

Various Special Pieces of Factory Equipment

Described in the Hawaiian Sugar Technologists' Association Report, 1922
or from local sources

THE CARTER JUICE STRAINER.

Manufactured by the Horton Brown Corporation, 149 Broadway, New York City, for straining both cold and hot juices. The following are the results from a machine installed by the West Indian Finance Corporation at Central Consuelo in the Dominican Republic.

On Cold Juices.—A supply tank 8ft. 6in. above the strainer is sufficient head to revolve the strainer at 40 r.p.m. The suspended matter from the juice flows by gravity through the mud pipe beneath the strainer to the mud canal under the defecators with a volume of a one inch pipe of juice escaping with it. The small volume of unstrained juice passes over the screen surface and keeps them clean and at the same time conveying the separated matter where ever desired. The clear juice flows by gravity through the strainers and is pumped away from the bottom.

The mill juice strainer is 12 mesh brass—144 holes per square inch. Size of opening, 0.053 inch.

The Carter Strainer has three sets of twilled monel wire cloth screens as follows:—

First Screen.—20 mesh—holes per square inch, 400. Size of opening, 0.0220 inch.

Second Screen.—30 mesh—holes per square inch, 900. Size of opening, 0.0163 inch.

Third Screen.—40 mesh—holes per square inch, 1,600. Size of opening, 0.0115 inch.

Over 17,000 lbs. of bagacillo is removed from the cold juice each 24 hours from the juice of 2,800 tons of cane. Before straining the cold juice 2,500 lbs. of bagacillo was being removed from the clarified juice each 24 hours on average cane.

By the Strainer on the Hot Juice.—Since installing a screen on the cold juice the bagacillo has decreased from 2,500 lbs. to less than 500 lbs. in 24 hours. The per cent. of mud at defecators has decreased—more clear juice is recovered and the juice settles more rapidly. The heating surfaces are kept cleaner and the factory can handle more juice.

THE MITCHELL SCREEN.

Manufactured by C. W. Hunt Company (1928) Inc., New York, U.S.A. The screen is designed in one size only, which has a rated capacity of 500 gallons per minute on cold juice. The screen is an electrically vibrated screen driven by a motor built directly in the housing and wound to suit 220—440 and 550 volts, 2 or 3 phase—50 or 60 cycle, to suit customers' requirements.

The vibrations of the screen are 60 per second in a circular movement of about 1/16th of an inch in diameter. The horse-power required is about three-quarters.

The results of a trial installation at Central Hormiguero—Cuba—were so satisfactory that three more installations have been installed for the present crop. An 80 mesh screen was used first, and was later changed to one of 60 mesh cloth. This was later changed to one of 40 mesh cloth. It was discovered that the 40 mesh screening gave juices as clear as the 80 mesh and 60 mesh and did not clog up nearly as fast.

The tests were also conducted with monel metal, nickel metal screens and bronze gauze screening. It was discovered that a 40 mesh phosphor bronze cloth back by a 5/8 in. opening, phosphor bronze cloth was the proper screen cloth to use.

The screen cloth kept clean for the first five or six hours, after which plain hot or cold water applied for a couple of minutes put it into order for another six hours, when the screen became completely clogged after 9 or 10 days. This screen was immersed in a solution of 1—1½ % potash solution for 15 hours, washed with hot water and was ready for use again. In the meantime a spare screen was installed in the machine, taking about 15 minutes.

The bagacillo removed amounted to about one ton dry basis per 250,000 arrobas of cane in 24 hours. Taking the strained juice and re-filtering this through a 100 mesh screen by gravity it was found that there remained 3/10 to 1/2 % of solids left on the weight of juice.

THE AUTO FILTER.

The Auto Filter consists of a wrought steel cylinder—divided above the horizontal centre into two parts, hinged together—the top half being raised by means of an overhead chain tackle when necessary to be open. The inlet and sluicing out pipe are connected to the bottom of the cylinder, and the air and water connection are on the top part of cylinder and are disconnected when filter is to be open.

The leaves of the filter consist of a heavy wire gauze, and are hung on to a rectangular frame-carrier, which is attached at either end to a heavy shaft, which extend through the steel cylinder and are supported by roller bearings set in a pedestal. The carrier is rotated by means of a worm drive attached at one of the end projecting shafts. The filtrate from each leaf passes through a separate pipe to a manifold at each end of the shaft, half discharging at one end and half at the other. Outside of the manifold are arranged glass tubes—one for each leaf, so that the action of each leaf may be observed. Connected with these tubes are cocks for the shutting off individual leaves should they run cloudy.

The filters are equipped with a patent sluicing device, which throws a stream of high pressure water on to both sides of the leaves while rotating. The filter cake and sluicing water discharge through the sluicing valve in the bottom of the shell.

A connection is also made whereby hot water may be forced through the leaves from the inside to facilitate the cleaning of the cloths.

THE AMERICAN CONTINUOUS VACUUM FILTER.

This is a rotating filter consisting of sectionated wooden or cast iron leaves amounted transverse to a rotating shaft. Each leaf is made up of triangular sector sections of approximately six or eight in number for small filters. Each sector has its own drainage member, consisting of a nipple, and a filter bag envelopes the whole sector and is securely fastened round the nipple, leaving a port exposed.

To assemble the filter, these individual sector sections are placed with the drainage nipple into its receiving port located on one of the main collecting conduits in the main shaft, the joint being made with a rubber insertion. The sector leaves are aligned by clamps secured at each radial aligning rod with a nut.

As with a plate and frame press, as many discs as required can be placed along the machine, but the individual sectors in each disc in the same relative position along the shaft feed into the same collecting conduit.

On the end of the shaft is a self aligning and adjustable valve similar to a plug cock, the plug being connected to three pipes—one for the collection of filtrate, another for the wash water and the third for the introduction of compressed air.

The leaves rotate in a bath, allowing approximately half of the area to be submerged into the solution to be filtered. To allow for discharging of the cake the pan is manufactured into separate narrow pans for each leaf to allow the cake to drop between.

The filter is rotated by worm drive either direct motor driven or belt driven, and while operating the suction draws the filtrate through the cloth on the submerged leaves and into the filtrate port in the valve at end of shaft. The leaves then gradually rise, having the required amount of cake deposited on them. On rotating, the ports in the shaft are consequently rotated, and the next quadrant is utilized for washing the cake—by means of fine sprays impinging on the cake. The wash water is directed into the wash water header by means of the valve ports in the end of shaft as stated previously.

Finally, the cake is discharged in the next quadrant by means of compressed air being introduced into the bags fastened to the sectors.

The cake being dry cracks and falls away, and is deflected by means of scrapers on to the spaces between the pan sections cut away for this purpose.

These filters are ideal for good filtering solutions with a reasonably high percentage of solid content, depending on the nature of material to be filtered. The upkeep on cloths is very little, and one labourer can attend to many machines at a time.

