Veloz L. M.

EL LIBRO MERCANTIL
MEXICO, D. F.

FAPECFT

B A S E S de NEGOCIACION para un INGENIO.

a.- LA COMPANIA suministrara el EQUIPO DE MAQUINARIA para produccion de CELULOSA que se encuentra en ..... PEDRO BETANCOURT, Mtzs. CUBA, empacada y LISTO para embarcarlo.

b.- El Ingenio se obliga a transportarlo, instalarlo y ponerlo en marcha por su cuenta, y bajo la direccion tecnica de la Compañia.

c.- De la produccion que se obtenga, se reservara un tanto por ciento para regalia por el uso de las patentes y un tanto por ciento para amortizar el costo de la Maquinaria.

d.- El Ingenio como consecuencia de los resultados obtenidos se obliga a aumentar gradualmente la capacidad de la planta.-

FAPECFT

C E N T R A L E S

para la fabricacion de

CELULOSA y SUBPRODUCTOS

del

BAGAZO de CANA DE AZUCAR

por el

PROCEDIMIENTO

HEMMER VALET

de

MEXICO, D. F.

Ingeniero Manuel Urquidi

ERICS: 5-13-96
CALLE PROGRESO 163

FAPECFT

FABRICACION DE CELULOSA

del

BAGAZO DE CAÑA DE AZUCAR.

Celulosa Hemmer Valet, S.A.

En el año de 1926 se organizó en México una Sociedad Anónima denominada "Celulosa Hemmer Valet", con un capital de $ 780.000.00 oro nacional, casi en su totalidad exhibido.

Esta Compañía fue organizada con el objeto exclusivo de fabricar celulosa, aprovechando el bagazo de la caña de azúcar.

M A Q U I N A R I A

La Compañía adquirió en Alemania un equipo completo de la maquinaria necesaria para la fabricación de celulosa y demás productos.

Este equipo fue instalado en Pedro Betancourt, Provincia de Matanzas, Cuba, en el ingenio llamado Central Cuba, y estuvo trabajando cerca de un año, durante el cual se produjeron ciertas cantidades de celulosa propia para la fabricación de papeles de alta calidad, así como de cartones especiales y otros derivados.

La capacidad de esta planta es de 750 kilos diarios de productos brutos de celulosa; y en el anexo número uno se agrega un muestrario de los productos refinados obtenidos con la celulosa producida. I A 1.

Circunstancias imprevistas debidas en gran parte a la depresión que experimenta la caña de azúcar en Cuba, obligaron a la Compañía a suspender esta fabricación, y la maquinaria en su totalidad se encuentra empacada convenientemente y lista para embarcarse a la República Mexicana.

El equipo de que se trata constituye una planta completa para la fabricación de la celulosa y subproductos, además de una planta anexa de corta capacidad, propia para producir seda artificial en hilo, del mismo bagazo de la caña de azúcar.

Esta planta es susceptible de adicionarse con maquinaria complementaria, para aumentar su capacidad considerablemente y es de advertirse que la totalidad de las piezas pueden construirse en México, sin necesidad de recurrir a fábricasextranjeras.

En el anexo número dos se hace una relación detallada de las diversas partes que componen la maquinaria para fabricación de la celulosa y demás productos del bagazo de la caña de azúcar; II A 2.
y en el anexo número tres consta una lista de las diversas cajas en las que se encuentra empacada la maquinaria, dando a conocer su peso y dimensiones aproximadas. III A 3.

P R O C E D I M I E N T O

El procedimiento que se aplica es muy sencillo, no está sujeto a secreto alguno y está completamente descrito en las patentes que originaron este procedimiento y que son propiedad de la citada Compañía y también consta en el anexo cuatro, en el que se hace una descripción alejada de todo tecnicismo para que sea facilmente comprendida. IV A 4.

El procedimiento propiamente dicho, consiste en usar sustancias químicas conocidas, que se elaboran en el país y que son muy baratas, tales como el hidrato de cal, el sulfito de sosa, la sosa y la potasa cáustica para eliminar gradualmente la sucrosa, la clorofila, la lignina, el parenquima, las gomas vegetales, dextrinas, resinas, ceras, fertilizantes, etc. etc., hasta dejar la celulosa prácticamente pura con la ayuda de vapor. Es de advertirse que las substancias químicas que se adicionan se recuperan en una gran proporción.

P R O D U C T O S

Con la celulosa que se produce del bagazo de la caña por el procedimiento Hemmer Valet, se puede producir papel de la más alta calidad, a la vez resistente y de poco peso, papel para periódico y en general pastas fibrosas de diferentes aplicaciones industriales.

Además de la producción de celulosa, con el procedimiento - Hemmer Valet se obtienen otros sub-productos de importancia comercial, tales como:

relleno para explosivos y artículos plásticos,
fertilizantes, sucrosas (jarabe cristalino, aromático),
resinas y ceras,
gomas vegetales,
dextrina, dextrosa,
furfurol,
solventes,
sedas artificiales,
celofano,
lacas
y toda clase de compuestos de celulosa en general.

Los productos anteriores tienen aplicaciones universalmente conocidas.

V En el diagrama del anexo número cinco, puede verse la proporción en que se producen la celulosa y los sub-productos. A5.

B A G A Z O

El bagazo antes de que el autor del procedimiento pudiera separar la celulosa, no había tenido otra aplicación que la de quemarse en las calderas y por cierto con resultados muy ineficientes, por la gran cantidad de agua que contiene; y los esfuerzos que se han hecho para obtener preparaciones tales como el Celotex no han tenido consecuencias comerciales, y lo mismo puede decirse de los experimentos costosísimos hechos en Tuinicú por la Compañía Celulosa Cubana, y la Cornstalks Products Co., que no han podido producir celulosa comercial.

Prácticamente la misma cantidad que se obtiene de azúcar por unidad de peso de la caña se obtiene también de celulosa y en cambio el precio mundial de la celulosa es más o menos dos a tres veces mayor que el de la azúcar, con lo cual resulta que este subproducto de la caña en realidad viene a ocupar en la industria azucarera el lugar dominante.

Por esto es de suponerse que si en los ingenios de azúcar se establece maquinaria para la elaboración de la celulosa por el procedimiento Hemmer Valet y demás sub-productos, se aliviará el quebranto que ahora sufren, precisamente porque no se trabajan los -- sub-productos como en las grandes industrias.

Debe tenerse presente además, que no solamente se obtiene la celulosa, sino también muchas otras substancias de importancia comercial, y que aún los resíduos de la fabricación son aprovechados como fertilizantes, todo lo cual aumenta considerablemente el rendimiento total que puede lograrse en los ingenios de azúcar.

VI En el anexo número seis se muestran dos diagramas de la explotación actual y futura de la caña de azúcar, y los resultados en - pesos, susceptibles de obtenerse con unoy otro procedimiento. Los precios están tomados del mercado de Nueva York. A6.

C A Ñ A D E A Z U C A R

Bien sabido es que la azúcar de caña, pasa por una situación crítica mundial que está obligando a los productores a transformar los procedimientos actualmente aplicados, no solo para abaratarlos, sino para poder aprovechar los importantes sub-productos que pueden obtenerse y que ahora se desdeñan.

VV

Además de la sobreproducción, la industria de la azúcar de caña se ha agravado por la elaboración en gran escala, de que está siendo objeto la remolacha para la producción de azúcar y alcohol. También del maíz y de otros productos vegetales se extrae azúcar y alcohol, con lo que se establece una competencia que no pueden sostener los ingenios de azúcar.

Por otra parte la industria de la caña de azúcar debe prepararse para poder resistir al nuevo competidor que ya se ha presentado en el mercado y que tendrá grandes proporciones, cuando se perfeccionen los procedimiento para producir azúcares sintéticos, del aserrín y en general de los hidrocarburos, que ahora se están aprovechando para convertirlos en alcohol.

El aprovechamiento del bagazo ofrece una solución para el desequilibrio que actualmente experimenta la industria de la caña de azúcar.

C E L U L O S A

Este producto está abriendo un campo enteramente inexplorado en las nuevas industrias. Las aplicaciones de la celulosa aumentan día a día, y sin duda a esto es debido el alto precio que alcanza en los mercados mundiales. Las actividades industriales de la actualidad, giran en torno de la celulosa.

La celulosa puede llegar a ser para México, factor importantísimo en la exportación, y solo por este concepto debe merecer la atención del Gobierno.

La importancia del aprovechamiento del bagazo de la caña de azúcar, aumenta si se considera que en todo el mundo se ha despertado un espíritu de protección en favor de las selvas, y las taxativas que habrán de imponerse en lo futuro para evitar la destrucción de los bosques, obligarán a los industriales a recurrir a otras materias primas.

Ninguna fuente más abundante y más económica que la que ofrece la caña de azúcar para el aprovechamiento del bagazo en celulosa.

P A P E L Y S E D A A R T I F I C I A L

El papel y la seda artificial son los productos mas importantes desde un punto de vista comercial, que se obtienen del bagazo de la caña de azúcar.

El papel que se obtiene, como ya se dijo, es de la mas alta calidad y susceptible de producirse en todas las variedades del comercio y en todas las fases de la industria. Con el procedimiento Hemmer Valet se puede obtener papeles delgados, gruesos, lustrosos, opacos, resistentes, secantes, transparentes, vidriados, apergaminados, etc. etc.

La seda que se produce con el bagazo es también de excelente calidad y de todos modos superior a las sedas artificiales que ahora se encuentran en el comercio, pues se produce un hilo uniforme, mas resistente y que puede teñirse con mayor facilidad que las sedas producidas por otros procedimientos.

S O C I E D A D E S C O O P E R A T I V A S

La forma mas indicada para la explotación del bagazo de la caña es organizar centrales que no se alejen grandes distancias de los ingenios, y que se adapten a la capacidad de los mismos ingenios.

La materia prima será transportada a estas centrales por procedimientos modernos baratos, utilizando en los casos que lo exijan las circunstancias, medios pneumáticos o hidráulicos.

