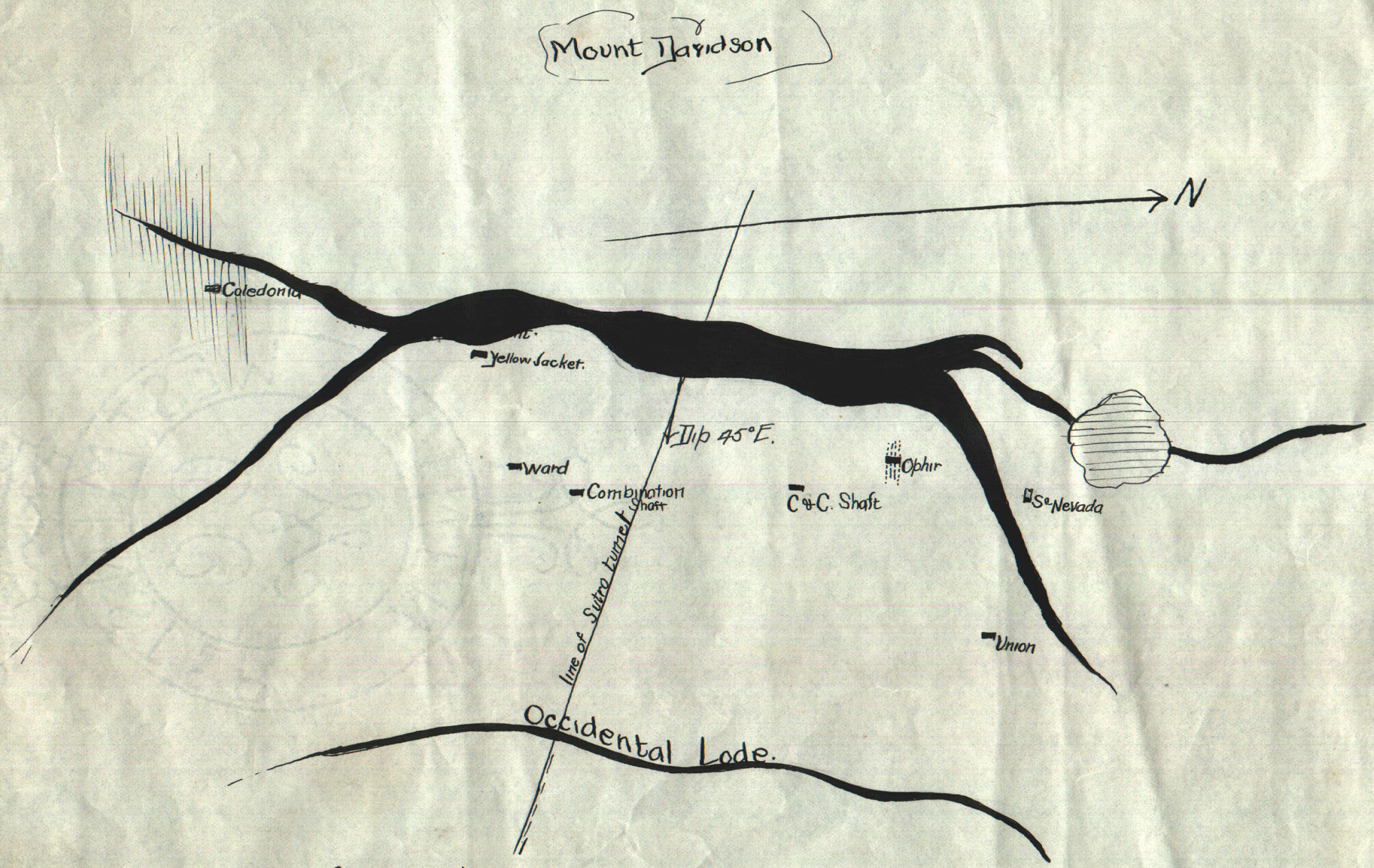
Nevada
Storey County
Comstock District

NOTES ON COMSTOCK MINES AND MILLS.



Map of vein showing approximate position of shafts of the Comstock with respect to the vein

MINING AND MILLING OF THE COMSTOCK ORES.

Notes taken during a four days trip through the various mines and mills of the Comstock Lode beginning April 21st and ending April 24th, 1904.

The Comstock Lode lies on the eastern slope of Mt. Davidson, the highest peak of the Virginia Range. The country rock is all volcanic and as far as mining goes is comparatively hard. The ore occurs in veins of quartz which are of considerable size. This was one of the richest mining camps of the world but at present most all of the mines have been abandoned. The greater part of the mining in this region is done through shafts to the extreme depth of 3500 ft.

The main obstacles in mining are the flood of water and the increase of heat with depth necessitating very large pumping and ventilating plants.

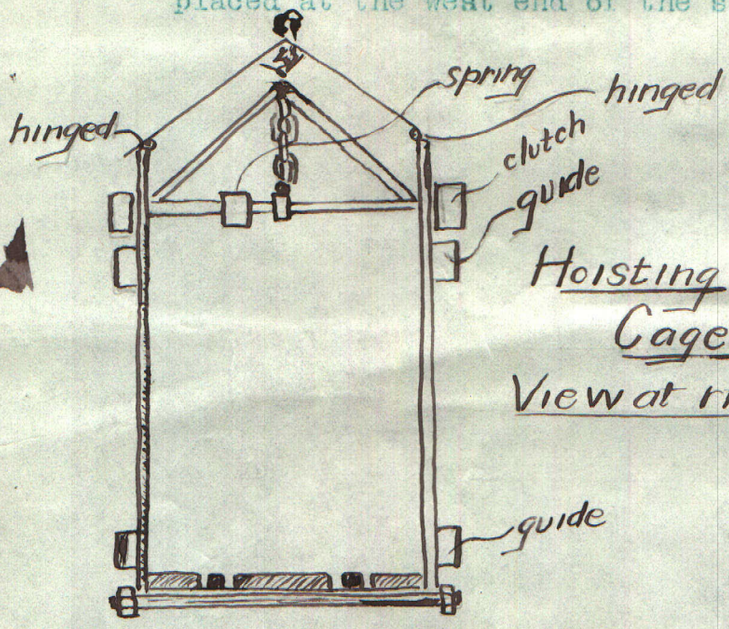
SIERRA NEVADA HOIST (small shaft).