Mr. Simpson, of Messrs. Natal Estates, Ltd., Mount Edgecombe, has kindly reported on the following:—

- (1) HUMMER SCREEN FOR SCREENING JUICE.
- (2) SEARBY SHREDDER.
- (3) MACERATION BATH.

(1) Hummer Screen for Screening Juice.

It is recognised that by straining the juice to a far greater extent than by the usual Cush Cush straining apparatus it is possible to remove a large amount of substance that otherwise might be deleterious to both filtering and also the purity and recovery of sugars.

This has been done successfully by the Peck Strainer, which has now a rival in the Vibrating Screen. These strainers are already in use in other sugar countries, and are being used throughout Natal and Zululand with excellent results.

(2) The Searby Shredder.

The Swing Hammer Shredder, as patented by Searby, of Hawaii, is in universal use in that country, where it is recognised exists the last word in extraction. In this country it has been in use at Mount Edgecombe for the last eight years with excellent results, and at the power consumption of 2.7 h.p. per ton of cane per hour,

It accomplishes in one operation the smashing of the cane that is ordinarily done by the whole train of mills.

(3) The Maceration Bath.

Is an innovation in this country by the Natal Estates, Limited, though it has long been used in other countries, chiefly Australia; indeed, it is known as the Australian Maceration Bath, where it has been used with extremely good results. The chief factors in its operation are: time, heat and total immersion in a large percentage of maceration water. It has been used at Mount Edgecombe between the fourth and fifth mills and has, in conjunction with the fifth mill, enabled Mount Edgecombe's extraction to increase from 90 per cent. to 94 per cent.

REPORT ON PECK STRAINER.

From Mr. Watson, Amatikulu Sugar Factory.

A 36in. x 70in. strainer was installed at this factory at the beginning of the 1926 crop.

This machine was fitted with 100 mesh screening, through which it was hoped we would be able to pass the whole of the mixed juice, approximately 10,000 gallons per hour, the juice having already passed through the usual perforated strainers of the Cush Cush elevators.

It soon became evident, however, that the strainer was not capable of this duty, and arrangements were made to bye-pass a certain amount of the juice. It was then found that the strainer, while clean, could cope with approximately 80 per cent. of the juice, but it soon got clogged and had to be cleaned. In the end, the 100 mesh screen was discarded and an 80 mesh substituted. With this it was possible to pass the total quantity of juice, but only for a matter of an hour or two, and eventually it was found necessary again to bye-pass about 20 per cent. of the juice, and at this rate the strainer kept going, cleaning only once every eight hours.

While, from the foregoing, it will be seen that the work of the strainer did not come up to expectations, we have no hesitation in stating that we derived great benefit from the work which it did do. It certainly removed from the juice a great deal of fine cush cush and sand which would otherwise have passed into clarification, reducing the bottoms in subsidiers by at least 15 per cent., and we can safely say that the removal of these impurities greatly assisted clarification, and did not, as was at first expected, interfere with the work of the filter presses, but, as a matter of fact, materially reduced the work to be done by them.

So certain are we of the benefits derived from the Peck Strainer that we are installing a 48in. machine this year, and hope, with the increased capacity, to be able to use 120 mesh screening and at the same time deal with the total juice from the mill.

With regard to cleaning, our experience has been that very hot water applied under pressure, followed by disinfection with Formalin, is the best method, this being carried out once every eight hours.

The upkeep has been comparatively small. Three screens carried us through the season, the only other parts requiring a little attention being the scrapers and their attendant gear, which, as will be readily understood, are subjected to rather hard wear and tear.

THE SWEETLAND CANTILEVER FILTER.

This is a filter of the rotating leaf construction but with means of opening similar to the Kelly Filter. When the shell is rolled back the whole interior is fully exposed to light and ventilation. The body of the filter is comprised of two parts—the movable body and the fixed head. The body is a cast iron cylinder with one end open and the other a head cast integral with the cylinder. Spaced round the flange of the shell are a number of studs with corresponding holes in the flange of the fixed head which are taken up with nuts to lock the filter.

To the head are fixed the driving mechanism—the filtrate discharge connections, the sluicing mechanism and the filtrate drainage shaft. The feed inlet is in the bottom of the shell, which also acts as the drain, and a special attachment is arranged for quick disconnection.

A filter is rotated at 0.6 r.p.m. during filtration and at 2.4 r.p.m. when sluicing, by simply moving a clutch lever. The filter is motor driven through silent chain drive.

The sector frames are fixed to a hollow rotating shaft being held in position by radial rods projecting from this shaft, the interior being divided into six separate channels, each receiving filtrate from a lateral row of sectors. The filtrate is collected in a casing bolted to the filter and terminates in an 8in. pipe to carry the filtrate away.

The size of these filters are 630 square feet of filter area, and when two units are wanted they are set back to back.

The advantages claimed by this filter are:—

- (1) Quick removal of sectors, which are very light but strong, being made of strong aluminium bronze, only weighing 25 lbs.
- (2) Filter can be opened or inspected within a few minutes by means of quick opening and observation ports.
- (3) The rotary motion of the filter discs ensures a perfectly uniform and homogenous cake formation.
- (4) Easy removal of cake when sluicing down as all ports of sectors are brought in contact with the sluicing water due to rotation of filter.

- (5) Individual sight glasses are inserted in each filtrate conduits, making it possible to observe the clarity of filtrate at all times.
- (6) It can be operated in various ways to suit conditions of plant, and can be used with filter cel.—paper pulp—or any other filter aid usually employed in sugar manufacture.

REPORT ON OLIVER FILTER.

By Mr. Viger, Chief Chemist of Tinley Manor.

The Oliver Filter consists of:—

- 1° A rotary drum.
- 2° A tank which receives the material to be filtered.
- 3° An agitator which keeps the liquor in constant motion.
- 4° A universal valve controlling vacuum or steam supply to the individual valves.
- 5° Two receivers for the filtered liquor.
- 6° Two centrifugal pumps to draw liquor from receivers.
- 7° A scraper which deflects the solids off the drum.
- 8° Atomizers to wash the cake.
- 9° A rotary brush which cleans the filter cloth.
- 10° A clutch, chain drives and gears to operate the filter.
- 11° A dry air pump and condenser to create vacuum.

The rotary continuous filter is designed with the idea of subjecting one-third of the filter area to work of filtration, half the filter area to washing and drying, and the balance one-sixth to discharging.

These fractions are of course variable, but in a given rotative speed the time allotted for filtration is seen to be less than half the time required for the total cycle.

In the Oliver Filter the filter area is divided into compartments, each of which is independent and separate from every other. Two outlets leave the compartment, but join together in one pipe passing through the hub of the machine. One of these branches is located on the leading side, and the other on the lagging side of the compartment, so as to facilitate draining, irrespective of the angular position of the compartment.

The main outlet pipe from each compartment passes through the hub of the machine with the outlets of adjacent compartments side by side. These are arranged on a circle so that they register with the annular port in the stationary member of the valve.

In brief this valve changes the compartment from vacuum suction to pressure steam blow.

The automatic filter valve is so arranged that one, two or three sections may be blown at a time.