Las prensas hidráulicas no son costosas y su manejo es bien conocido en todos los ingenios de azúcar. Las operaciones para empacar, tampoco resultan costosas y calculando un transporte digamos a 100 kilómetros, la tonelada de bagazo podría ponerse en una central a un precio máximo de cinco pesos, calculando esta tarifa de los datos de los ingenios de Cuba por no tener a la vista los

relativos a ingenios mexicanos.

Atribuyendo a la tonelada de bagazo un precio de $ 3.50, costo de un barril de petróleo crudo, a lo que es equivalente por lo que a las calorías concierne, se obtendría una cantidad alzada agregando empaque y flete, de $ 8.50 en la central de producción de celulosa. Este precio es conservador ya que en los ingenios solo puede aprovecharse más o menos un cincuenta por ciento del bagazo en las calderas.

La Compañía Celulosa Hemmer Valet, S. A. está dispuesta a autorizar el establecimiento de fábricas de celulosa mediante la regalía que se establezca en cada caso, y se ocupará de la instalación y en general de todo lo que se refiera a la parte técnica de dichas fábricas a petición de los interesados.

Indudablemente que la forma más apropiada para el establecimiento de estas fábricas es la de Sociedades Cooperativas que permiten a los diversos productores de bagazo estar representadas facilmente en ellas.

La instalación en cada caso exigirá una cantidad diversa, que depende en primer lugar de la capacidad de la planta, y en segundo de las condiciones del lugar.

Se estima que para una central de 100 toneladas diarias de celulosa se requerirá para la maquinaria, un capital alzado de un millón de pesos. Una fábrica de esta capacidad absorverá 200 toneladas de bagazo diariamente, de lo que podrá obtenerse alrededor de 35,000 toneladas de celulosa al año.

El valor de esta producción a base de ochenta y cinco a noventa dólares la tonelada, equivaldría acerca de tres millones de dólares; y suponiendo un costo de cincuenta por ciento, lo cual es conservador, la utilidad que se obtendría sería próxima a las cifras anteriores.

Claro está, que la capacidad de la Central que se establezca, depende de la capacidad de los ingenios asociados.

INTERVENCION DEL GOBIERNO

La circunstancia de tratarse del establecimiento de una industria nueva en el país, exige la intervención del Estado para facilitar la unión entre los productores y un buen entendimiento indispensable para lograr un seguro y pronto éxito.

La Secretaría de Industria puede ayudar de modo efectivo a la realización del establecimiento de la nueva industria, otorgando ciertas facilidades tales como el uso de un local que se destine a oficinas de propaganda, el nombramiento de un delegado que presida y facilite las reuniones, etc.

Además de esas facilidades la Secretaría puede estudiar la conveniencia de otorgar exención de ciertos impuestos durante el tiempo y de la naturaleza que juzgue convenientes; así como otorgar las facilidades en el transporte, que sean compatibles con la ley, y en la fijación de las tarifas ferrocarrileras aplicables.

La Compañía Hemmer Valet por su parte, otorgará todas las facilidades del caso para que los co-asociados puedan organizar su compañía e instalar las centrales de producción de celulosa, sin necesidad de hacer erogaciones gravosas por los derechos que representa la Compañía Hemmer Valet, la que cuenta con el personal técnico y con la experiencia necesaria para asegurar el éxito en cada una de las centrales que se establezcan.

De todos modos es posible establecer la primera central con la maquinaria que está en disponibilidad en Cuba y que como ya dijimos corresponde a una capacidad de 750 kilos diarios o sea 300 toneladas al año, y es susceptible de aumento gradual hasta llegar a mil toneladas anuales.

México, D. F. abril de 1931.

A N E X O N U M E R O U N O.

Muestrario de los productos que se obtienen del

BAGAZO DE CAÑA DE AZUCAR.

FAPECFT

9

Muestra de Papel hecha con

Celulosa de Bagazo PURA producida en Laboratorio en HEIDELBERG

SIN preparacion del Bagazo EN SECO

36501 A V

FAPECFT

P.S. Vease certamen del Instituto del Govierno Aleman de Berlin-Dahlem.

Muestra de Papel hecho con Celulosa PURA de Bagazo de Caña de Azucar de MEXICO. La Celulosa se hizo con la Maquinaria de la Compañia PERO SIN PREPARACION EN SECO, y el mero PAPEL se hizo en la Fabrica dela I.G.Farbenindustrie en Ludwigshafen - Rhin, Alemañia.

FAPECFT

P.S. Vease Certificado de la I.G.Farbenindustrie de Franfurt,s/M.

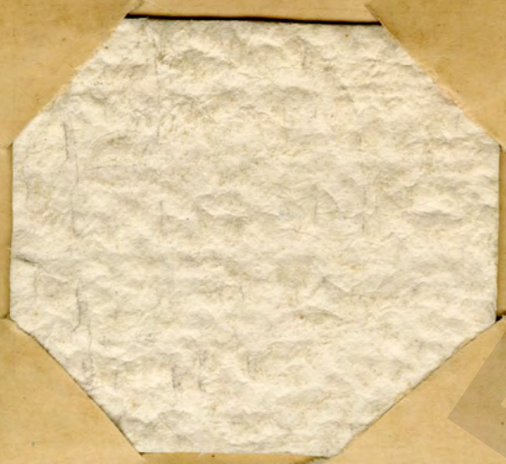
"C E L U B A G A Z"

Celulosa de Bagazo con 89.7% Alpha

Celulosa 89.7% Alpha

en forma de carton, tal como de la Maquina

FAPECFT



"C E L U B A G A Z"

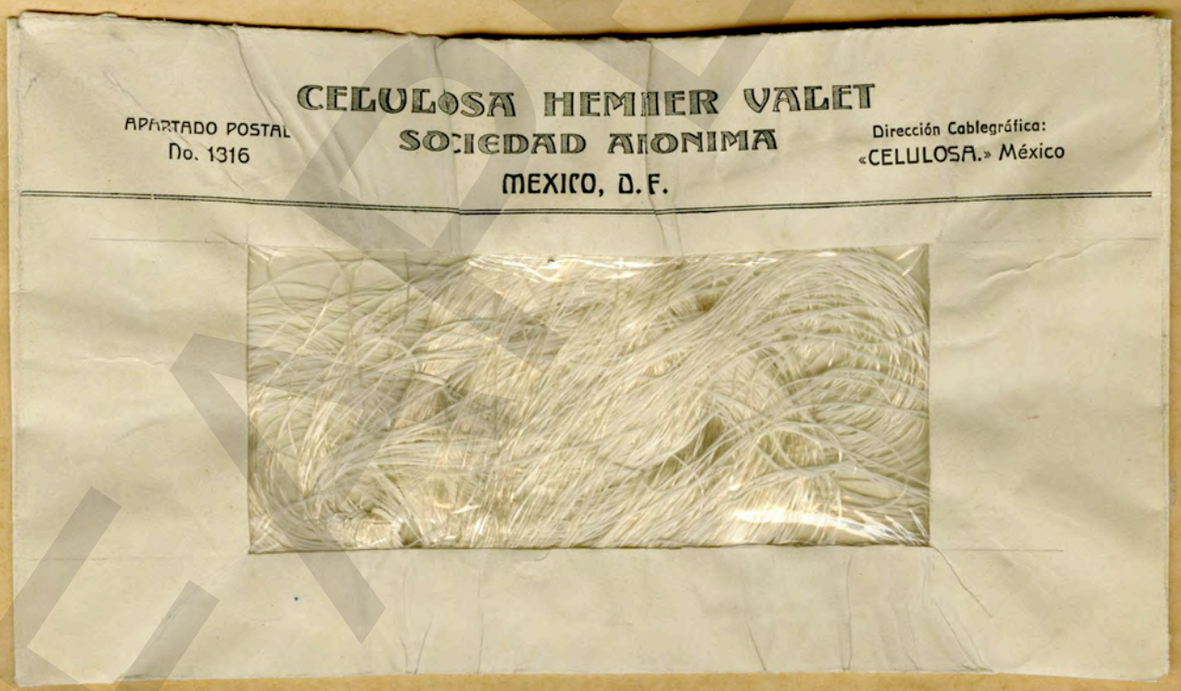
Celulosa de Bagazo de Caña de Azucar lista para su transformacion en Seda Artificial.

Lo mismo como arriba

FAPECFT

" C E L U B A G A Z "

conteniendo 89.7% de Celulosa ALPHA, en forma de " P U L P A "



" B A G A Z I L K "

(nombre international) nuestra Seda artificial (Viscosa) producida con Celubagaz de 89.7% ALPHA en Nuevayork, E.U.A.

EXPECT

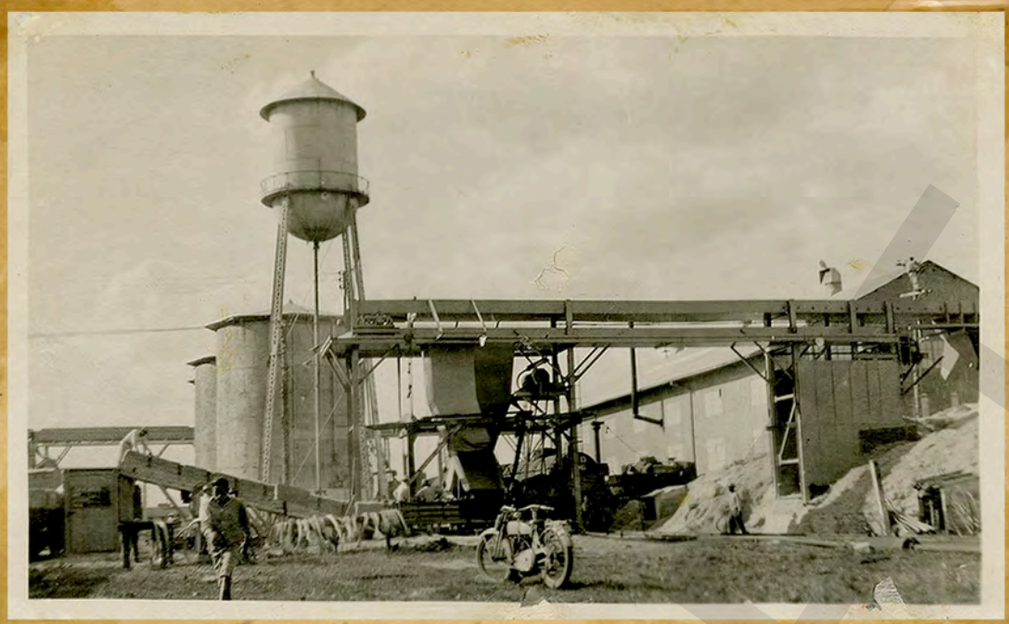
2.