Location: Northern end of Comstock Lode and east of croppings.

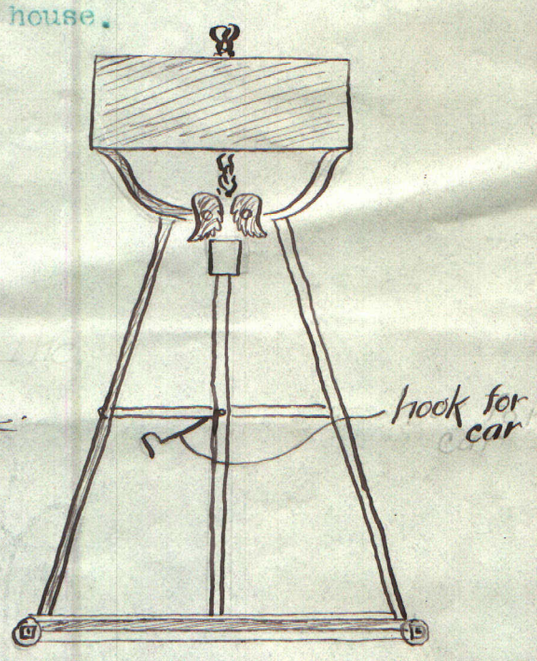
This is a type of hoist used for prospecting to a moderate depth. It is electrical driven and is capable of hoisting from a depth of 500 ft. The present depth of the shaft is 250 ft. and is not being worked. It is a two compartment shaft with the same type of cage used all over the Comstock. The gallows frame is built up of 10 x 12 timber and the shives (52 inch) are about 20 ft. high. The cars used for excavated material are end dump and have a capacity of about 1800 lbs. 28 in. x 26 x 43 in.

A two drum hoist was used and was originally driven by steam.

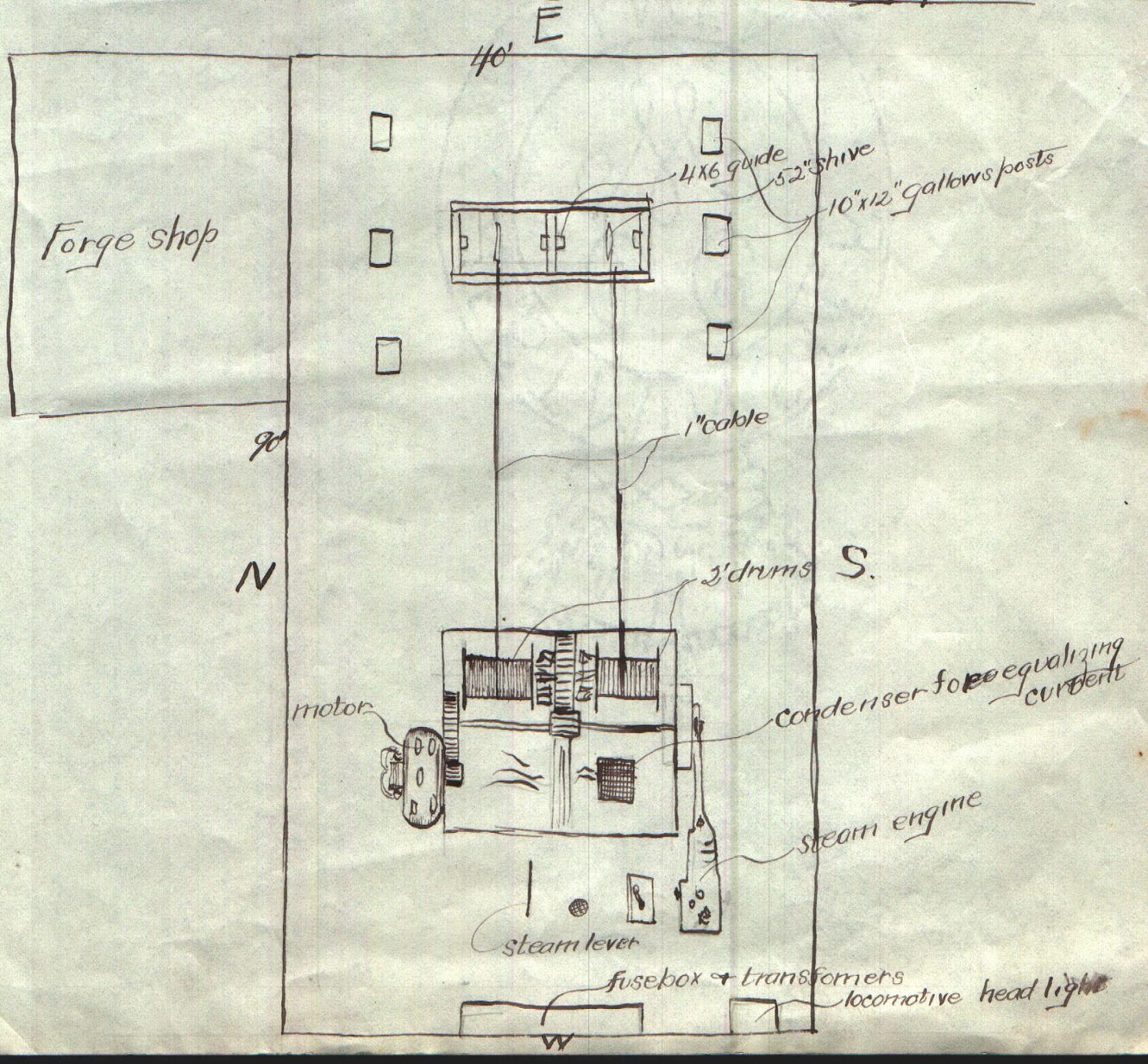
Later an "F." Westinghouse variable speed motor was installed. The current is stepped down from 2300 to 400 volts by transformers placed at the west end of the shaft house.