After the compressed blow and discharge of the cake, the cleaned cloth must be idle until fully submerged; another blank beyond the blow port takes care of this.

Displacement washing of the cake is made possible by the uniform resistance of the cake, when applying water a complete coating is necessary, and care must be taken not to disturb the cake formation by too forcibly applying the water, or by applying more water than can be sucked through the cake, for then the excess runs down the cake and erodes away the surface of the deposited solids and tends to weaken the strong liquor in the container.

The water is usually applied hot, as a fine spray at a pressure of about 30 lbs., directed against the cake. The spray nozzles are located on the ascending side of the drum above the container, and the amount of water fed to the cake regulated by an ordinary valve.

The time for washing is necessarily limited by the fact that the water application must be a maximum at the zenith of the travel. This would seem to be a limitation, but, so long as the wash percolation is greater than the voids of the cake, the wash should approximately true displacement.

The secret of the excellent record of these filters as washing machines is that only relatively thin cakes are built up and their form preserved until washing is completed.

In continuous filters agitation in the filter tank to prevent settling of the coarser material is a necessary part of the design. This is done by means of an oscillating arm agitator which hangs on the bearing or shaft of the filter. A crank arm on a rotating shaft located behind the filter rocks the agitator back and forth so that the liquor is in constant motion.

The vacuum line is connected to the top of the receiving tanks; the filtrate inlet is connected to a side opening and the filtrate outlet at the bottom; and exhausted by centrifugal pumps. The receivers are provided with a float which closes the vacuum line when the liquor rises to a given point in the tank. This seals the vacuum lines from liquid and saves the dry air pump from possible injury.

The filtering portion of the drum is adjusted to about 8—10 inches vacuum and 15—20 on the washing section.

The thickness of the mud discharged at scraper varies between 3/16in. to 1/4in. in thickness. The brush located beneath the scraper (which keeps the cloth perfectly clean) does not form part of the original arrangement in the Oliver Filter. Its introduction was due to the cloth getting dirty with some gummy substance or wax so as to make filtration impossible after two hours' work. The filtering area of the filter is 65 square feet, and its capacity is roughly equivalent to 500 square feet of plate and frame filters.

It has been found necessary to wash the cloth with a weak solution (2 per cent.) of commercial HCl twice a week. Should the cloth get torn it is easily patched by inserting a strip of cloth beneath the spirally wound wires. The life of a cloth is barely a month.

We are not yet in a position to compare the costs of operating the Oliver Filter against the plate and frame filters, but judging by its performance we can safely say a substantial saving in labour, filter cloths, and increased recovery of sugar is obtained.

There are a number of advantages in the continuous filter that are prominent and obvious, but probably most important is its fool-proof operation. Its efficiency is almost entirely free from the personal equation of the operator. The lowest labourer can tighten up grease cups, and oil the bearings of a slowly revolving filter. He has nothing to do with the time of filtration, with the extent of the washing cycle or manipulating valves in order to hold positive pressure during transference of liquors. The universal valve does everything for him automatically, so that his personal efficiency is a factor of practically zero importance. Labour saving, or, as it is better called, labour productivity, is practically a maximum with Oliver Filters. A battery of machines can be attended by only one man, so that a single operator can filter and discharge immense tonnages.

The labour productivity is pretty close to a maximum, for it is only when recovering the drum that any real labour is involved. It may be necessary to do this every three or four weeks. Relatively, however, recovering the filter is less frequent than with any of the intermittent operating filters. While it may not be possible to completely free the last trace of soluble, on the average the washing efficiency stands highest on these filters. Good discharge of the cake is vital to any filter, and whenever it is complete for cycle after cycle it can be called an advantage in favour of that filter. Observation of the work being done is a requirement in any filter.

The exposed cake on the ascending drum, the discharge cake, the cleaned cloth dropping down below the scraper, and the wash water application are squarely in view, and the ease of observation is truly a marked advantage.

The greatest weakness in the operation of Oliver Filters is in the dryness of cake discharged. The moisture content in the discharge cake compares unfavourably with compressed cake as obtained on plate and frame presses.

In industrial work, metal to metal surfaces are subjected to hard wear. Corrosion and erosion make the use of ground disc valves poor practice at best. The flat grinding valve in the Oliver Filter is a drawback inherent in its design.

The following figures tabulated from November 17th, 1927, to December 2nd, 1927, show the comparison between the Oliver Filter and plate and frame filters:—

Oliver Filter Juice.			
Brix.	Sucrose.	Purity.	pH.
10.17	8.58	84.3	9.2

Plate and Frame Juice.

Brix.	Sucrose.	Purity.	pH.
12.05	10.18	84.4	9.2

Cakes.

	Sucrose.	Moisture.
Oliver	2.54	70.89
Plate and Frame Filters	5.87	60.50

An experiment was conducted on the same lines as those carried out by Borden in Hawaii. Bagacillo from the Peck Strainer was added to the mud so as to increase its porosity, and greater displacement of the soluble was obtained. The results have been most gratifying. The average sucrose in the cake dropped to .7 per cent.

N.B.—Speed of drum = 1 revolution in six minutes or a surface speed of 33 inches per minute.

**REPORT ON MEINECKE CHUTE
INSTALLED AT CENTRAL VERULAM
IN 1925.**

By Mr. Herrison, Chief Engineer.

A Meinecke Chute was installed between our third and fourth mills and was in operation for three weeks with fair results. After consulting the representative at the time of the supply of the machine who had had previous experience with these chutes, we both came to the conclusion that certain alterations were necessary so as to obtain better results, which were carried out. We started the 1926 season with the chute operating. Results were certainly better but not perfect, the main trouble being that the chute would not feed the following mill regularly. There was a tendency of breaking up the blanket into lumps of various sizes which caused the mill to slip and choke. Naturally, as results were not satisfactory, the chute was taken out and the slat carrier was installed. My personal opinion is that the Meinecke Carrier would work well with mills of short centres and soft canes of low fibre percentage. But with a hard cane of high fibre, such as "Uba," a well designed scraper type intermediate carrier will take some beating.

Mr. Herrison's Remarks on his Patent Cooling Device for Crystallizers.

Mr. Herrison also makes the following remarks on his Patent Cooling Device for Crystallizers and enclosed a blue print, which I have with me. He reports: "The only parts that I remove from an ordinary Crystallizer are the Stirrers."

Test results for Crystallizer 5ft. 6in. x 6ft. 0in. x 12ft. 6in., fitted with water cooling apparatus,

Chairman: This is the work of a very small committee, but I think you will recognise it is a really monumental piece of work, and the amount of work involved in drawing up the questionnaire in the first place, and collecting, dissecting and classifying all the data received was very great. We are very much indebted to the Committee for placing all this valuable information on record. I notice that Hawaii has been used as a kind of standard throughout, presumably because corresponding figures from other countries are not so fully available. There are many things about which I am sure you will no doubt like to inquire and comment upon before we pass on to the next part of this report. You will notice the Committee have laid down various standards.