A N E X O N U M E R O D O S.

Celleccion de Fotografias de la Fabrica en

PEDRO BETANCOURT, Matzs. CUBA.

FAPECFT



1.

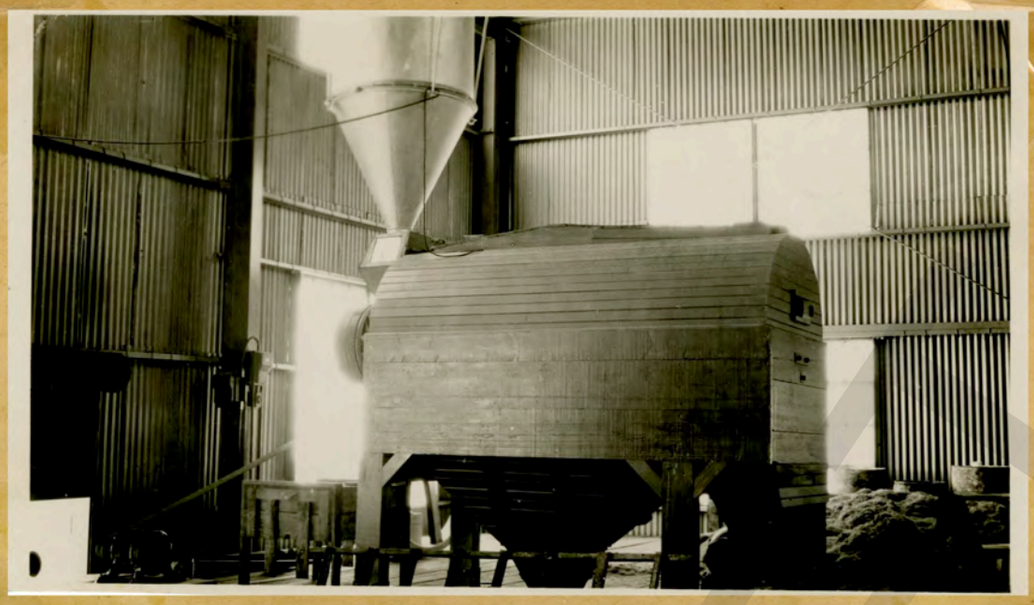
Vista General de :-
Instalacion de transporte del BAGAZO viendo de los Trapiches, Maquina llenadora de Prensas, Prensas de Empaque, - Carga de Pacas de BAGAZO.-

2.

Edificio completo de la Fabrica de CELULOSA
Pedro Betancourt, Mtzs.Cuba.
" CENTRAL CUBA "

3

Caseta con divisiones, adaptadas para recoger y separar la FIBRA CORTA, el PARENQUIMA y los FERTILIZANTES.-

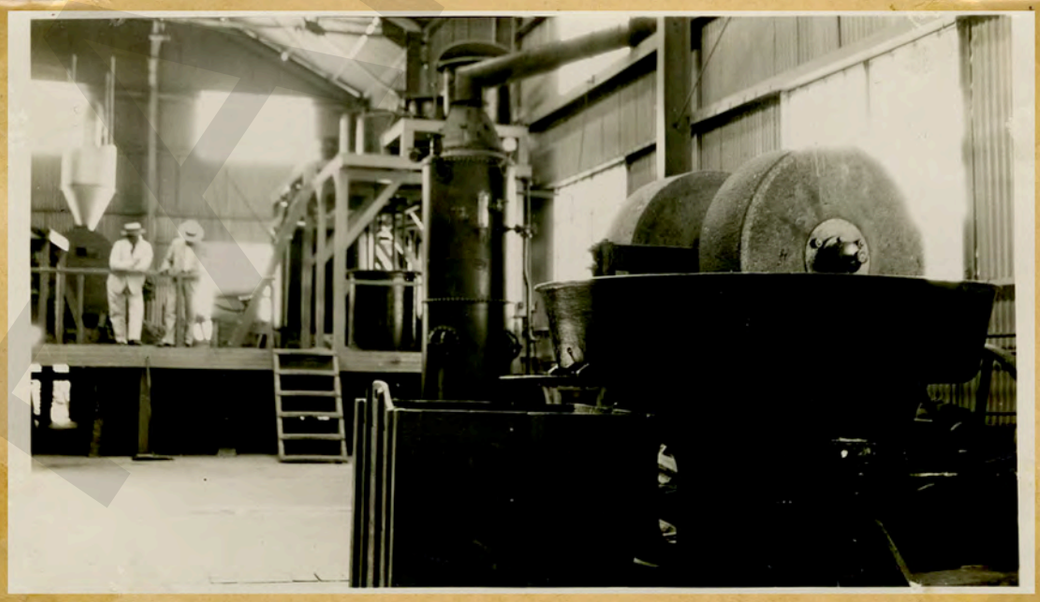


4.

Vista de la Instalacion del Ciclon,
CILINDRO tamizador con Exhaustor y parte
para vaciar FIBRA LARGA.

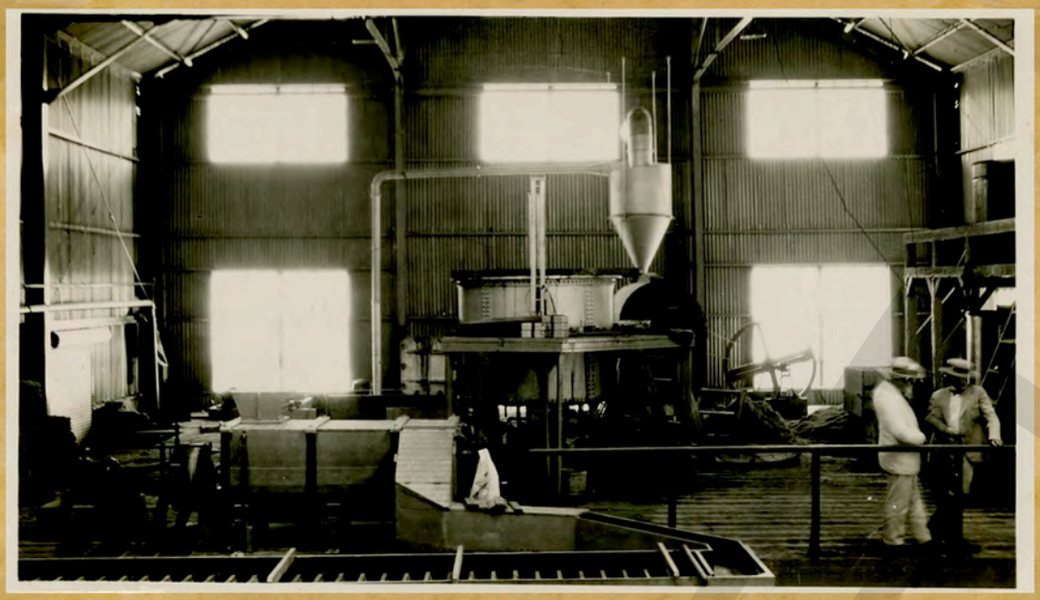
5

Vista de la Instalacion del COCEDOR con
Plataforma del mismo, - Tanque de recepcion
de la Celulosa etc.-



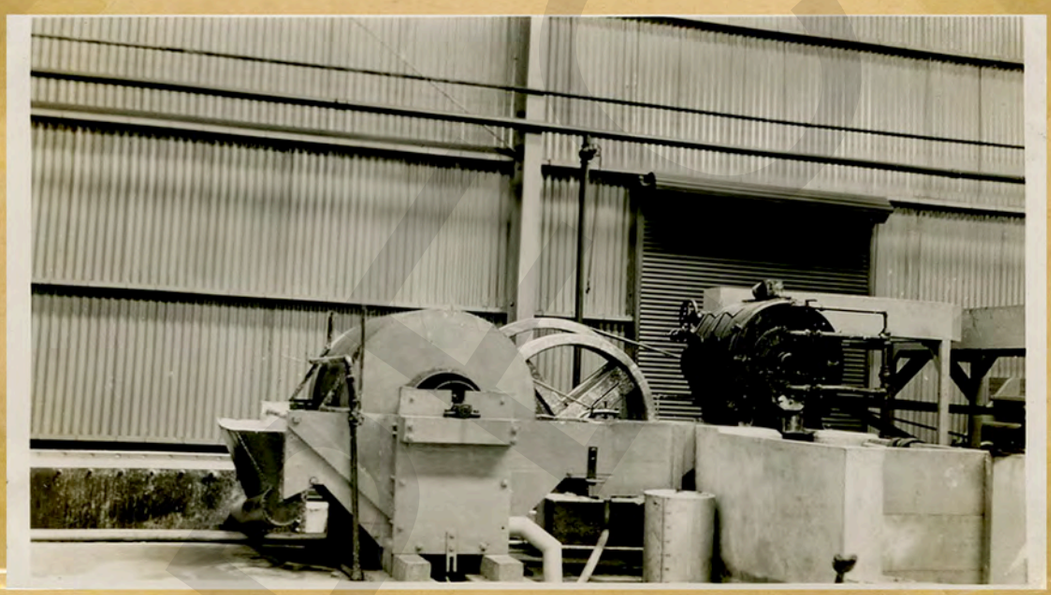
6.