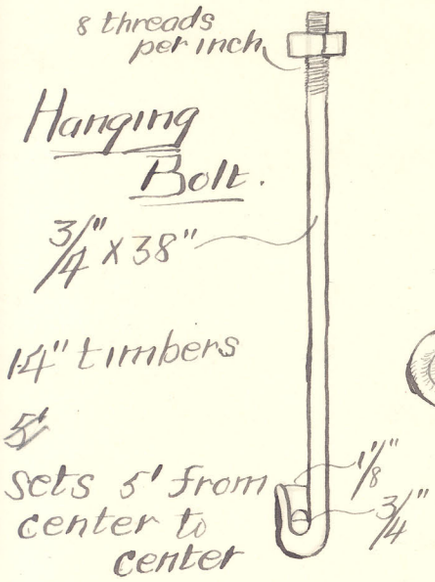
Hoisting Cage.
View at rt ls.



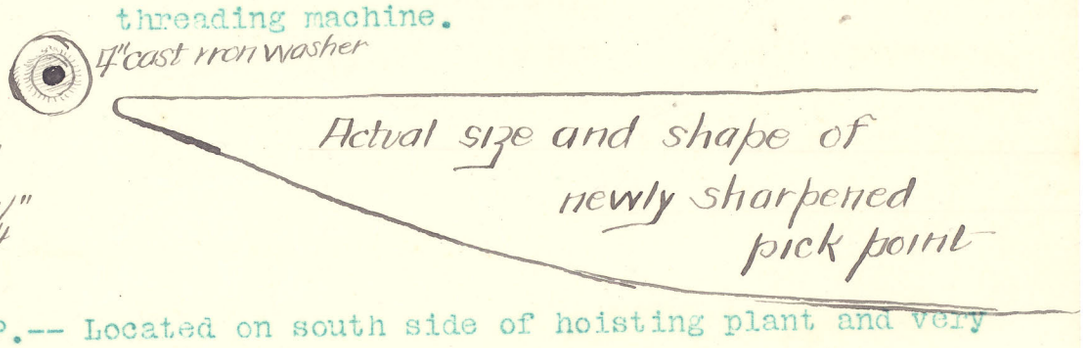
Approximate plan of Sierra Nevada Hoisting plant



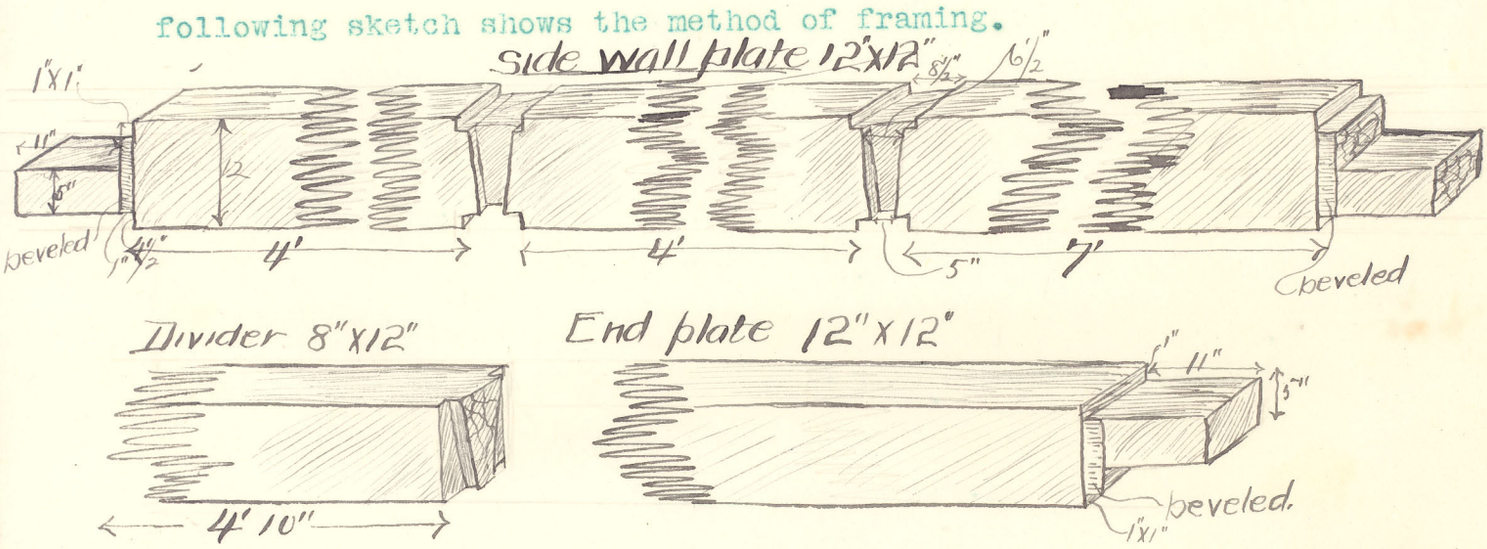
There was a high and low pressure cylinder and an enormous walking beam which raised a column of water in the shaft pipe over two hundred ft. ata single stroke.



FORGE SHOP.--- Consists of one bellows, one forge, one set of drill sharpeners tools for plus bits and a good many ordinary blacksmith's tools. There was also a Wiley and Russel bolt threading machine.



WOOD SHOP.-- Located on south side of hoisting plant and very convenient to the shaft. Timbers are sent to the bottom of the shaft by lashing them on the cages. The shop is rather large to accomodate a large supply of timber. It is equipped with two round motor driven saws and rollers for heavy timbers. The following sketch shows the method of framing.



YELLOW JACKET HOIST.