Mr. Rault: I notice in the recommendations regarding centrifugals, the capacity for raws with double curing, or mill whites, for pre-curers 2.5 and then second curing 2.5. What do you mean by second curing?

Mr. Pearce: Washing in the centrifugals.

Mr. Rault: Do you reckon you want as much for that second operation?

Mr. Pearce: In some factories the steam is down for the second curing.

Mr. Rault: You think you should have as much for your wash as when you are spinning the raw treacle out?

Mr. Pearce: It takes almost as much capacity for the second curing as for the first. What surprised me was the big variations in capacity in some factories; some had five to six times as much as another. Take the juice heating surfaces for instance; there is a big variation in them. They run from 16 to 89 square feet per ton of cane, but the one with 16 seems to get along just as well as the one with 89.

Mr. Patrick Murray: You give the figures of boiler heating surface. I don't think there is a figure like 140 square feet per ton of cane per hour in this country. I think that is a mistake.

Mr. Pearce: It might be a mistake, but those are the figures given to us. I can't imagine how any factory can get along with 140 feet heating surface.

Mr. Murray: With regard to the figure of 450 for boilers, I think that is rather low. I would recommend 500 square feet per ton of cane per hour for raw sugar factories.

Dr. Hedley: There is one point with regard to induced draught. It says: "Extra fuel is being used by factories to assist the bagasse in some cases. This

is due perhaps mostly to the high percentage of moisture in this bagasse." One should not have to use extra fuel, as I have said this morning. The varying figures you give point to the necessity for investigating the causes of this and lends good colour to the suggestion made this morning that we should have a set of testing instruments. The percentage of moisture in bagasse can be got over not only in pre-heaters, but in milling, and I think it is down to 36 in Hawaii. With regard to sulphur boxes, the report is not very definite about that, and it is going to be an important question this year. I know that people have come to this meeting to know something about this sulphur dioxide report of the Commission which has been going round to all the factories. Might I at this stage ask what is going to happen to that report? We have only a month before we start up. I know it is the Sugar Millers' business, and it has probably to go before a Millers' meeting. Would it not be a good thing if it was expedited, because it is necessary for the factory staffs to know what they are going to do with regard to more sulphur burning and settling tanks and so on? After the Sugar Millers have had the report, would it not be a good thing if we held a meeting as Technologists to discuss this report, say one or two representatives from each of the factories, and go into it? It is a most important thing, and although the Sugar Millers' Association will decide the matter, undoubtedly it ought to come before the Technologists too. There is not much time to do it now. It may mean very radical changes in settling tanks or other pieces of plant. Nothing has been said about it yet, but I know that some factories are waiting for it. The manager of one of the factories spoke to me before I came down.

Chairman: With regard to the second part of Dr. Hedley's remarks concerning the Sulphur Dioxide Commission, that report has been prepared and is to be handed in the first place to the Sugar Millers' Association who appointed the Commission. Perhaps Mr. Eadie will explain when it is likely to come before the Technologists' Association.

Secretary: The report has reached me and will be presented to a Millers' meeting to-morrow week. They will decide what course is to be adopted in regard to the report. It is impossible for me to say what may happen about it, but I presume it will come back to the Technologists in some form or other. I don't think any time will be lost about it.

Dr. Hedley asked if the Secretary would report to the Millers that the question had come up at this meeting.

The Secretary stated that he thought they could be satisfied that the Millers' Association was quite cognisant of the necessities of the case, and that nothing would be done without the advice of the Technologists' Association.

BOILERS.

QUESTION No	FACTORY No. 4.	FACTORY No. 8	FACTORY No. 10.	FACTORY No. 12.	FACTORY No. 14.	FACTORY No. 15.	FACTORY No. 16.	FACTORY No. 19.	FACTORY No. 9.	FACTORY No. 11.	FACTORY No. 20.	FACTORY No. 22.
1	350	480	397.2	381	330	360	450	281	140	440	450	387
2	No	Yes	Yes	Ye	No	No	Yes	Yes	No	Yes	Yes	No
3 (1)	490	500	—	—	—	—	550	—	170	450	—	—
3 (2)	400	475	—	—	375	—	450	—	120	380	—	—
4	1 to 84.63	1 to 80	1 to 55.55	1 to 80	1 to 71.43	1 to 78	—	1 to 55.13	1 to 55	1 to 71	—	1 to 129
5	1 to 3	1 to 7	1 to 5	1 to 8.5	1 to 7.1	1 to 2½	—	1 to 8.7	1 to 1½	1 to 1½	—	—
6	Water tube	Both	Both	Fire tube	Fire tube	Fire tube	Fire tube	Both	5 H.R.T.	Fire tube	Both	Both
7	—	25%	70% H.R.T. 30% W.T.	—	—	—	—	50/50	—	—	3 water tube 1 fire tube	2 H.R.T. 1 W.T.
8	No	Yes	No	No	No	—	No	No	Yes	No	No	No
9	—	100	—	—	—	—	—	—	130	—	No	—
10	Induced draught	Induced draught	Induced and forced draught	Both induced and forced 50% Natural 50%	Induced draught	Induced draught	Neither	Induced	Induced draught	No	No	No
11	9' 0"	6' 6"	Induced, 7' 0"	Induced, 8' 0" Forced, 7' 0"	8' 0"	—	3 turbine furnaces	6' 8"	7' 6"	—	—	—
12	No	No	Yes	Yes	No	No	No	No	No	No	No	No
13	—	—	"NOCO" Air-Heater, 12% increased steam pressure.	Howden Ljungstrom. Very good.	—	—	—	—	—	—	—	—
14	Feed pipe passes through whole length of flue. Increases temperature 20°C.	No	Exhaust water heater, 180°F. Satisfactory.	No	Exhaust steam coil in feed tank. Temp. at 190°F.	Water heater	—	—	Water heated by exhaust steam coil to 190° F. before entering economiser. Decided advantage	Exhaust steam heater, self-regulating according as exhaust is available.	Exhaust steam heater. Good results.	—
15	Dross coal. One truck per week	Dross coal. 25 tons per week	Wood only for starting and finishing crop	Dross coal	None	A little coal and wood	—	Dross coal. 1,000 tons on water tube boilers	25 lbs. pea coal per ton cane	None	None	Wattle wood to start and end season. 1 ton to 15 tons of sugar
16	Mixed with bagasse on elevator	Mixed with bagasse	—	Mixed with bagasse	—	Mixed with bagasse	—	Shovelled into boiler furnaces	Direct to boilers	—	—	Through bagasse hopper

JUICE SCALES.