Instalacion de:
CALDERA para Vapor y MOLINO CHILENO ESPECIAL.-



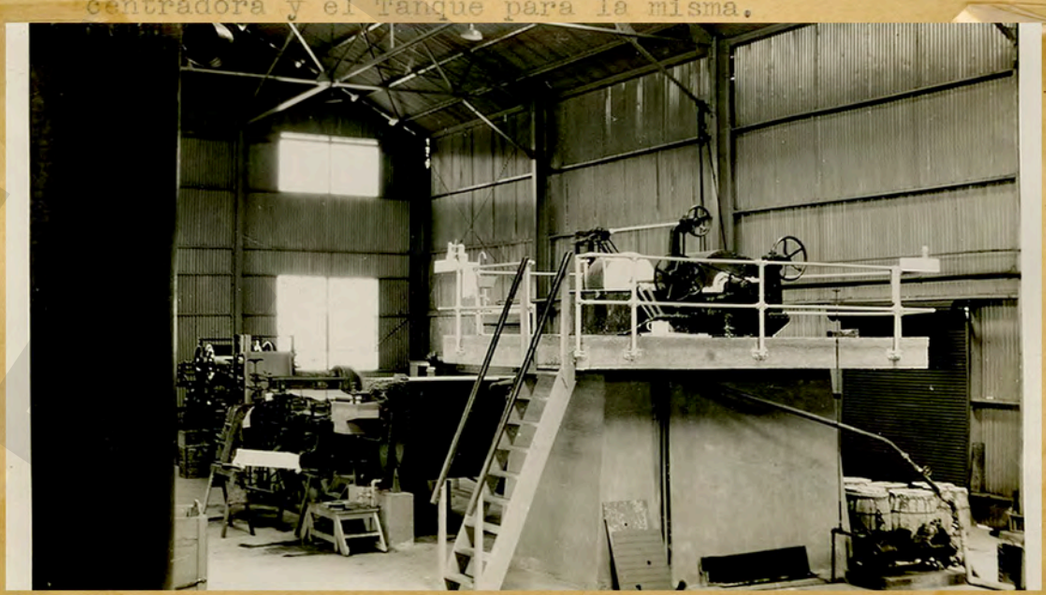
7.

Vista general de Instalacion para PREPARACION EN SECO del Bagazo. Molino sistema Cruz-martillos,- Ciclon separador,- Cocedor,- Puerco-espino,- y Separador-limpiador a flotacion de agua.-



8.

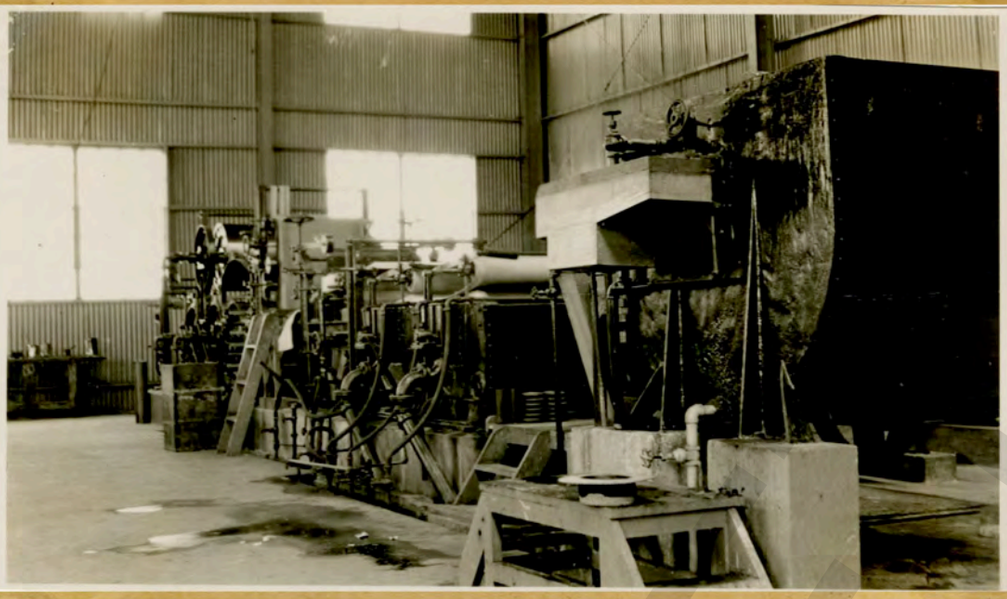
Vista de la entrada del canal de flotacion,. el Tamizador centrifugo "Fuellner, la Maquina concentradora y el Tanque para la misma.



9.

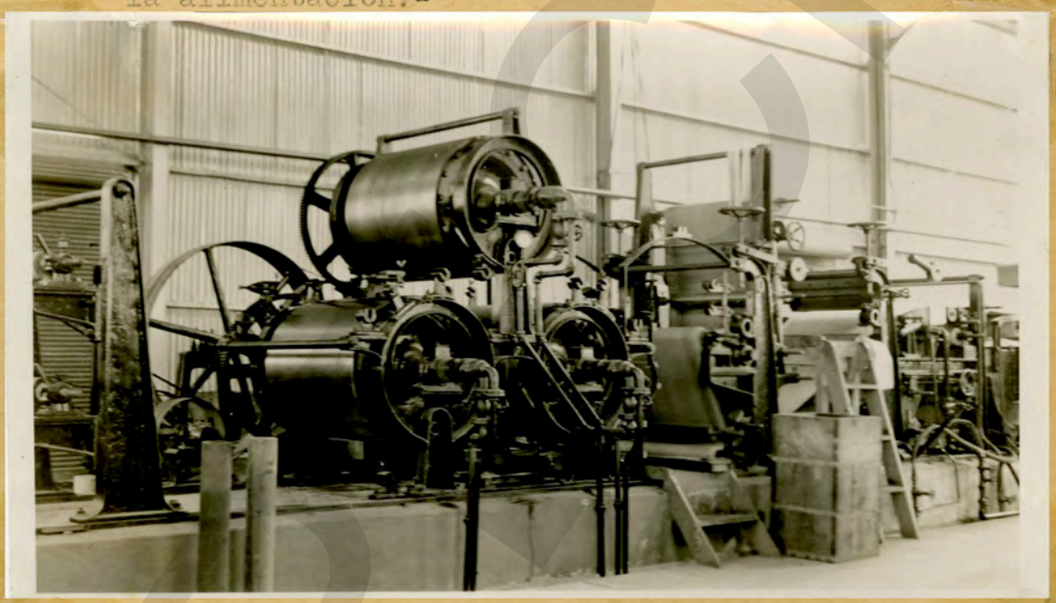
Bomba para Celulosa,- Tanque abastecedor.Maquina para desaguar.- Cilindros secadores,- Maquina para enrollar.- En la Plataforma se ve el Holandes para blanquear etc.

Bomba para CELULOSA - TANQUE abastecedor. Maquina para DESAGUAR - CILINDROS SECADORES - MAQUINA para ENROLLAR - En la PLATAFORMA se ve el HOLANDES para blanquear etc.



10.

Tanque abastecedor para Maquina desaguadora,- con dos cilindros y con las Copas de Cobre para la alimentacion.-



11.

Grupo de dos Prensas para desaguar y los tres Cilindros a Vapor para secar Celulosa o en Rollos o en Hojas sueltas. La Instalacion Secadora misma.-

12.

LABORATORIO IMPROVISADO.

A N E X O N U M E R O T R E S.

a. Enumeracion de las partes que componen la MAQUINARIA para la FABRICACION de la CELUBAGAZ, y demas ..... SUB-productos que se encuentra (la maquinaria) empàcada en la Ysla de Cuba.

b. Lista de las Cajas en que se encuentra empacada la misma maquinaria para fabricacion de Celulosa y demas ..... Sub-productos.

FAPECFT

Pormenores de la Maquinaria para la manufactura de
CELULOSA DEL BAGAZO DE CAÑA DE AZUCAR y SEDA ARTIFICIAL con
la Celulosa en cuestion.

Nº 1..... 1 Molino sistema Cruz-martillos
3 rejillas para idem
1 Caja para materias estrañas
1 Exhaustor pression media
1 Motor para idem
1 Lote Tuberia para conectar idem y transporte pneumatico
1 Lote Tuberia para Cizlon
1 Ciclon
1 Codo para idem 400 m/m diam.
1 Motor para Molino de 5 HP.
1 Lote de Correas, Poleas completo para idem

Nº 2..... 1 Tambor tamizador
1 Ca-sita para idem
1 Exhaustor para idem
1 Motor para idem 2 HP.

Nº 3..... 1 Cocedor con forro de Cobre, cap.3.8 m3
completo con doble fondo y tapa y todas
armaturas, medidor de agua y lejias etc. etc.
1 Injector para idem a pression
1 Tanque maedra recibidor de Celulosa
1 Puerco-Espino con conecciones y Llaves completo
1 Instalacion para limpiar a flotacion
1 Tamizador centrifugal
1 Instalacion para concentrar la Celulosa
1 Tanque fierro para Celulosa concentr. con movimiento
1 Bomba para Celulosa
1 Motor para maquinaria Nº 3 completo 15 HP

Nº 4..... 1 Hollandes completo para moler y lavar
1 Motor para idem de 8 HP.

Nº 5..... 1 Molino Chileno sistema moderno especial
1 Motor para idem de 3-5 HP.

Nº 6..... 1 Maquina completa para desaguar la Celulosa
compuesta de:-
1 Tanque abastecedor con copas de cobre
2 cilindros desaguadores completos
1 Prensa Primera completa de forros de Hule y Cobre
1 Prensa Segunda idem idem
1 Lote de Rieles para fundamentos
2 Fieltros para idem parte secadora
5 Fieltros para cilindros
5 Fieltros para Prensa segunda
4 Telas de Alambre de reserva pa. cilindros
1 Bomba
1 Juego de Engranes de reserva pa. Cilindros y Prensas
1 Juego completo de Poleas para idem
1 Juego completo de Correas idem
1 Motor de movimiento variable de 10 HP.
1 Juego completo de Poleas para movimiento de idem

Nº 7..... 1 Caldera Vertical completa con Bomba, Injector,
Armatura y tuberia etc. de 15 HP.

./.