This is located in Gold Hill near the southern end of the Lode. The electric hoist is of about the same type as the one of the Union Shaft. Near the hoist is an E. A. Rix Duplex air compressor. 104 rev. per minute which is driven by 75 H. P. induction motor 2080 volts. The shaft has two hoisting compartments and the ordinary cage is used.

CROWN POINT.

This consists of short tunnels and stopes driven under croppings of the vein near the V. & T. Crown Point bridge. All of the workings in this mine are poorly timbered and represent a typical poor man's mine. In the tunnel an occasional timber is put in where loose ground is encountered. The stopes are mostly all narrow and are timbered by short stulls and a few lagging where the ground is very loose due to filling of old workings of previous mining operations. The ore here contains a great deal of manganese and is sampled almost entirely by panning.

BRUNSWICK LODE No. 1.

Located on the St. Johns ledge about 1 1/2 miles south east of Virginia City.

The ledge is about parallel to the Comstock Lode and dips about 43 degrees to the east. An inclined two compartment shaft follows the vein down to a depth of 900 ft. The width of the vein varies from a mere seam up to 75 ft. Several stations were cut and drifts are run along along the srtike for several hundred ft. Very little ore was ever taken from this vein on account of its low grade. The hoisting in the incline is done by an elecrtic hoist. The skips are self dumping. One of the compartments of the incline is used as an upcast and the other a downcast. The whole mine is ventilated by this method.

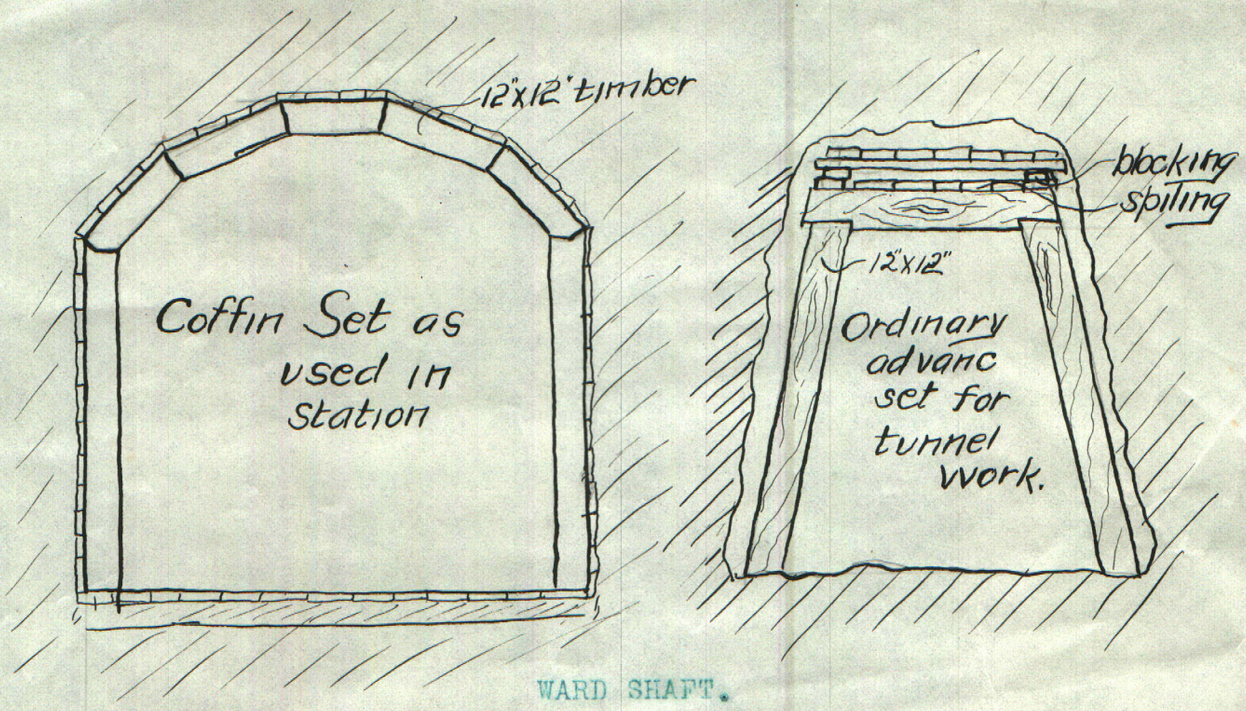
UNION SHAFT HOIST.

This is a type of hoist used in deep mining. It is electrical driven and consists of a Risdon Continuous rope hoist run by a 100 H. P. 3 phase motor. The hoisting is at present being done by steam on account of the sinking being done in the shaft. This consists of a two drum steam hoist of 40 H. P. two cylinders.

At one time this hoisting plant was the site of one of the biggest pumps of the world. The fly-wheel was about 35 ft. in diameter and weighed about 105 tons.

CALEDONIA SHAFT.

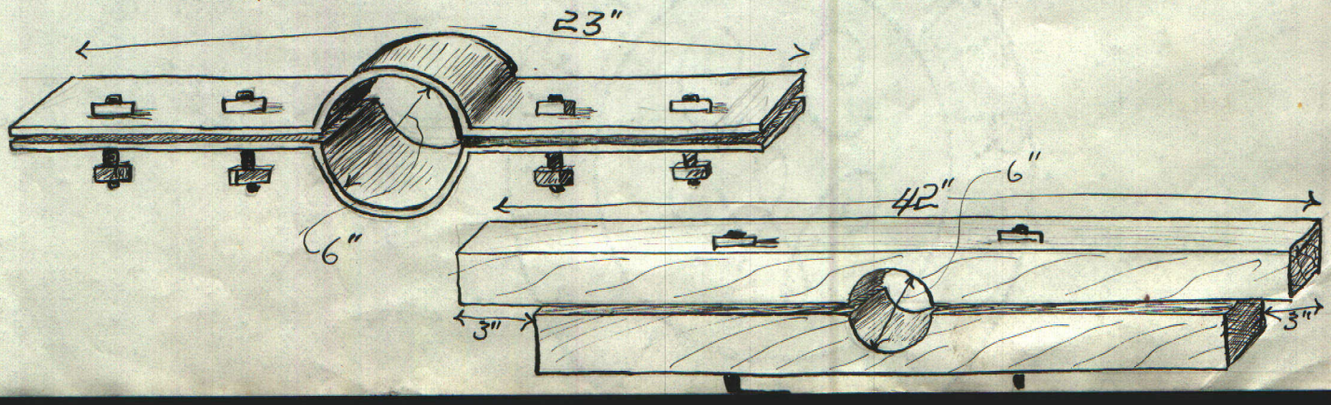
Gear driven reel hoist single cylinder engine. Jaw clutch. Work being done on twelve hundred level only. Stations cut and timbered by coffin set. A ten H. P. motor blower (40in. fan) used for ventilation of this level. An 11 inch air pipe is used in some places and is said to be too small. Drifts and winzes are run for long distances along a low grade vein. The management have decided to leave this vein and drive crosscut to original Comstock vein.