QUESTION No.	FACTORY No. 4.	FACTORY No. 8.	FACTORY No. 10.	FACTORY No. 12.	FACTORY No. 14.	FACTORY No. 15.	FACTORY No. 16.	FACTORY No. 19.	FACTORY No. 9.	FACTORY No. 11.	FACTORY No. 20.	FACTORY No. 22.
1	Howe	Howe	Howe	Howe	Howe	None	Maxwell, Boulogne	Howe	Richardson	Howe	No sealer in use	No sealer in use
2	Yes	Yes	Yes	Yes	Yes	—	Yes	—	—	Yes	—	—
3	Weighing	Weighing	Calculated from volume	Weighing	Calculated from volume	Not measured	Calculated	Weighing a container holding a certain quantity of water	Meters	Calculated from volume	—	—
4	Howe	Howe	—	Lienert meter	—	—	—	—	—	—	—	—

JUICE HEATERS.

1	Vertical	Vertical	Both	Horizontal	Both	Horizontal	Horizontal	Both	Vertical	Vertical	Horizontal	Vertical
2	—	Vertical	Both	Horizontal	Vertical, good draining	Horizontal	Horizontal	No preference	Vertical	Vertical	—	—
3	89	67	40	46	56	6½	70	82.7	53	64.25	16	—
4	86.5	88%	87.15	90%	87.18	—	85 to 90	84.35	85.17	90 %	90.5 %	—
5	5	4	5	5	5 to 7	25 to 30 lbs. square inch	2.5 to 5	10	60	5 to 8	15	—
6	—	70	—	40	65	—	—	—	70	64.25	20	—

CLARIFIERS AND SUBSIDERS.

1	Dorr clarifiers	Rectangular tanks	Dorr's	Rectangular, 7' x 4' x 4'	Rectangular, 1,000 tons	Petree subsidors and clarifiers as standby	Rectangular, open type	Clarifiers with coils. Settling tanks without coils	Open rectangular	Open coil clarifiers	Rectangular M.S. tanks	Double bottom circular
2	No	Yes	No	No	No	Clarifiers with coils	No	Clarifiers	No	Yes	No	—
3	1 to 162	1 to 3.2 1 to 112	1 to 723	70	74.6	—	78	169.85	94	96	—	40
4	200 to 1	110	1 to 723	—	100	—	90	—	85	130	—	—
5	Dorr clarifiers system	Two cocks on side, stepped	Dorr clarifiers system	Drain cocks	A series of stepped coils	—	One decanting pipe fixed to bottom of tank	Plug at bottom	Float	Drain cocks and sloping bottom to tanks with plug outlet	—	—

SULPHUR BOXES AND BURNERS.

QUESTION No.	FACTORY No. 4.	FACTORY No. 8.	FACTORY No. 10.	FACTORY No. 12.	FACTORY No. 14.	FACTORY No. 15.	FACTORY No. 16.	FACTORY No. 19.	FACTORY No. 9.	FACTORY No. 11.	FACTORY No. 20.	FACTORY No. 22.
1	Towers	Tower	Towers	Tower, 5'x5'x35' Perforated slats	30' tower with perforated trays	Towers	30' tower	Tower	Tower	Tower	Wooden open type	5' deep iron tank with injector
2	—	Tower	Towers	Tower	Tower	Towers	Towers	—	Towers	Combination of tower and box	Steam injectors	Present equipment
3	Haddon	Rotary	Flat water-cooled oven	Brick furnace with large area. Triple brick baffles, spaced 6" apart	Prentice burner	Haddon's rectangular furnace	A long shallow cast-iron box	Taylor	Flat water-cooled oven	Prentice	Vertical cylindrical type. Draught by steam injector	Iron dome

FILTER PRESSES.

1	32	58	16	21	30	—	40	16.3	63	60	60	51
2	32	50	20	—	45	—	80	20	70% of primary	60	—	51
3	120	100	40	70	70	100	98	101.8	286	78.48	160	57
4 (1)	120	175	—	—	—	—	125	—	286	80	—	57
4 (2)	—	175	—	130	100	—	125	—	286	60	—	57
5	6 of 32" x 32", 36 plates. 4 of 30" x 30",	42" x 42", 48 plates	4 of 40" x 40" 6 of 26" x 26"	560 sq. in. x 200 sq. in.	24" Installing 2 of 40"	34½" x 34½" Pyramid type of grooves	2' 9" x 2' 9"	31½" x 31½"	34" x 34", 40 4 plates. 36" x 36", 42 42 plates	31½" x 31½"	3 of 40" x 40" 4 of 31½" x 31½" 2 of 25" x 25"	1 of 36" x 36" 5 of 24" x 24"

6	Side	Side	Side	Side	Side	Side	Side	Side	Side	Side	Side	Side	
7	Large	Large	Large	Large	Large	Large	Large	Large	As used	Large	Large	Large	Small
8	No	No	Yes, on large presses	No	On large presses only	No	No	No	No	No	No	No	No
9	—	Cameron plunger, steam driven	No pump	No pump	No pump	Double ram, Cameron, and Duplex Eureka	Double ram, single action, Cameron	Reciprocating, with safety valve set at 40 lbs. sq. inch	—	Cameron vertical double ram	Vertical, Cameron	Horizontal duplex, ball valve	
10	—	8,000	—	—	—	7,000	3,500	4,000	—	7,000	4,000	—	
11	Three - throw geared pump	Centrifugal	No perference	Belt-driven centrifugal	Yes, centrifugal	Duplex type of substantial make	—	Ram type with automatic regulator	—	As we have	No	—	
12	Yes	No	Yes	Yes	Yes	No	No	No	Yes	No	No	No	
13	Moderate for white sugar	—	Complete success	Less chance of breaking plates. Heavy on steam	Quite satisfactory	—	—	—	—	No trouble since replacing pump with montjus	—	—	
14	No	No	Yes	Yes	Yes	No	No	No	No	No	Being installed for 1929 crop	No	
15	—	—	Yes	Yes	Reduced volume of mud	—	—	—	—	—	—	—	
16	—	—	No	No	—	No	Installing universal screen, electric	No	—	Installing anti-clean strainer for 1929 crop	No	—	No

PRE-EVAPORATOR.

QUESTION No.	FACTORY No. 4.	FACTORY No. 8.	FACTORY No. 10.	FACTORY No. 12.	FACTORY No. 14.	FACTORY No. 15.	FACTORY No. 16.	FACTORY No. 19.	FACTORY No. 9.	FACTORY No. 11.	FACTORY No. 20.	FACTORY No. 22.
1	No	No	No	No	No	No	Yes	No	No	No	No	No
2	—	—	—	—	Exhaust	—	Exhaust as much as possible	—	—	—	—	—
3	—	—	—	—	Juice heating	—	Heat raw juice in heaters	—	—	—	—	—
4	—	—	—	—	—	—	Crushing rate been increased 8 %	—	—	—	—	—
5	—	—	—	—	108	—	83	—	—	—	—	—
6	—	—	—	—	108	—	—	—	—	—	—	—

EVAPORATORS.