Nº 8 ..... 1 Estacion de Soluciones Quimicas componiendose de 7 Tanques de Fierro acondicionados con llaves etc. Tuberia respectiva y armatura completa.

Nº 9..... 1 Juego completo para secar a vapor consistente de 3 Cilindros secadores con sus respectivas armaturas, medidores, condensadores etc. etc.

1 Juego de Fieltros para idem

Nº 10..... 1 Instalacion completa para enrollar con su armatura etc. etc.

N.B. Toda la maquinaria arriba mencionada, como ha sido instalada en el Ingenio "Central Cuba" en Pedro Betancourt, Mtzs. Cuba esta provista de ABSOLUTAMENTE TODO para poderla montar y echar andar sin ma-s adiciones de maquinaria etc.
Todos los Motores y armaturas etc. estan ABSOLUTAMENTE COMPLETOS y constan de STARTERS, REOSTATS ETC. ademas de sus respectivas POLEAS, CORREAS, Tubarias etc. etc. todo completo.

MAQUINARIA PARA SEDA ARTIFICIAL

Nº 1..... 1 Prensa filtro
2..... 1 Tanque de Inmersion
3..... 10 Latas para Madurar Celulosa alcalina
4..... 1 Prensa completa para VISCOSA
5..... 1 Maquina DESFIBRADORA COMPLETA
6 ..... 1 Maquina para SULFIDACION
7..... 1 Tanque de Plomo
8..... 2 MAQUINAS MOTORES PARA HILAR
9..... 1 Maquina compresora
10..... 1 Bomba de AIRE
11..... 1 Maquina Mexcladora
12..... 1 Tanque para Solucion para Hilar (Spinning kettle)
13..... 1 Maquina Hiladora
14..... 1 Lote de partes para Maquina hiladora
15..... 7 Juegos de cambios para movimiento de Maq.hiladora
16..... 1 Lote de Juegos de Vidrio para idem
17..... 1 idem idem de Reserva.-
18..... 1 Lote Armaturas para Tanque hilador y Mezcladora.

N.B. Esta maquinaria puede producir aproximadamente 5 kilos de Seda artificial en Hilo por dia.

Mexico,D.F. Enero 1931

E.C.Hemmer Valet

El Peso aproximado de las maquinas etc. para producir Celulosa es de 85 toneladas (ochentacinco toneladas y la de la maquinaria de Seda artificial aproximadamente de 5 toneladas (cinco toneladas) de manera que se puede calcular con un peso total de 100 toneladas paroximadamente con todo y empaque.

Vale.

III a 22

Pormenores de la Maquinaria Adicional
aproximadamente necesaria para una produccion de
3000 kilos de Celulosa por dia.

---

2 Cocedores de 12 m3 capacidad c/u.

1 Holandes para tratamento de Jabon y de lavado

1 Bomba para transporte del Holandes ala Maq.tamizadora

1 Momba idem dela Tamizadora al:

1 Ma-quina (Holandes) para blanquear

1 Rafinadora adicional

1 Caldera adicional

3 Cilindros secadoras adicionales

1 Tamizador-refinador "Wandel"

1 Instalacion secadora al Vacio para Bagazo

1 Instalacion idem para Celulosa en pulpa

1 Instalacion pequeña para purificar agua.

1 Varias Armaduras etc.

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Valor aproximado $ 30.000.oo a
$ 35.000.oo O.N.

La Maquinaria arriba mencionada EN LA MAYOR PARTE SE ENCARGARA FABRICAR EN MEXICO MISMO.-

Mexico,D.F. Enero 1931

E.C.Hemmer Valet

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Lista de las Cajas en las cuales se encuentran empacadas

LAS MAQUINAS y sus Accesorios para la fabricacion de

C E L U L O S A y demas SUBPRODUCTOS.

C.H.V. # 1, 1 caja
, conteniendo
1 Motor # 3, de 2 HP. 850m/m min. para Ventilator
1 Starter para idem # 3a
8 Correas,
1 Polea
1 Tubo de Goma
Volumen: 0.65 x 0.7 x 0.6

CHV. # 2, 1 caja
conteniendo
1 Motor # 2 para Molino Cruz-martillo de 10 HP. 1750 rev.min.
9 Correas
Volumen: 0.8 x 0.6 x 0.65

C.H.V. # 3, 1 caja
conteniendo
1 Motor # 1 de 5 HP. de 1750 rev.min.
1 Starter para idem # 1a y 1b.
2 Correas
Volumen: 0.85 x 0.6 x 0.45

C.H.V. # 4, 1 caja
contentiendo
1 Motor # 4 de 2 HP. 870 rev.min.
1 Starter para idem # 4a y 4b.
1 Starter # 5a
5 Correas
Volumen: 0.75 x 0.65 x 0.55

C.H.V. # 5, 1 caja
conteniendo
1 Motor # 7 de 2 HP. 850 rev.min. para Molino Chilenao
1 Starter para idem # 7a
2 Correas
Volumen: 0.75 x 0.65 x 0.65

C.H.V. # 6, 1 huacal
conteniendo
1 Separator completo c/ puerco-espino
2 Chumaceras para idem
1 Poleas locas
4 ventilatores c/ tubos
7 Tubos de Goma
Volumen: 1.25 x 1.25 x 3.1

C.H.V. # 7, 1 caja
conteniendo
1 Motor # 6, para Separator, de 15 HP. 1750 rev.min.
1 Starter # 8c. y 8d.
1 idem # 9b.
1 idem # 10a y 10b.
1 Polea 8" ø x 14" x 4"
7 Poleas diversas segun sus usos.
Volumen: 0.9 x 0.8 x 0.75

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C.H.V. # 8, 1 caja, conteniendo:

1 Maquina completa para separaracion de Fibra"Fuellner"
1 Starter # 6a.
Varios partes de la maquinaria etc.
Volumen: 1.6 x 1.2 x 1.1

C.H.V. # 9, 1 caja
conteniendo:
1 Molino sistema cruz-martillo completo
8 rejillas para idem
1 Starter
2 Chumaceras
1 Polea y ademas
1 caja con
varios partes para la instalacion segun lista.
Volumen: 1.1 x 1.1 x 1.5

C.H.V. # 10, 1 Huacal
conteniendo:
1 Cocedor completo incl. Cubierta,
cubierta interior, fondo doble,
Serpentin y tubo de subir de vapor
Volumen: 2.0 x 2.0 x 2.0

C.H.V. # 11, 1 caja
conteniendo:
1 Ventilator completo para Polvo
1 caja con 3 Amperometros # 6d. 8e.y 9.
Volumen: 0.65 x 0.65 x 0.65

C.H.V. # 12, 1 caja
contentiendo:
1 Motor completo # 5 para Ventilator
de 3 HP. 1730 rev.min.
Volumen: 0.65 x 0.55 x 0.4

C.H.V.# 13, 1 caja
conteniendo:
1 Ventilator para Bagazo con
1 separator para matrias pesadas.
Volumen: 0.7 x 0.7 x 0.7

C.H.V.# 14, 1 Huacal
conteniendo:
1 Tambor para separacion de Fibras con
sus tubos y ventilator.
Volumen: 1.35 x 3.4

C.H.V. #15, 1 Caja
conteniendo:
1 Motor completo # 8 para Holandes
1 bomba a mano para lejias
1 injector para lejias
1 Condensator para Cocedor
1 Condensator para Caldera.
Volumen: 1.2 x 0.95 x 0.7

C.H.V.# 16, 1 Caja
conteniendo:
1 Motor completo c/transmision de engranes
para maquina desaguadora,# 9,1130 rev.min.
Volumen: 1.1 x 1.25 x0.7

C.H.V. # 17,1 Huacal,
conteniendo:
1 Taza del Molino Chileno
Volumen: 2.1 x 2.1 x 0.7

C.H.V. # 18,1 Huacal,
conteniendo:
parte inferior de # 17,Volumen: 1.45 x 1.5 x 1.o

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C.H.V. # 19, 1 Huacal
conteniendo:
1 juego para cimientos del molino chileno
Volumen: 1.5 x 1.5 x 0.3

C.H.V. # 20, 1 Huacal
conteniendo:
1 Piedra para Molino chileno
Volumen: 1.1 Ø x 0/45

C.H.V. # 21, 1 Huacal
conteniendo:
1 Piedra como # 20:
Volumen: 1.1 Ø x o.45

C.H.V. # 22, 1 Caja
conteniendo:
1 Rodillo para Ia Prensa desaguadora, superior
Volumen: 1.55 x o.5 x 0.5

C.H.V. # 23, 1 Caja
conteniendo:
1 Rodillo para IIa idem
Volumen: 1.55 x 0.5 x 0.5

C.H.V. # 24, 1 Caja
conteniendo:
1 Rodillo para Ia. Prensa desguad. inferior
Volumen: 1.65 x 0/45 x 0.45

C.H.V. # 25, 1 Caja
conteniendo:
1 Rodillo para IIa. idem idem
Volumen: 1.65 x 0/45 x 0.45

C.H.V. # 26, 1 Huacal
conteniendo:
1 Rodillo para Holandes
Volumen: 0.85 Ø x 2.55

C.H.V. # 27, 1 Huacal
conteniendo:
1 Tambor para lavar del Holandes
Volumen: 0/78 Ø x 2.1

C.H.V. # 28, 1 Huacal
conteniendo:
1 Tina del Holandes
Volumen: 0.8 x 1.45 x 2.75

C.H.V. # 29, 1 Huacal
conteniendo:
1 Tanque abastecedor c/movimiento y copas
1 Tapa para Holandes
Volumen: L.65 x 2.7 x 1.5

C.H.V. # 30, 1 Huacal
conteniendo:
1 Tina para tanque desaguador
1 Ciclon
1 Codo para el mismo
2 Tubos idem
Volumen: 1.76 x 1.87 x 2.6

C.H.V. # 31, 1 Caja
conteniendo:
1 Cilindro io de la Maq.desgdro.
Volumen: 0/85 Ø x 1.7

