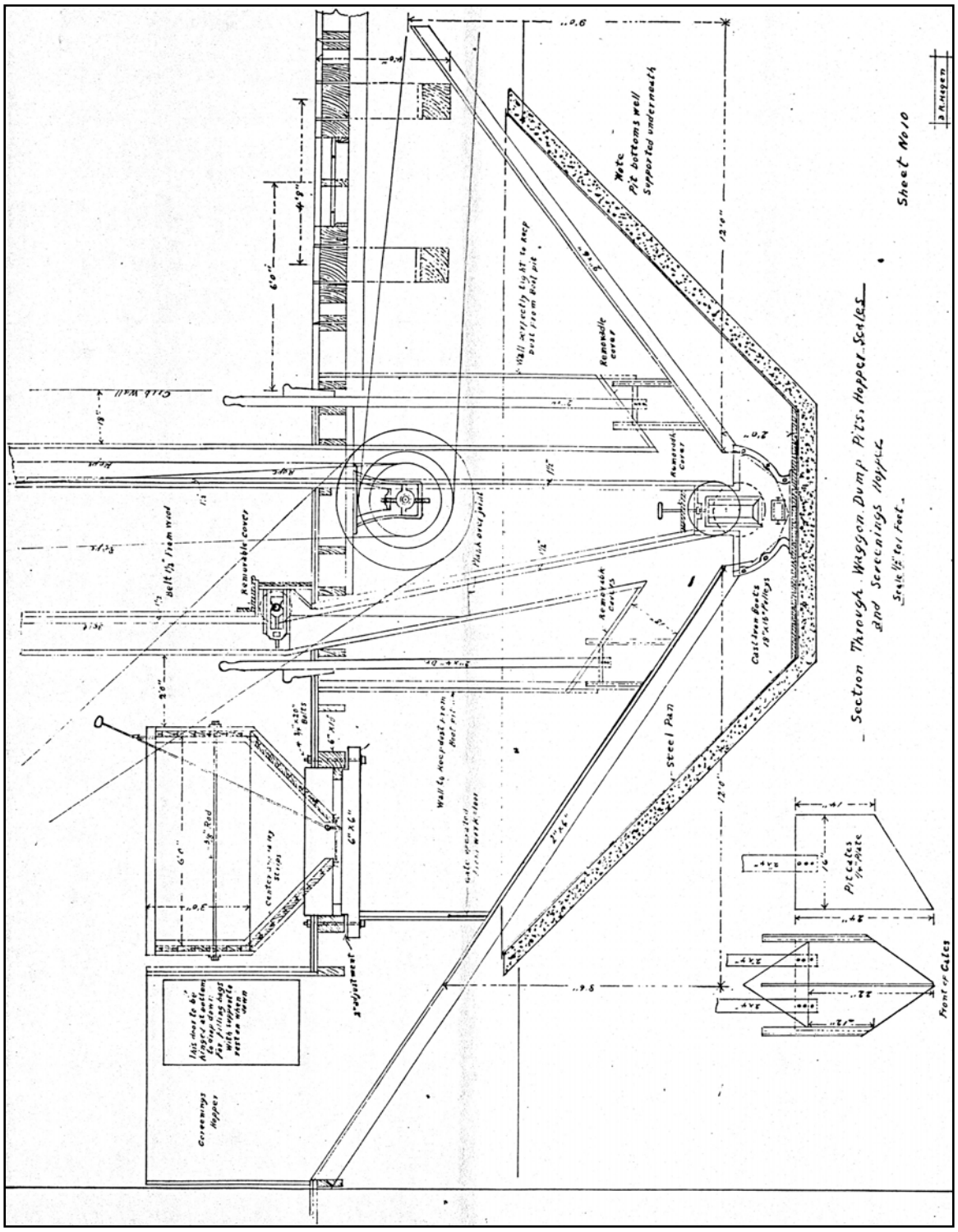

THE C.C.C. CO.
LIMITED
Side Elevation
Scale 1/8 To 1 Foot.
Sheet No I
D.A. Hagen

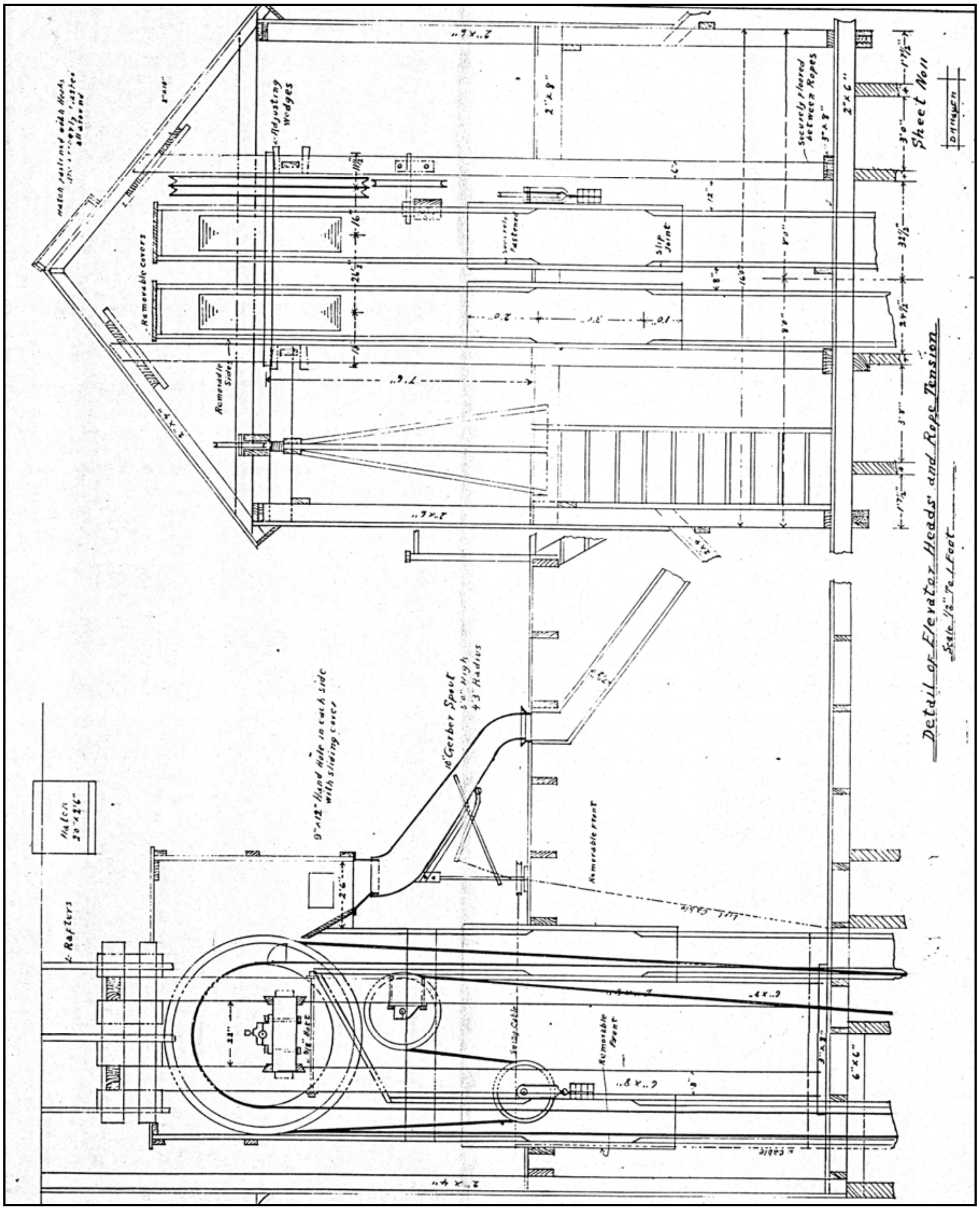

End Elevation
Scale ½" To 1 Foot
Sheet No 2
D A Hagen

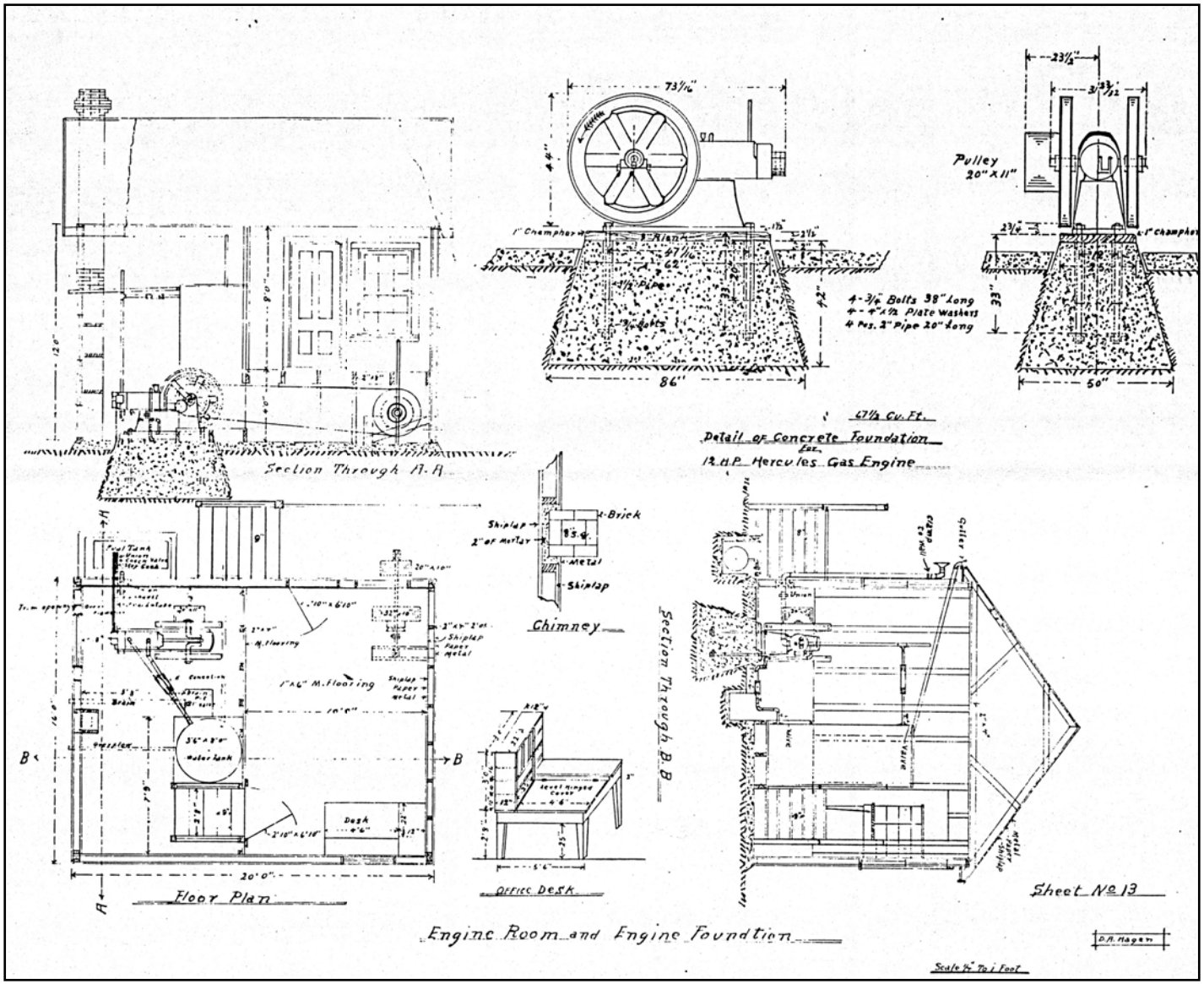

Railway Siding
Fill
13'0"
12'0"
31'0"
32'0"
Pr Sliding Doors
Dust Bin under
Hinged Doors
33'0"
6'0"
20'0"
Loading Platform
Fill
13'0"
Pr Sliding Doors
Extended Dispatch Shed
Work Floor Plan
Scale Half an Inch to a Foot
Sheet No 4


Note Cupola securely Wind Braced
2"x4" End Studs
2"x6" Side Studs
metal
Shiplap
Shiplap
Galv. flashing