1	2 sets of 3	4	2 sets of 3	4	3	4	4	3	4	4	4	5. Quad. 1st extra vessel
2	220	300	214	320	150	317	225.39	234.3	310	160	320	280
3	No	Yes	No	Yes	No	Yes	No	Yes	Yes	No	Yes	—
4 (1)	—	250	—	250	—	—	250	—	—	180	—	—
4 (2)	—	300	370	320	—	—	350	—	—	240	—	—
5	49.85 brix	57 brix	53.07 brix	—	58.2 brix	25 Beaumé	47 brix	50.2 brix	45 brix	26° Beaumé	30° Beaumé	22° Beaumé
6	17.0 brix	15.5 brix	14.81 brix	—	17.6 brix	8 Beaumé	16.5 brix	18.6 brix	17.5 brix	15 brix	16.9 brix	7° Beaumé
7 (1)	Two - throw geared pump	Centrifugal	Motor - driven centrifugal	Evans Simplex, flywheel type	Steam duplex	Duplex	Worthington steam duplex	Single - action pump with barometric seal	Steam duplex	Horizontal plunger	Centrifugal	None, drawn into condenser
7 (2)	—	Centrifugal	Motor - driven centrifugal	Evans' Simplex, flywheel type	Steam duplex	Duplex	Evans' Globe	Duplex	Steam duplex	Horizontal plunger	Cameron	Steam, horizontal plunger
8	No	No	No	No	No	Counter current type	No	No	No	McNeil's Patent	—	No
9	—	—	No	Quad. is more efficient on steam	—	—	—	—	No	Quadruple	—	—

VACUUM PUMP.

1	31.43	85.0	45.3	—	59	36	350	104.4	13	30.74	50	—
2	31.43	85.0	—	—	59	—	—	—	—	20	—	—
3	2 dry slow motion, horizontal	Dry and slow motion, horizontal	Dry pump	Dry pump	Dry, horizontal reciprocating. Steam-driven	Dry	Dry	Dry, slow speed	—	Dry air, horizontal	Dry	Wet

PANS.

QUESTION No.	FACTORY No. 4.	FACTORY No. 8.	FACTORY No. 10.	FACTORY No. 12.	FACTORY No. 14.	FACTORY No. 15.	FACTORY No. 16.	FACTORY No. 19.	FACTORY No. 9.	FACTORY No. 11.	FACTORY No. 20.	FACTORY No. 22.
1	3	3	3	4	3	3	3	3	3	5	4	2
2	2, Mirlees-Watson flat calandrias	2, 1 Standard, 1 Express	3, 1 suspended, 2 built-in	3	3 built-in calandrias	2	3 calandrias	2, with flat steam chest	2 A. & W. Smith converted coil	1	2, one flat and one inclined	2 converted coil
3	1 A. & W. Smith	1	—	1	None	2	—	1	1	4	2	None
4	Calandria. Quicker boiling	Calandria for 1st and 2nd sugars. All H.S. operating from start of strike	Suspended calandria. Better circulation	Calandria is quicker and uses less steam	Calandria for speed	Calandria for faster boiling	Calandria. Increased heating surface and faster boiling	—	—	Coil for large grain sugar	Calandria. Same work in less time	Calandria. Less liable to form false grain. Better circulation
5	Calandria for jelly	Coil pan for slow boiling when building up grain	No	No preference, but heating surface must allow for graining at a maximum of 25% volume of pan	Coil pans, for slow boiling	No	Coil pan. More regular grain & better exhaustion of molasses	Coil pan	—	Calandria	Calandria	—
6 (1)	53	75	56	5.3	57	4.1	—	61.12	50	13	36	—
6 (2)	19	15	—	4.4	Nil	28	—	30.58	13	40	28	—
7 (1)	1.47/1	1.5/1	2/1	9 to 5	1.5 to 1	—	—	1.5 to 1	2 to 1	—	2 to 1	—
7 (2)	1.12/1	1/1	—	1/1	Nil	—	—	1 to 1	2 to 1	—	1 to 1.1	—
8	Both, mostly exhaust	Exhaust	Exhaust	Exhaust chiefly	Exhaust chiefly	Both at times	Exhaust	Exhaust	Exhaust	Exhaust, helped with live	Both	Both
9	At least 3	3	3	Minimum of 3	4	—	3 for small factories, 4 for large factories	—	—	—	—	—
10 (1)	75 to 1	100	—	—	—	—	60	—	—	60	—	—
10 (2)	70 to 1	75	66	70	75	—	50	—	—	40	—	—
11	No	No	No	No	No	—	No	No	—	No	—	—

CRYSTALLIZERS & HOT ROOM TANKS.

1 (1)	130	60	56.5	46, water-cooled	90	84	65	122.23	90	70	—	40
1 (2)		90	83.0	60, water-cooled	128	250	90	285.20	190	—	168	75
1 (3)	74	—	—	—	—	—	—	—	—	160	—	—
1 (4)	300	200	450	600	316	160	118	320.86	40	48	144	120
2	Rect., 14' x 10' x 4', 560 cu. ft. 6 of 1,200 cu. ft.	Rectangular, 12' x 8' x 5'	Round, 1,200 galls, 14' x 8'	2,000 cu. ft.	Rect., 3' x 12' x 12'. Circular, 16' deep x 10' high	300, depth of 3' 0"	—	C.I. tanks, 350 cu. fee	Crystallizers	Rectangular, 800 cu. ft.	600 cu. ft. each	Concrete pits, 8,000 to 12,000 gallons
3 (1)	200	60	70	—	90	—	—	—	—	—	—	—
3 (2)		100	100	—	128	—	—	—	—	—	—	—
3 (3)	100	—	—	—	—	—	—	—	—	—	—	—
3 (4)	300	500	500	—	650	—	—	—	—	—	—	—

SYRUP TANKS.

1	67	60	170	15	32	96	47	69.77	175	84	79	80
2 (1)	70	80	—	—	—	—	100	69.77	150	100	—	—
2 (2)	35	40	—	15 as a minimum	40 to 50	—	75	24.45	—	80	—	—

BLOW UPS.

QUESTION No.	FACTORY No. 4.	FACTORY No. 8.	FACTORY No. 10.	FACTORY No. 12.	FACTORY No. 14.	FACTORY No. 15.	FACTORY No. 16.	FACTORY No. 19.	FACTORY No. 9.	FACTORY No. 11.	FACTORY No. 20.	FACTORY No. 22.
1	189	144	54	21	13	—	—	138.5	—	14	70	200
2 (1)	180	144	—	—	—	—	—	130.61	—	18	—	—
2 (2)	50	72	—	—	—	—	—	26.48	—	12	—	—

CENTRIFUGALS.