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C.H.V. # 32, 1 Caja
conteniendo:
1 Cilindro 2o de la maquina desaguadora
Volumen: 0.85Ø x 1.7

C.H.V. # 33, 1 Caja
conteniendo:
1 Motor completo # 10, para Tanque abastr
de 3HP. 870 rev.min.
Volumen: 0.75 x 0.65 x 0.55

C.H.V. # 34, 1 Caja
conteniendo:
1 Lote de diferentes armazones, partes etc.
para la Instalacion.segun lista detallada
Volumen: 1.4 x 1.4 x 1.0

C.H.V. # 35, 1 Caja
conteniendo:
1 Lote lo mismo como # 34, y segun detalles
en lista especificada.
Volumen: 1.4 x 1.4 x 1.0

C.H.V. # 36, 1 Caja
conteniendo:
1 Lote partes fierro fundido etc. para
armazon de la maquinaria etc.
segun lista detallada.
Volumen: 1.1 x 1.1 x 0.95

C.H.V. # 37, 1 Caja
conteniendo:
1 Lote de armaturas para la maquinaria,
segun lista detallada.
Volumen: 1.7 x 1.05 x 1.05

C.H.V. # 38, 1 Caja
conteniendo:
1 Lote lo mismo como # 37,
segun lista detallada.
Volumen: 1.3 x 1.1 x 1.45

C.H.V. # 39, 1 Huacal
conteniendo:
1 Cilindro secador a Vapor
Volumen: 0.95 Ø x 1.75

C.H.V. # 40, 1 Huacal
conteniendo:
1 Cilindro secador a vapor
Volumen: 0.92 Ø x 1.75

C.H.V. # 41, 1 Huacal
conteniendo:
1 Cilindro secador a vapor
Volumen: 0.92 Ø x 1.75

C.H.V. # 42, 1 Huacal
conteniendo:
1 Caldera a vapor
Volumen: 1.3 x 1.2 x 3.5

C.H.V. # 43, 1 Caja
conteneindo:
1 Lote partes de maquinaria segun lista detallada
Volumen: 1.0 x 1.45 x 1.07

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C.H.V. # 44, 1 Caja
conteniendo:
2 Starters electricos
Volumen: 0.81 x 0.48 x 0.87

C.H.V. # 45, 1 Huacal
conteniendo:
4 Engranes para Partida secadora
Volumen: 1.0 x 1.02 x 0.54

C.H.V. # 46, 1 Huacal
conteniendo:
3 Poleas conicas maq.aagdra.
Volumen: 0.9 x 0.89 x 0.76

C.H.V. # 47, 1 Huacal
conteniendo
1 Polea dela maq. agdra.
2 Poleas de madera
Volumen: 1.56 x 1.56 x 0.53

C.H.V. # 48, 1 Huacal
conteniendo:
2 Poleas fierro conicas
1 Polea madera
Volumen: 1.15 x 1.15 x 0.69

C.H.V. # 49, 1 Huacal
conteniendo:
3 Poleas de Madera
Volumen: 1.77 x 1.8 x 0.44

C.H.V. # 50, 1 Huacal
conteniendo:
2 Poleas
Volumen: 0.88 x 0.88 x 0.38

C.H.V. # 51, 1 Caja
conteniendo:
1 Lote de varias partes de la
Instalacion etc. seg. lista detallada.
Volumen: 0.93 x 0.6 x 3.30

C.H.V. # 52, 1 Huacal
conteniendo:
1 Tanque para desaguar
1 Engrane
1 Anillo de fundamento para caldera.
Volumen: 1.24 x 1.24 x 0/25

C.H.V. # 53, 1 Huacal
conteniendo:
3 Poleas
Volumen: 1.36 x 1.36 x 0.40

C.H.V. # 54, 1 Huacal,
conteniendo:
8 Poleas
Volumen: 1.8 x 0.71 x 0.71

C.H.V. # 55, 1 Huacal,
conteniendo:
3 Poleas
Volumen: 1.39 x 1.32 x 0.47

C.H.V. # 56, 1 Huacal,
conteniendo:
2 Poleas
Volumen: 1.08 x 1.08 x 0.28

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C.H.V. # 57, 1 Caja
conteniendo:
1 Lote partes de la Maquinaria etc.
segun detalle en lista enumerativa
Volumen: 0.62 x 0.67 x 2.2

C.H.V. # 58, 1 Caja
conteniendo:
1 Lote armaturas segun lista detallada
Volumen: 0.78 x 0.77 x 3.02

C.H.V. # 59, 1 Caja
conteniendo:
1 Maquina cortadora completa
para Bagazo. Volumen: 1.6 x 1.04 x 1.52

C.H.V. # 60, 1 Caja
conteniendo:
1 Lote Aparatos de Laboratorio
1 Mesa para dibujar plegadiza.
Volumen: 1.16 x 0.92 x 0.64

- SEDA ARTIFICIAL -

M.B.P. 2480, 1 Caja	Volumen:	0.64 x 0.62 x 1.06
M.B.P. 2481, 1 Caja	idem	0.83 x 1.15 x 1.73
M.B.P. 2482, 1 Caja	idem	1.18 x 1.08 x 2.14
M.B.P. 2483, 1 Caja	idem	0.78 x 1.32 x 1.7
M.B.P. 2484, 1 Caja	idem	0.83 x 1.24 x 1.73
M.B.P. 2485, 1 Caja	idem	0.89 x 1.53 x 1.55
M.B.P. 2486, 1 Caja	idem	1.45 x 1.93 x 2.3
M.B.P. 2497, 1 Caja	partes refaccionarias de vidrio.	

Peso aproximado 50.000 kilos de los cuales la mayor parte va como metros cubicos en cuando a fletes de Mar.

FADEGT

A N E X O N U M E R O C U A T R O

a. Descripcion somera del PROCEDIMIENTO HEMMER VALET.

b. Copia de una Patente Americana ortorgada al señor Hemmer Valet.

c. Notas sobre MANIPULACION DEL BAGAZO.

d. Precios de COSTO y MANUFACTURA dela CELULOSA.

e. Plano diagramatico delas Operaciones en la produccion de CELULOSA Y SUBPRODUCTOS.

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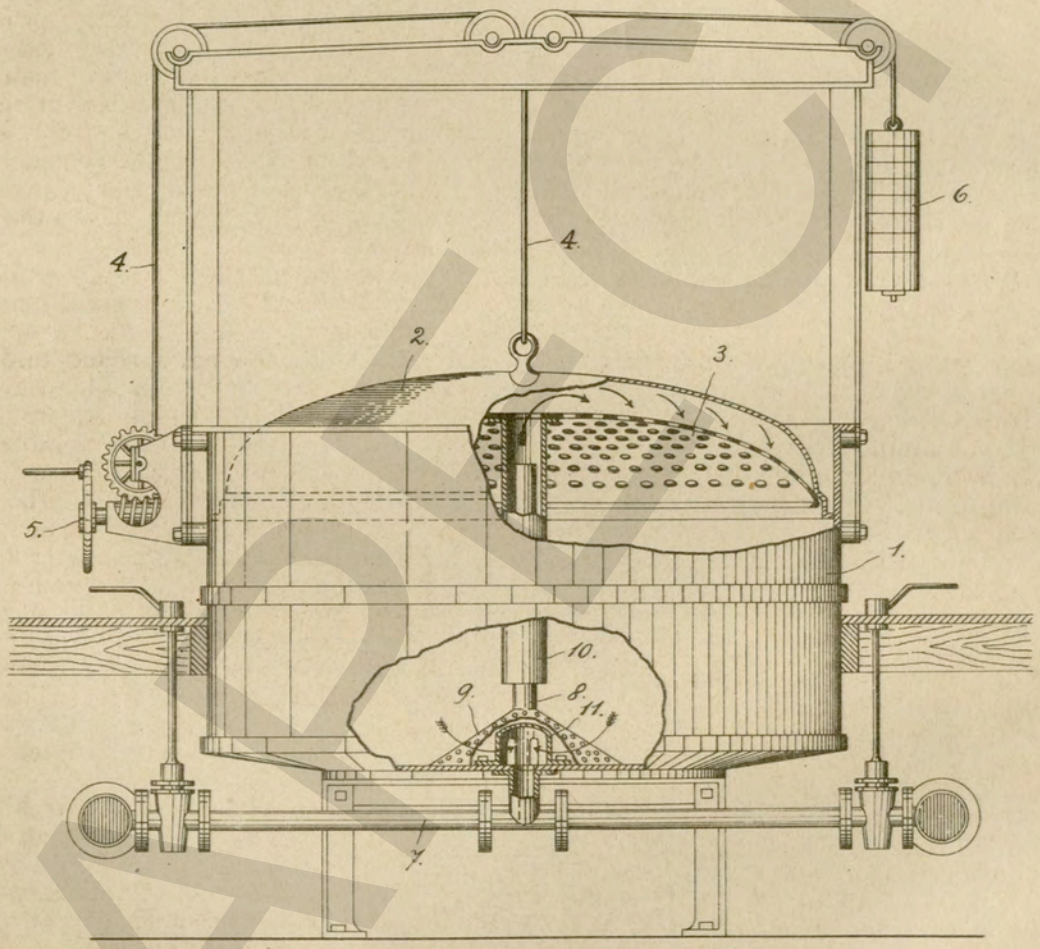
Sept. 3, 1929 E. C. H. VALET Re. 17,422

PROCESS FOR EXTRACTING THE PURE CELLULOSE FROM THE BAGASSE OF SUGAR CANE

Filed Aug. 9, 1926



Inventor:
Earnest Charles Hemmer Valet
By B. Singer, Atty.

FAIR COPY

Reissued Sept. 3, 1929. Re. 17,422

UNITED STATES PATENT OFFICE.

EARNEST CHARLES HEMMER VALET, OF MEXICO, MEXICO, ASSIGNOR TO CELULOSA HEMMER VALET, SOCIEDAD AMONIMA, OF MEXICO, MEXICO, A CORPORATION OF MEXICO.

PROCESS FOR EXTRACTING THE PURE CELLULOSE FROM THE BAGASSE OF SUGAR CANE.