metal
com. boards
2"x6"
Rafters
9"x10"
2"x6"
9"x6"
Driveshed Roof Telescope
Telescope Joint
Shiplap
& Com. Boards
Note
Height of shipping bin timbers must not be
to be according to High Water Rail
6"x10" Cribbed in wall
under each partition
Clearance Line
Door
Note for Engine Foundation
See Engine Plan
Section Through A.A.
Scale ½" To 1 Foot
Sheet No 5
D.A. Hagen


Rail
33'-0"
Tie Bracing
Drill Spout
Bin Spouting & Numbering Plan
Scale ¼" to 1 foot
Sheet No 7
D.H. Hugen


Section Through Waggon Dump Pits, Hopper Scales and Screenings Hopper
Scale ½" to Foot.
Sheet No 10
Note
Pit bottoms well supported underneath
Steel Pan
Screenings Hopper
Front of Gates


Detail of Elevator Heads and Rope Tension
Scale 1/2" To 1 Foot
Sheet No 11
Removable covers
Adjusting Wedges
Removable Side
Slip Joint
10" Gerber Spout
9"x12" Hand Hole in each side with sliding cover
Hatch 2'0"x2'6"
Rafters
Removable Front


Section Through A-A
Floor Plan
Chimney
Section Through B-B
Office Desk
Detail of Concrete Foundation
For
12 H.P. Hercules Gas Engine
67½ Cu. Ft.
4-3/4 Bolts 38" Long
4-4"x½ Plate Washers
4 Pcs. 2" Pipe 20" long
Pulley
20" X 11"
Engine Room and Engine Foundtion
Sheet No 13
Scale ½" To 1 Foot