Raw 1 (a)	4.47	3	3.5	2.5	4.3	—	6	—	1	2.1	6	—
1 (b)	2.29	2	7	2.5	1.0	—	—	—	1	—	1.4	—
M.W.1 (a)	1.53	2	—	—	—	1 $\frac{3}{4}$	—	2.24	2.4	0.98	—	—
1 (b)	2.94	2	—	—	—	4	—	4.58	4.5	2.1	—	—
1 (c)	2.29	3	—	—	—	2 $\frac{1}{3}$	—	1.93	3.0	1.12	—	—
Raw 2 (a)	—	3	—	3	6.5	—	—	—	—	2.1	—	—
2 (b)	—	—	—	3	2	—	—	—	1	—	—	—
M.W.2 (a)	—	2	—	—	—	—	—	—	2.4	0.98	—	—
2 (b)	—	2	—	—	—	—	—	—	4.5	2.10	—	—
2 (c)	—	3	—	—	—	—	—	—	4.0	1.12	—	—
3	None	None	None	None	None	None	—	None	—	None	—	None
4	Perforated in foreworkers. Fontaine in afterworkers	Perforated in foreworkers. Slotted in afterworkers	Copper with brass linings under	Fontaine linings	Copper, Fontaine	Fontaine	1st steel, 2nd brass, 3rd Fontaine	Fontaine	Fontaine throughout	Copper perforated sheet, conical slot	Conical slotted and round hole	Fontaine
5	—	As above	.026"	—	Fontaine throughout	Fontaine 17 1000	Steel, 4 to sq. in. Brass, 8 to sq. in. Copper Fontaine	—	Spiral woven wire gauge	Copper perforated sheet	Conical slotted and round hole, 14 to the inch	—

1	Platform scale	Platform scale	Platform scale	Platform scale	Platform scale	Platform scale	Avery platform scale	Platform scale	Platform scale	Platform scale	Platform scale	Platform scale
2	—	Dial scale	Automatic scales	Platform scale	Automatic	—	—	Avery	—	—	Avery pre-determined	Platform scale
3	—	No	No experience	Unreliable	No experience	Unreliable	No	—	—	No	—	No experience
4	—	No	—	No	—	No	—	—	—	No	—	—

WATER SERVICE PUMPS.

1	Duplex and Mc-Onic	Motor - driven centrifugal	Centrifugal, 2 pumps	Centrifugal and Duplex	Motor - driven centrifugal	Centrifugal, single stage, steam driven	Weir & Cameron	Centrifugal, electric drive	Gravitate to factory at 40 lbs. sq. in.	Motor - driven centrifugal	Centrifugal	Partly gravity, partly centrifugal
2	4,000	4,000	3,200	2,769	3,960	3,500	—	2,500	—	2,500	312	—
3	Dam	River supply	River supply	Both	River supply	River supply	Dams	River supply	Dams	Dam for fresh water and river for condensers	River supply	Dams

TEST RESULTS FOR CRYSTALLIZER.

5' 6" x 6' 0" x 12' 6"

Fitted with Water Cooling Apparatus.

TIME COOLING.	THIRD SUGAR.		FIRST SUGAR.		FIRST SUGAR.		THIRD SUGAR.		FIRST SUGAR.		SECOND SUGAR.		THIRD SUGAR.		FIRST SUGAR.		SECOND SUGAR.		THIRD SUGAR.	
	300 cubic feet Capacity. September 15th, 1927.		300 cubic feet Capacity. September 16th, 1927.		300 cubic feet Capacity. September 19th, 1927.		300 cubic feet Capacity. September 22nd, 1927.		300 cubic feet Capacity. September 23rd, 1927.		300 cubic feet Capacity. September 26th, 1927.		300 cubic feet Capacity. September 27th, 1927.		300 cubic feet Capacity. September 28th, 1927.		300 cubic feet Capacity. September 20th, 1927.		300 cubic feet Capacity. September 30th, 1927.	
Hours.	Water-cooled.	Ordinary.	Water-cooled.	Ordinary.	Water-cooled.	Ordinary.	Water-cooled.	Ordinary.	Water-cooled.	Ordinary.	Water-cooled.	Ordinary.	Water-cooled.	Ordinary.	Water-cooled.	Ordinary.	Water-cooled.	Ordinary.	Water-cooled.	Ordinary.
	Temp. °C.	Temp. °C.	Temp. °C.	Temp. °C.	Temp. °C.	Temp. °C.	Temp. °C.	Temp. °C.	Temp. °C.	Temp. °C.	Temp. °C.	Temp. °C.	Temp. °C.	Temp. °C.	Temp. °C.	Temp. °C.	Temp. °C.	Temp. °C.	Temp. °C.	Temp. °C.
—	70	Drop. in Temp. in 17 hours, Ordinary type, 41 °C.	58	61	62	57	63	60	55	53	59	65	64	63	58	59	62	62	62	65
1	63		61	59	51	56	59	59	48	51	55	62	58	60	50	56	55	61	55	64
2	55	—	48	59	49	56	55	58	44	57	51	12	50	60	46	55	53	61	47	64
3	52	—	42	59	40	55	50	58	42	57	50	61	46	60	42	54	50	60	42	63
4	50	—	39	58	38	53	50	56	39	50	48	61	46	60	39	53	50	60	42	62
5	48	—	36	57	—	52	48	56	37	49	45	61	44	59	37	52	46	60	42	62
6	44	—	35	57	36	52	46	55	39	48	42	60	42	58	35	51	43	58	41	61
7	42	—	33	56	32	52	44	55	34	47	40	60	41	57	33	50	40	57	41	60
8	39	—	30	55	32	50	41	55	—	—	39	59	38	55	32	50	37	56	41	60
9	37	—	30	54	30	45	39	54	—	—	38	58	35	55	30	50	35	56	40	60
10	37	—	28	49	27	40	37	52	—	—	37	58	34	55	30	50	33	56	38	60
11	36	—	28	47	—	—	34	52	—	—	34	56	33	55	29	49	32	56	36	60
12	35	—	27	46	—	—	32	52	—	—	32	55	33	54	29	49	30	56	34	59
13	34	—	—	—	—	—	32	52	—	—	30	55	33	—	—	—	30	55	33	59