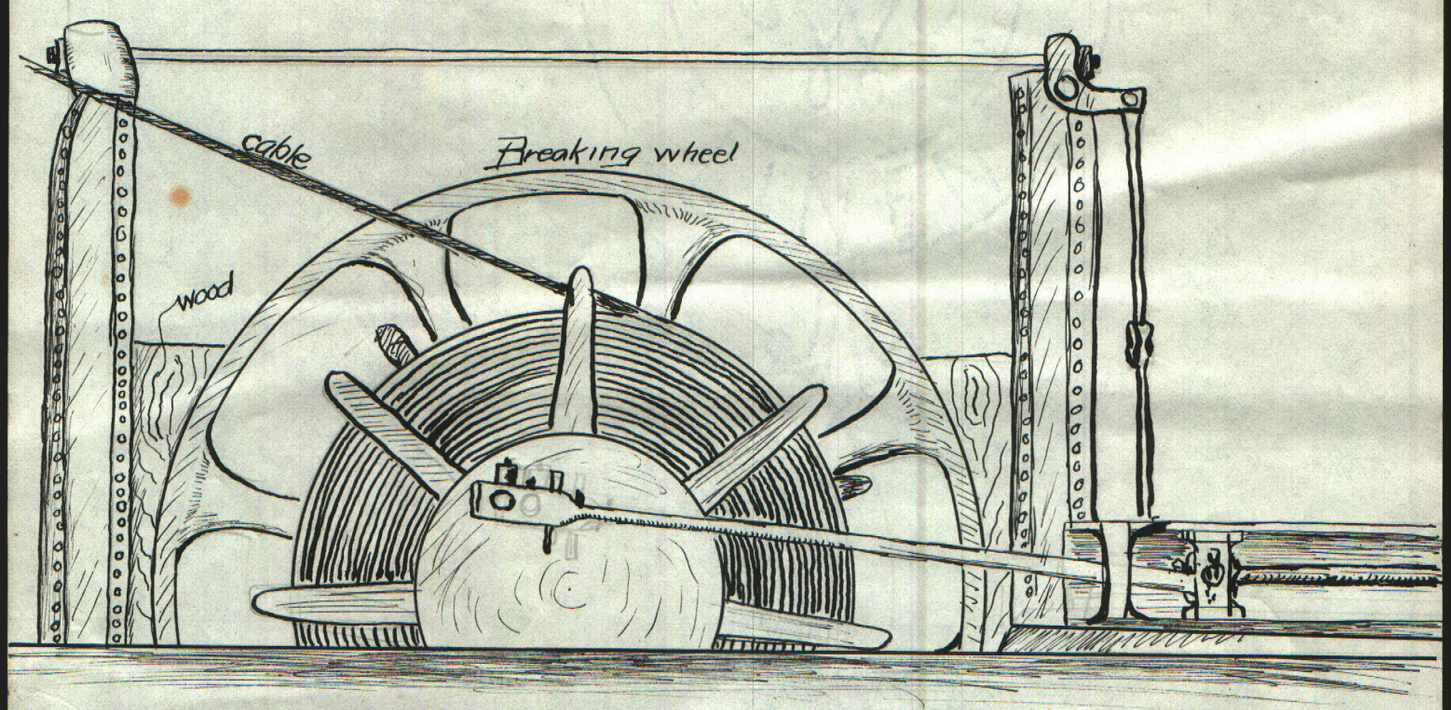
WARD SHAFT.

This shaft was once abandoned and much of the shaft caved and is at present being retimbered preparatory to prospecting the ground. The retimbering costs $23.00 per set. The shaft timbers are held up by inclined posts to walls of shaft at surface and the same further down.

Iron and wooden clamps used for holding up the 6in. water pipe in the shaft.