Original No. 1,630,147, dated May 24, 1927, Serial No. 128,305, filed August 9, 1926, and in Mexico June 14, 1926. Application for reissue filed May 22, 1929. Serial No. 365,222.

The present invention refers to a process and apparatus for extracting and separating cellulose from the bagasse of sugar cane, in order to utilize this cellulose in the manufacture of paper, cardboard and similar products.

The invention has for its object to provide a simple and inexpensive process by which the cellulose pulp may be manufactured at the place where the sugar cane is grown and crushed, and from where it may be sent in a compressed form to the factories which convert it into paper, cardboard and similar products.

The principal difficulty encountered up to this date in the separation of the pure cellulose from the bagasse of the sugar cane consisted in obtaining a thorough elimination of the saccharose remaining in the bagasse after crushing, and of the resinous and other components of the stalks. A sufficiently complete elimination of all foreign matters is accomplished by the process described hereinafter.

The sugar cane, before or after it has passed through the mill, is cut by adequate machinery into lengths of about one inch and carried by conveyors to the macerating tanks wherein takes place the first step of the process. The cane mill may also be connected directly with the macerating tanks which are of a suitable construction and provided with an agitating mechanism, and the macerating liquid may be heated by exhaust steam.

The macerating tanks which, as already mentioned may be located at a certain distance from the mills, or adjacent to the same, are filled with a clear solution of lime, which solution may be prepared by adding from about three to five parts of unslaked lime to 100 parts of water, agitating and permitting the undissolved lime to settle and the bagasse is left to remain in this solution during a variable time which depends upon the system of tanks used and upon the temperature of the solution, which temperature, however, should not reach the boiling point.

As soon as the object of this first treatment has been obtained, which is to eliminate certain components of the bagasse which may be an obstacle to its subsequent treatment, the lime solution is drawn off for separate and independent treatment for other products, and the bagasse without being washed is carried to cooking tanks especially constructed for obtaining a sufficiently pure cellulose. In case the bagasse has not been cut up into small lengths before being subjected to the treatment with the lime solution, this may be done now before introducing it into the cooking tanks.

In the accompanying drawing is shown a preferred form of a cooking tank used for carrying out the present process. As will be seen from this drawing, a round tank 1 is provided with two covers 2 and 3, preferably fastened together along their edges. These covers may be raised by means of cables 4 or chains moved by a crank 5, and are further provided with a counterweight 6. The lower cover 3 is perforated over its entire surface and less curved than the upper cover 2, so as to leave an open space between both covers. Instead of the covers 2 and 3 being united, they may also be placed separately one above the other, but the upper cover should fit tightly into the side walls of the tank 1. The cooking apparatus is provided with suitable piping 7 for admitting either direct or indirect steam.

The cooking tanks are filled as high as possible with the bagasse taken out of the macerating tanks, and with a liquid consisting of a solution of about 6% of caustic soda and of a solution of from 2 to 3% of sodium sulphite, in the proportion of about 18 gallons of the caustic soda solution and 12 gallons of the sodium sulphite solution, making 30 gallons of both solutions combined, for every 100 pounds of dry bagasse. The composition of the liquid may further be varied by adding additional clear lime solution, according to the class of bagasse to be treated, which varies with its age and the place where it has been grown. In some cases there may also be used a weak solution of calcium sulphite, reducing proportionally the amount of sodium sulphite solution. Instead of sodium sulphite, sodium hypo-sulphite may also be used.

When the cooking tanks have been filled with the bagasse and with the solutions already described and determined according to the properties and compositions of the bagasse, steam is admitted to the tank through the pipe 7, and the bagasse is cooked at a pressure of from 7 to 8 pounds and during 4 to 6 hours which is sufficient time to secure the greatest possible purity of the cellulose.

The perforated cover 3, through its own weight and the additional weight of the upper cover 2, presses down on the bagasse during the whole cooking process, in order that the bagasse may not be revolved in the tank by the inrushing steam and by the circulating solution, but will stay quiet without moving. This is an essential part of the process, as otherwise the percentage of pure cellulose obtained would be greatly diminished. The solution however is continually forced through the mass of the bagasse, being pushed up by the entering steam through a vertical pipe 8 which rests on a perforated cone 9 provided at the bottom of the tank and over the steam inlet; from there the solution overflows as indicated by arrows into the space between the two covers 2 and 3, and enters the tank again through the holes of the lower cover. After passing downward through the bagasse, it is sucked in again by the incoming steam through the perforated cone 9 and into the pipe 8. This pipe is partly surrounded by a wider tube 10 connected with the lower cover 3, and on top of the steam inlet there is placed a hood 11 having a number of openings, which serves to divert the steam laterally so that it may push before it the solution which enters through the cone 9 and raise it through the pipe 8.

After the cooking process is finished, the solution is drawn off and fresh steam is admitted which washes the cellulose remaining in the tank and cleans it of all the dissolved substances. The pure cellulose is then taken out and placed in suitable tanks, to be bleached with chlorine, chlorides or similar substances, or it may also be bleached electrically.

After bleaching the cellulose may be sent to paper making machines of any system, according to the class of paper, cardboard, etc., to be made; the bagasse cellulose pulp may either be used alone or mixed with pulp from other materials.

What I claim is:

1. A process for extracting the pure cellulose from the bagasse of sugar cane, which consists in first treating the bagasse with a solution of lime, in boiling it afterwards under pressure in a solution of about 6% of caustic soda combined with a solution of 2 to 3% of sodium salts until, all the foreign matter has been dissolved and separated from the cellulose, in cleaning the cellulose thus obtained with fresh steam after having drawn off the solutions, and in bleaching the pure cellulose.

2. A process for extracting the pure cellulose from the bagasse of sugar cane, as set forth in claim 1, including the step of cutting up the bagasse into small pieces before it undergoes a treatment in boilers.

3. A process for extracting the pure cellulose from the bagasse of sugar cane, which consists in macerating the bagasse in a solution of lime contained in a heated tank provided with agitators, in boiling it under pressure in a solution of caustic soda and a solution of sodium salts, in a proportion of about 18 gallons of caustic soda solution and 12 gallons of sodium salts solution to every 100 pounds of dry bagasse, in separating with a current of fresh steam the dissolved foreign matter from the pure cellulose, and in bleaching the pure cellulose with chlorine, chlorides or electrically.

4. A process for extracting the pure cellulose from the bagasse of sugar cane, as set forth in claim 3, including the step of adding to the solutions of caustic soda and of sodium salts a solution of lime in a proportion of about 12 gallons to every 100 pounds of dry bagasse.

5. A process for extracting the pure cellulose from the bagasse of sugar cane, as set forth in claim 3, wherein to the solutions of caustic soda and of sodium salts during the second step of the process, is added a weak solution of calcium sulphite, reducing eventually the quantity of sodium salts employed.

6. A process for extracting cellulose from the bagasse of sugar cane, which consists in first treating the bagasse with a substantially clear lime solution, in boiling it afterwards in a solution containing caustic soda and a sulphite of sodium, in cleaning the cellulose thus obtained with fresh steam after having drawn off the solutions and in bleaching the cellulose.

7. A process for extracting cellulose from the bagasse of sugar cane, which comprises first treating the bagasse with a substantially clear lime solution, and thereafter heating the same in a caustic solution containing a sulphite of sodium.

8. The process according to claim 7 wherein agitation of the bagasse during the heating in the caustic and sulphite solution is prevented.

9. The process for extracting cellulose from the bagasse of sugar cane, which comprises cutting the bagasse into small pieces, then treating it with a substantially clear lime solution and thereafter boiling it in a solution containing caustic soda and a sulphite of sodium.

10. A process for extracting cellulose from the bagasse of sugar cane which comprises first cutting the bagasse into small pieces,

then adding to the bagasse a substantially clear lime solution and heating the mixture with steam while maintaining the temperature below the boiling point, then separating the fibres from the solution and thereafter boiling in a caustic and sulfite solution.

11. A process for extracting cellulose from the bagasse of sugar cane, which comprises macerating the bagasse in a substantially clear solution of lime contained in a heated tank provided with agitators, in boiling it under pressure in a solution of caustic soda and sodium sulphite, in separating with a current of fresh steam the dissolved foreign matter from the cellulose, and in bleaching the cellulose with chlorine, chlorides or electrically.

In testimony whereof, I have signed my name to this specification.

EARNEST CHARLES HEMMER VALET.

FAPECI

IV

D

#369520

Filed June 8/1929

Conceded Sept 12/30

issued Febro 10/31

33

Case 6

Treating the Bagasse of Sugar Cane.

My invention comprises a complete process by which the bagasse of sugar cane may be treated to produce therefrom an excellent grade of cellulose. My invention is an improvement over that disclosed and claimed in my patent No. 1,630,147, dated May 24, 1927, an application for a reissue of which is now pending. The present application is a continuation in part of United States application Serial No. 192,785, filed May 19, 1927.

Attempts to manufacture cellulose from the bagasse of sugar cane have heretofore entailed considerable expense and have likewise resulted in a product that was not readily bleachable except with such strong bleaching solutions as attacked the fibre, reduced the yield, and resulted in a product of insufficient strength and hence was not suitable for the manufacture of high grade paper.

My process includes also the production of various by-products whereby great economy is effected not only in utilization of substantially all the ingredients of the bagasse, but also in complete utilization of the various chemicals employed, resulting in a minimum of waste.

In practicing my process I first reduce the moisture content of the bagasse as it comes from the mill and thereafter separate the longer fibres suitable for cellulose manufacture from the epidermis, parenchym, and shorter fibres. The drying of the bagasse and the subsequent separation of the fibres is preferably carried out by the process described and claimed in my co-pending application Serial No.366,825 filed May 29, 1929. This process comprises air drying of

the bagasse over a period of one or two weeks in a building provided with perforated floors and side walls open to the atmosphere, the bagasse being loosely spread about one or two feet deep on the perforated floors and a gentle current of air forced through and over the bagasse. The bagasse is then treated preferably in a hammer-mill which breaks up the hard epidermis into a powdery form and partially opens up the fibrous part to detach the parenchym and smaller fibres from the longer fibres. By means of screens and air flotation the longer fibre is then separated from the other parts of the bagasse and further separation of the smaller fibres and the parenchym from each other and from the epidermis and foreign matter is effected.