FACTORY No. 16.	FACTORY No. 19.	FACTORY No. 9.	FACTORY No. 11.	FACTORY No. 20.	FACTORY No. 22.	QUESTION NO.
21.5	19.63	16	80, or 40 per tandem.	24.93	16	1
16.5	16.69	18	15.8	15.9	—	2
Wooden slats. Link chain.	Flat link with wooden slats.	Wooden slats. Apron type.	Ley's No. 9060, 6" pitch. Pancl slats, 1 1/8" thick.	Steel edge type and wooden slats.	Wood slat and roller.	3
Yes.	No.	No.	Yes.	No.	No.	4
One set, Ramsay.	—	—	One set for each tandem. Fixed blades.	—	—	5
32"	—	—	10"	—	—	6
40 h.p. engine, belt-driven.	—	—	Steam engine, belt-driven.	—	—	7
35 h.p.	—	—	50 h.p.	—	—	8
35 h.p.	—	—	60 h.p.	—	—	9
500	—	—	360	—	—	10
Increased capacity. Better feed to crusher.	—	—	A levelled and more even feed.	—	—	11
At the top of carrier.	—	—	At bottom of incline.	—	—	12
No.	No.	—	No.	—	No.	13
Smith double crusher. 3 sets of mills, 24" x 48".	11-roller mill, 24" x 54".	Krajewski, 23" x 48". 4 sets of mills, 24" x 48".	Each tandem. Splitter rolls, 1 pair, 31 1/2" x 64". 4 mills, 32" x 66".	17-roll mill. Krajewski, 22" x 48". 4 mills, 24" x 48". 1 mill, 26" x 36".	Krajewski, 20" x 48". 3 sets of mills, 24" x 48".	14
Double crusher and one mill by one engine, 22" x 42". Two mills by one engine, 12.5" x 18".	Krajewski, 1st and 2nd mill from one engine. 3rd mills from one engine.	Driven by two main engines.	Splitter, No. 1 and No. 2 driven by one engine. 3rd and 4th mills by one engine.	1 engine, 20" x 48", for crusher and 1st mill 1 engine, 20" x 36", for 2nd and 3rd mills. 1 engine, 15" x 30", for 4th mill. 1 engine, 16" x 30", for 5th mill.	Krajewski, No. 1 and No. 2 mill, by one engine. No. 3 mill, one engine.	15
23	23	25	50	25	—	16
One slat conveyor. One scraper type carrier.	Trough type, flat links with angle-iron slats.	Apron type.	Ley's malleable link and apron carrier.	Slats and scraper.	Scraper type between No. 1 & No. 2 mills. Slat conveyor between No. 2 & No. 3 mills.	17
Roller mill, 6" pitch.	Roller chain and wood slats.	Scraper type.	Ley's No. 804, 4" pitch.	Roller type with steel rim and bush.	Rubber belt.	18
Cush-cush strainer, returned before 3rd mill.	Drag type and rubber slats, after 2nd mill.	Cush-cush strainer, returned before 3rd mill.	Cush-cush strainer, returned between 2nd and 3rd mills.	Scraper type and screw conveyor to 3rd mill.	Cush-cush strainer, returned before 1st mill.	19
21 %	21.45 %	23.5 %	30 %	25 1/2 %	30 %	20
—	Outlet 2nd mill. 10 lbs. pressure.	Perforated pipe. Water at about 20 lbs. per square inch.	Spray pipes by gravity. 20 lbs. pressure.	Gravity. 15 lbs. pressure.	25 feet of head of water before 3rd mill, through perforated pipes.	21

QUESTION NO.	FACTORY No. 4.	FACTORY No. 8.	FACTORY No. 10.	FACTORY No. 12.	FACTORY No. 12.	FACTORY No. 14.	FACTORY No. 15.
1	38	40	65	66.26	—	60	30
2	15.4	16	17.0	16.7	—	15.63	15.38
3	Drag link and pin. 6" pitch.	1" hickory slats. Chain No. 9060.	13" pitch pine. Ley's chain No. 9063, wooden slats.	Roller link, forged steel chain, 6" centres. 6 x 2" wood slats.	—	Ley's chain No. 9060, 6" pitch. Deal slats, 2" thick.	Taskon type and wood slats.
4	Yes.	Yes.	Yes.	—	—	Yes.	Yes.
5	One set, locally made.	One set, locally made.	One set. Double shear steel.	—	—	One set 11 knives. Harvey Engineering Co.	One set with slating knives.
6	4"	9"	18"	—	—	7"	6"
7	Steam engine, belt-driven.	Motor, belt-driven. 12" belt.	Motor, belt-driven.	—	—	Motor, belt-driven. 10" belt.	Steam engine and belt drive.
8	90 h.p.	From 30 to 60 h.p.	40 h.p.	—	—	30 h.p.	18 h.p.
9	90 h.p.	80 h.p.	100 h.p.	—	—	50 to 70 h.p. motor.	18 for 8 knives.
10	500	450	300	—	—	200, but intend to increase to 400.	300
11	Better feed to crushers and better extraction.	Better feed. Less slipping and increased tonnage.	Leveling of cane in carrier.	—	—	Increased capacity and extraction.	Increased capacity due to more even feed.
12	At the highest point of cane carrier.	At commencement of rise to carrier.	100 feet from crusher.	Bottom of incline.	—	At bottom of incline of carrier. 50 feet from crusher.	6' up incline from carrier and above 20' from crusher.
13	No.	No.	No.	No.	—	No.	No.
14	Krajewski. 4 sets of mills, 66" x 33".	Krajewski, 32" x 70". 4 sets of mills, 34" x 72".	Double crusher, 34" x 74". 5 sets of mills, 34" x 66".	No. 1 tandem. Friction double crusher, 32" x 60". 4 sets of mills 31" x 60".	No. 2 tandem. Friction double crusher, 30" x 60". 3 sets of mills 31" x 60".	Krajewski, splitter, and 4 mills, 34" x 66".	Krajewski, 24" x 48". 3 sets of 3-roller mills, 26" x 34". 2 sets of 3-roller mills, 30" x 60".
15	Crusher and 2 mills by one engine. 2 mills by one engine.	Crusher and 2 mills by one engine. 2 mills by one engine.	Crusher, Cortiss, 28" x 54". 2 mills, Cortiss, 32" x 48". 3 mills, slide valve, 32" x 60".	No. 1 tandem. No. 1 tandem. Double crusher and 1 mill, 1 Cortiss. 2nd and 3rd mills, 1 Cortiss. 4th mill by one engine.	No. 2 tandem. No. 2 tandem. Double crusher by 1 Cortiss. 1st, 2nd and 3rd mills by 1 Cortiss.	Krajewski, one engine, splitter and Krajewski, one engine, splitter and 1st mill. 2nd, 3rd and 4th mills.	3 mills and crusher by one engine. 2 mills by 2nd engine.
16	40 in present condition.	65 tons.	85	85	—	65	35
17	Apron carriers.	Apron type.	2 Ramsamy. 3 apron carriers.	Apron slat type.	—	Scraper between No. 1 and No. 2.	Steel slats. Apron carrier.
18	Ley's chain No. 578.	Ley's chain No. 9060.	Ley's chain No. 9060.	Roller link, 6" centres. 5/8" x 4" x 38" wood slats.	Spaced 42" apart.	B.B. chain No. 194. 4" pitch.	Ley's 103 with C.3 attachments.
19	Cush-cush strainer, returned before 2nd mill.	2 cush-cush strainers, returned before 2nd mill.	2 cush-cush elevators and 1 Peck strainer. Returned to front of 1st and 3rd mills.	Cush-cush elevator, returned to front of 1st and 3rd mills.	In front of 1st mill.	2 cush-cush strainers, returned between 1st and 2nd mills and 2nd and 3rd mills.	Cush-cush strainer, returned between 2nd and 3rd mills.
20	21 %	27 %	24.3 %	24.13 %	—	—	25 to 30 %
21	Perforated pipe behind 3rd mill. 40 lbs. pressure.	Perforated pipe and plunger pump. 20 lbs. pressure.	Perforated pipe. Gravity. 14 lbs. square inch.	Monel metal nozzles, 1/8" hole, spaced 3/4" centres. 25 lbs. pressure.	—	By pump at 40 to 50 lbs. pressure, through spray pipe.	Gravity pressure, 9 to 10 lbs. square inch.