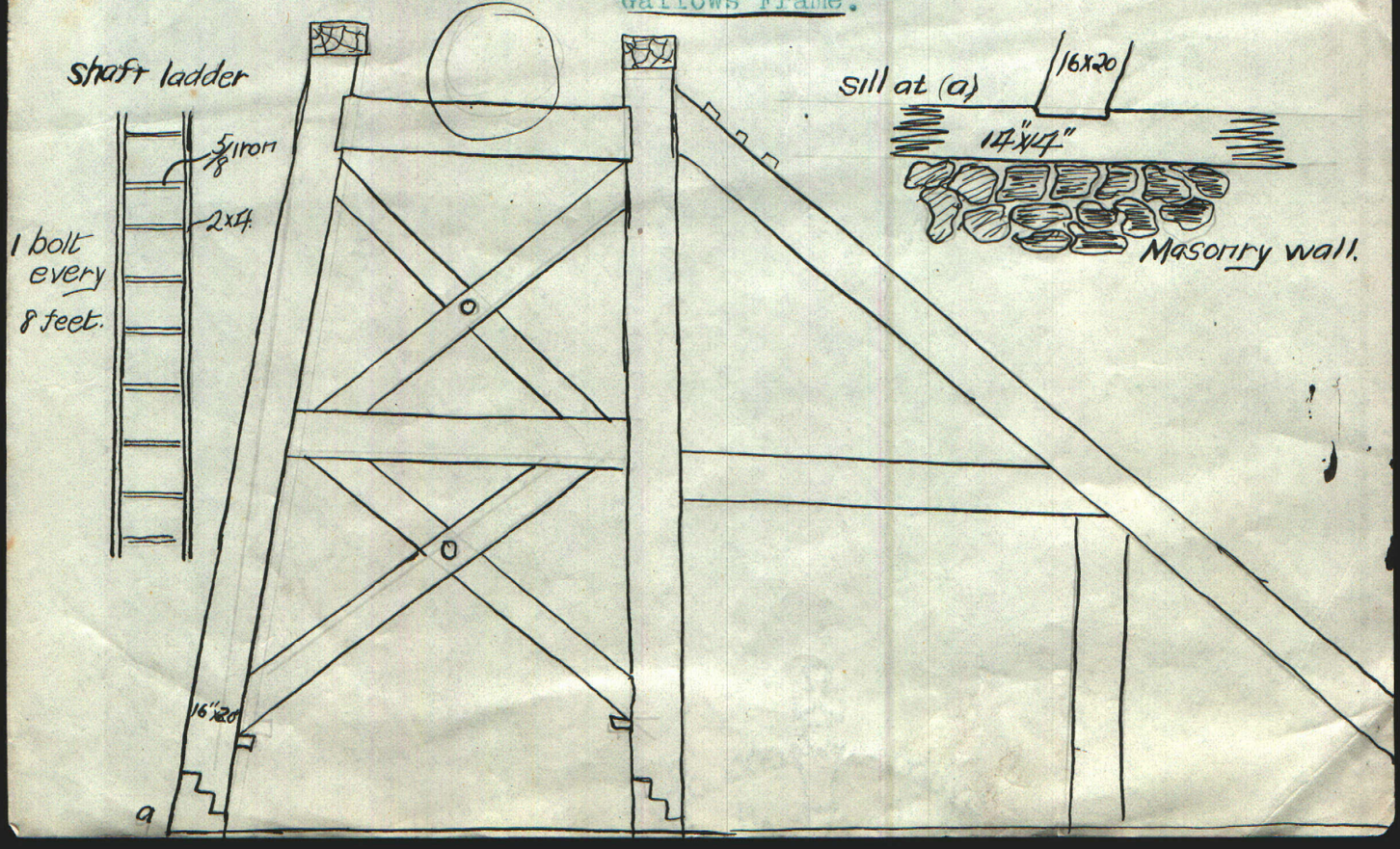


Approximate side view of reel and brake.



A 20 H. P. motor is installed in the shop. 2 jaw clutches on driving shaft. Round saws and grinding stone. Blacksmith shop. Change room.

Gallows Frame.



COMBINATION SHAFT.

This is the largest and deepest shaft of the Comstock. It is now abandoned and used as an upcast, for ventilating most all of the other mines. It is four compartment and was sunk to the depth of 3500 ft. The hoisting and pumping and air compressing pant are of the very large type. The shives are four in number and are about 16 ft. in diameter. There was no gallows frame used.

C & C SHAFT.

Location: One half mile or more east of about the middle of the croppings of the vein. A small vein parallel to the large vein was encountered in the shaft. This is a three compartment and very deep shaft and is a down-cast and the Ophir inclined is the up-cast. This ventilation causes a draft of air strong enough to blow a man's hat off. The remainder of the mine that is not ventilated by this natural circulation is furnished with fresh air by electric fans. The temperature of the 1950 and 2150 levels is very high and is getting higher. This is the only mine on the Comstock that is at present working on a large scale and producing are. Hoisting is being done through 2150 ft. Quite a large body of ore has lately been struck in the Ophir ground and is hoisted through the C & C shaft.

At the 2150 level there is installed a very large pumping plant. It consists of three 220 H. P. induction motors and large Reidler pumps, drawing the water through a two ft. pipe from a large tank. The water is brought from the lower levels to this tank by the hydraulic elevator. The electric pumping plant pumps the water to the surface. The temperature of the water is about 120 degrees F.

HOIST.-- This is a reel hoist similiar to the one at the Ward shaft, but is much larger.

The indicators for depth consist of a large revolving cylinder for each compartment.

At the change of shift, about ten men pile on each cage. Each man reports at the time-keepers' office before going down in the mine. The waste rock from the mine is trammed out on the dump and the ore is dumped from the cars in a large ore bin about a hundred yards north east of the shaft.

The old head frame is still used over the shaft, and is a very heavy type of framing. The power plant consists of four large boilers but only two are used at once. Four foot pine wood is used.

FORGE SHOP:-- One forge working. Plus bits sharpened. Four men constitute the forge crew.

MACHINE SHOP:-- Several large lathes and other machinery. About four men working. Many of the steel wearing plates of the mine pumps have to be replaced on account of the corroding power of the mine waters.

THE WOOD SHOP:-- The wood shop adjoins the machine shop. The timbers are framed here.

ROPE HOUSE:-- A shed about 100 ft. long and 20 ft. wide. One coil of flat steel rope is always kept ready. Before using, the rope is first tarred and then lubricated. The rope in the shaft is over-hauled about every week and a new one ~~and a new one~~ is placed about every eighteen months.

CHANGE HOUSE:-- The floor of the change house is below the hoisting floor. It consists of a large room with several long rows of hooks with a lot of miner's clothes hung on them. The room is kept warm by a very large stove. Following are some of the rules posted on the wall:

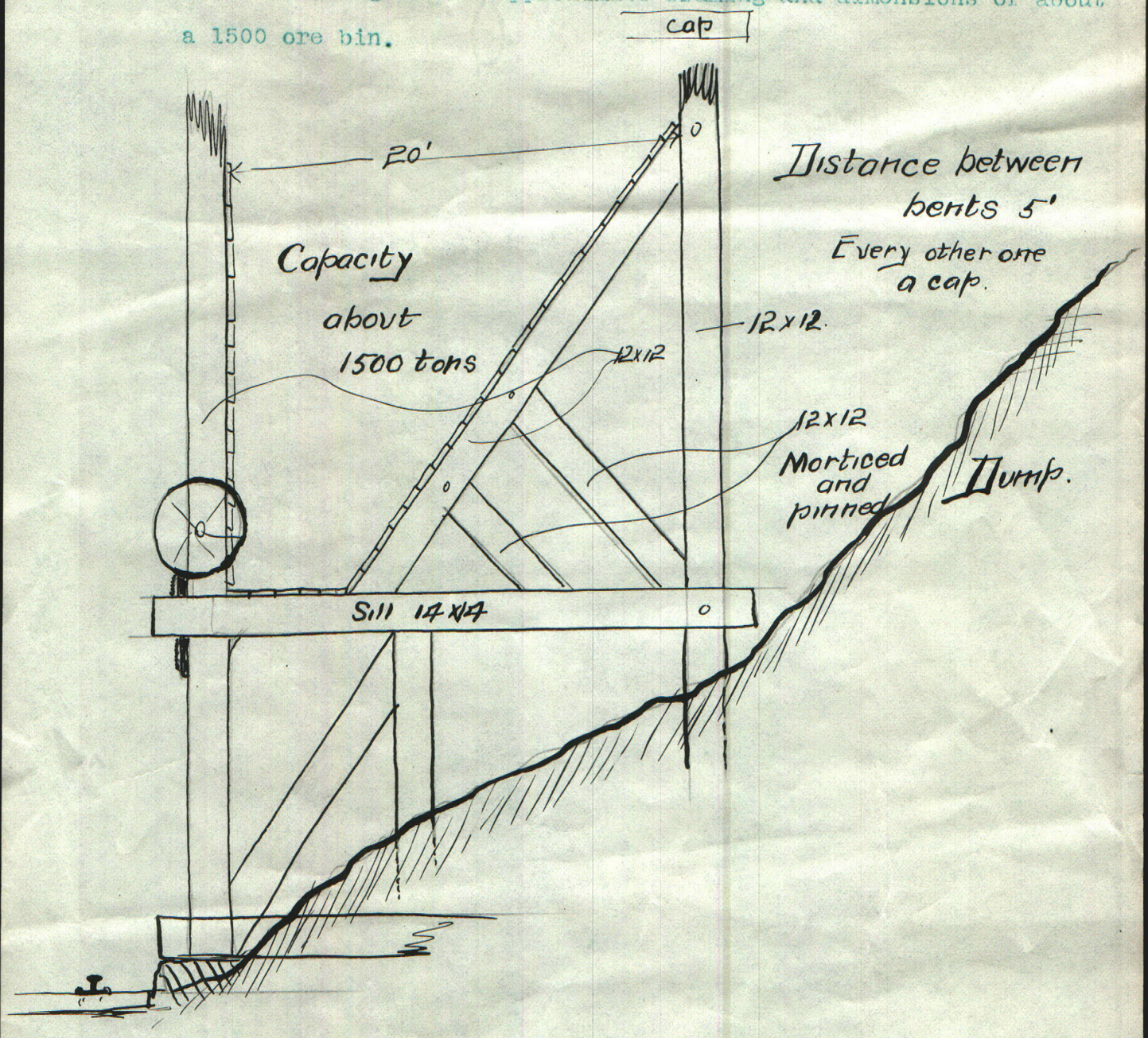
"Any clothes found on the floor will be destroyed."

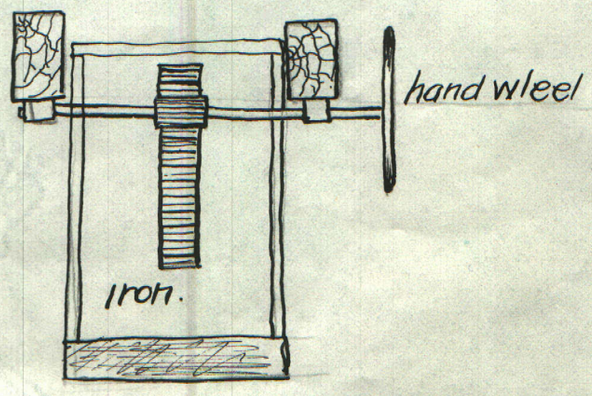
"Any one throwing clothes on the floor will be discharged."

All visitors to this mine register at the office and are well treated. There are accommodations for bath next to the office.

UNION ORE BIN.

Following is the approximate framing and dimensions of about a 1500 ore bin.





Ore chute from bin

KINKEAD MILL.

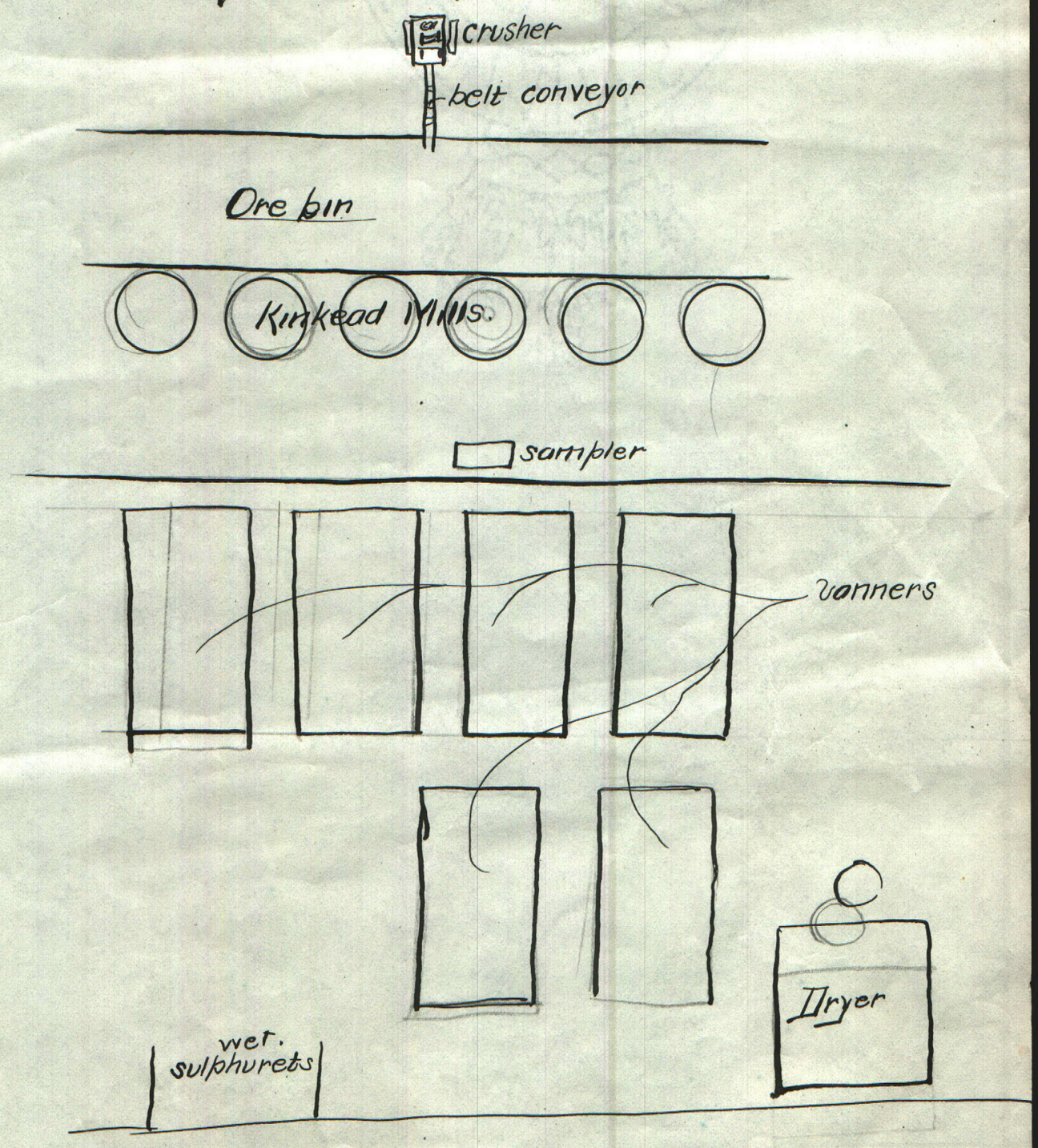
This mill has six Kinkead mills and six Wm B. Frue vanners and has a compacity of about 40 tons per day. The concentrates that are now obtained, run from $600.00 to $1500.00 per ton. Considerable fine sulphurets run off with the tailings. The difference of verticle height between the ore bin and the grinders is about eight feet and from the grinders to vanners ten feet.

The ore is taken from the rock breaker to the ore bin by a belt conveyor. The ore is fed into the grinders by automatic disc feeders.

A small traveling chain block is hung over the mills in order to hang up a grinder to put in new wearing plates which last about week. The ore is groud to 40 mesh through punched burred screen and the pulp is carried to the concentrators through pipes. Each mill has its own concentrators. The belt of the concentrator travels at the rate of about 60 ft. per minute and shakes at the rate of 1800 strokes per minute. The vanners are six feet wide and slope 1/4 inch per foot. Just back of the streams from the distributor free gold can be seen with the naked eye. The sulphurets are dried by steam pipes to about three per cent moisture and sacked for shipment.

The tailings are run through a canvas plant, boxes 2ft. by 36 ft. The tails are then run over a Woodbury shaking table saving about 100 lbs. of sulphurets per day. Speed 230 strokes per minute and run by pelting wheel.

Approximate plan.



BEST and BELCHER MILL.

Vertical height of mill 100 ft. 2 grizzlys bars 1 1/2 in. apart. One 6x22 Gates Gyratory crusher just at end of grizzlys and run by 20 H. P. motor.

Next Floor:-- Five Kinkead mills and traveling chain blocks of 6000 lb. test. The mills are run by 20 H. P. motor and crush coarse (1/8 inch).

Next Floor:-- Five vanners run by 5 H. P. motor.

Next Floor:-- Four Kinkead mills. Fine crushing. Smaller mills.

Next Floor:-- 4 ft. vanners. Tails from first crushing run through classifier to separate fines from coarse to prevent too much sliming of the ore.

There is a canvas plant on the bottom floor with a slope of 1/2 inches per foot. The boxes are 23"x 32'.

WOODBURY CYANIDE PLANT.

One strong solution tank 11x20 ft. and three small weak solution tanks. Eight leeching vats 4 ft. by 19 ft. 8 in.

Zinc boxes 23 inches wide and built of 2in. planking.

THE BUTTERS CYANIDE PLANT.

This plant is situated in six mile canyon about three miles east of Virginia City. It was built for the purpose of cyaniding 130,000 tons of tailings that had accumulated in this canyon. The tailings run on an aversge 3.95 oz. of silver and .12 oz. of gold per ton. They are first harrowed and dried and then scraped by slips and dumped into side dump cars which are trammed up an inclined trestle work by an endess cable, and which are dumped into a large bin.

A belt conveyor carries the tailings to large wheel elevator. This mill is designed to have a capacity of 300 tons per day.

The sol. is precipitated by a continuous electric current. The electrodes are of lead and aluminum, 26 in. by 48 in.

The aluminum is the anode. The plates are cleared of precipitate by mechanical brushes.

The solution after being ppd. is passed through filter press 22 plates.

The precipitating current is supplied by 50 volts 500 Ampere dyna mos run by a motor.

This plant taken as a whole is very modern, and has all of the latest mechanical appliances.

see plan

Approximate plan of Butters Cyanide plant.