The materials are then ready for chemical treatment by my improved process. In order to make clear the present process I will describe a treatment of a specific quantity of bagasse fibres together with specific quantities of the various chemicals to be employed. I wish it understood, however, that the various quantities given are representative only and are not to be taken as limiting my invention except as so limited in my claims. To a quantity of about 300 kilograms of dry bagasse fibre, separated from other ingredients by the preliminary process above described, I add about 1200 to 1500 liters of a clear saturated solution of lime. I heat the fibres and lime solution together for about one-half hour preferably first by steam allowed to enter directly into the solution, and then by passage of steam through heating coils, while maintaining the temperature below the boiling point, preferably at a temperature of about 90°C. This treatment of the fibres is of particular value as a step in the elimination of the natural coloring matters and of the sugar

content, which latter amounts to about one and one-half to three per cent. or even more of the weight of the dry bagasse fibres. It is absolutely essential in order to obtain a good grade of paper stock for the sugar to be completely eliminated as otherwise it is impossible to bleach to a pure white product. After the lime treatment, and while the fibres are still immersed in the lime solution I add a cold solution containing sodium sulphite. With the quantities above mentioned I add 300 to 500 liters of the sodium sulphite solution, the amount of the sulphite in solution being about one-half to two per cent. of the fibre weight. Preferably the entire quantity of sodium sulphite amounting to about one and one-half to six kilograms, is dissolved in about 100 liters of water, and 200 to 400 liters of water are added cold to the solution in the cooker to reduce the temperature thereof to about 60 to 75°C. prior to the addition thereto of the cold sulphite solution. This prevents the loss of sulphite which might otherwise occur if the temperature were maintained constantly at the higher temperature of 90°C. While I have found a solution of sodium sulphite (Na_2SO_3) satisfactory for this step in my process, any solution which has an equivalent sulphite ion concentration and equivalent alkalinity is a suitable solution. After the addition of the sulphite solution, the mixture is now heated up to the initial temperature by means of steam for about one-half to one hour which time I have found sufficient for my purposes. I have found that this treatment of the fibres, first with clear saturated lime solution and then with the sulphite and lime solution, insures substantially complete elimination of the sugar content and also of the natural coloring matters. I believe this to be due to the partial opening up of the fibre by the alkaline

solution to permit the sugars to go into solution and perhaps also to the enhanced solubility of the sugars in the presence of lime. The sulphite solution, I believe to be of particular value in connection with the elimination of the natural coloring matters. After this treatment I draw off so much of the solution as may be readily removed from the fibres, which amounts to about 1000 liters or two-thirds of the total employed. The fibres are then washed with hot water and/or steam and I may add if convenient the wash water to the solution already drawn off. This solution, which I will call "Solution A" is used in connection with by-product manufacture, as will be pointed out hereinafter.

The next step of my process comprises the addition to the washed fibre of a weak caustic solution, comprising about 1,000 liters of caustic potash, caustic soda and sodium or other suitable sulphite in the proportions of about .3 to .6% caustic potash, 3-1/2 to 5% caustic soda and 1/2 to 1-1/2% of the sulphite. The mixture is now heated by the addition of live steam in quantity sufficient to add about 200 liters of water to the solution and the temperature maintained around 130°C. for from four to eight hours. The treatment is effected in a closed cooker, the pressure within which is accordingly raised to about 1-1/2 to 2-1/2 atmospheres.

The particular proportions of the various chemicals depend upon the age of the bagasse and also upon the soil in which the sugar cane is grown. In place of the caustic soda additional caustic potash could be used, but this is not preferred on account of the greater expense involved. During this treatment the silica is removed by the caustic potash, the vegetable glue is dissolved, the last traces of the coloring matter are destroyed, the resinous matter and vegetable wax are

saponified or emulsified by the combination of chemicals used, and any epidermis or parenchym remaining with the fibres has been so acted upon as to render them harmless during the further treatment and manufacture of the cellulose. At the end of the cooking process samples of the solution and of the fibre are taken in order to ascertain whether the proper stage of purity of the cellulose has been reached, and if it has the pressure is reduced to about one atmosphere and the solution, which I will call "Solution B", drawn off and saved for by-product manufacture. The fibre is then washed with hot water or steam until the water runs practically clear. The fibre is then removed from the cooker and placed in hollanders or beaters where it is beaten in a lukewarm solution of about 28°C. to 33°C. of soap preferably of the type of Marseilles soap; about one to three kilograms of the dry soap being in solution in about 1,000 liters of water. The material in solution is then heated in the beaters to about 50-70°C. The soap solution washes out the last traces of the resins, waxes and gums. This solution is then removed and may, if desired, be saved for by-product manufacture. The fibre remaining is then thoroughly washed with lukewarm water having a temperature of 30°C. to 35°C. in the same beaters and bleached in any well known manner.

I have found it of particular importance that the lime solution and the solution of sulphite added in the initial part of my above described process be added separately with sufficient time elapsing before the sulphite solution is added, to insure the full respective effects of these reagents. By the separate addition of these solutions I am able to

eliminate substantially all of the sugar and coloring matter and hence obtain a cellulose that can be readily bleached without loss of strength of the resulting material.

In the latter part of my process it is of particular importance to add the soap solution after the removal of the caustic solution and the subsequent washing of the fibres. If the soap solution is added while the caustic solution is still in the cooker a kind of wax soap is formed which adheres in lumps to the cellulose and is most difficult to remove therefrom, requiring an immense quantity of hot water, and even after all this washing the fibres remain slippery to the touch, and are therefore not readily workable with the usual paper making machinery.

The recovery of by-products is of importance in my novel process as it substantially lowers the cost thereof. By-products obtainable from my process include high grade cellulose from the short fibres of the bagasse, when these are not added to the longer fibres in the above process, sweetening syrups, fertilizers, filling material for the plastic arts or for explosives, waxes, resins, glues, etc. A description of the various processes by means of which these by-products may be obtained will now be given.

In my above mentioned copending application, the separation of the short fibres from the parenchym and epidermis is described. This separation, briefly, is effected by air flotation methods to first remove the powdered epidermis and dust, followed by screening, using slit screens through which the shorter fibres pass, leaving the parenchym behind. I have found that a very excellent grade of cellulose, very high in alphacontent, may be obtained from these separated short fibres. According to marketing conditions these may be added directly to the long fibres and treated therewith by my

above described process or treated separately for by-product manufacture. These shorter fibres when separated in the above manner are freer from adhering parenchym, etc. than are the longer fibres, and I have found that they are particularly suitable for the production of a special high grade of alpha cellulose from which artificial silk of a quality superior to that hitherto produced may be manufactured. When treated for the production of such high grade cellulose, the short fibres are treated separately by a process similar to that described for the longer fibres. As by my process hereinafter described, I recover sweetening syrup from solution A and resins, waxes, glues, etc., from solution B, I prefer to use these solutions in treating the short fibres, in order to make those solutions as rich as possible in the recoverable ingredients. In treating the short fibres for the production of artificial silk, I first use solution A just as it comes from the cooker after treatment of the long fibres, and then recondition it by the addition of clear lime solution and, after the treatment with this solution add fresh sulphite solution. The short fibres are then treated in solution B which may also be reconditioned, or solution B may be withdrawn and fresh solution used, which latter may bein turn used for treatment of the longer fibres. After the alkali treatment the short fibres are washed, beaten in soap solution and bleached, as in the case of the longer fibres. The resulting cellulose is then ready for treatment for the production of artificial silk of unueually high quality.

Without reconditioning the solutions, and

employing only such temperatures as may be obtained from exhaust steam of the plant, I may obtain a by-product from the short fibres of considerable strength and of a very good light color, suitable, without bleaching, for newspapers or the like or suitable when bleached for other uses of cellulose. It is not essential to use solution A in this case, but its use is preferred in order to enrich the solution with the sugar from the fibres. When using the unconditioned solutions, I agitate the short fibres for from four to six hours in solution B, maintain the temperature at about 90°C. by exhaust steam of the plant and then wash them, using preferably the wash water from the longer fibres and finally treat the fibres with the soap solution, which may also be that used in the treatment of the longer fibres.

Vegetable waxes, glues, and resins are precipitated by the use of acids or in any other known manner from the alkali solution after its use in treating the fibres.

The parenchym, separated in the first part of my process from the other components of the bagasse, may be sold without treatment as a filler for explosives, or, if desired, the sugar contents contained therein may be recovered, and the remaining material used for other purposes.

The sugars, which amount to about 3% to 5% of the total, may be removed from the parenchym by treatment with so much of solution A with or without addition of fresh lime and sulphite solution as is necessary to bring the sugars into solution. This solution is then drawn off combined with all of solution A remaining from the

treatment of the long or short fibres, which solution contains the sugars removed from the fibres and added to the molasses of the sugar plant in such proportions as to reduce the specific gravity to 8° to 12° Bé. This mixture I then pass through filter presses, condense the filtrate to about 33° Bé., bleaching at the same time to a crystal clear syrup containing the sugars. This syrup is of value as a sweetening material for edible products. It has a peculiar and pleasant aroma and flavor, which I believe to be distinctive to my particular process and to the materials from which it is produced.

The parenchym, after the above extraction of the sugars, may be sold separately as filling material for the plastic arts, or may be added to the separated epidermis and dust and the whole used as a fertilizer, as may also be used the filter cakes remaining in the presses after filtration of the sugar containing solution.

I have now described my novel process in considerable detail, and given a representative treatment of a particular quantity of the bagasse. I have described as well various methods by which each of the constituents of the bagasse may be utilized in by-product manufacture with a minimum of waste not only of the bagasse but also of the various chemicals employed. Certain of the by-products and processes for their recovery disclosed herein are not claimed in the present application, as they form the subject matter of applications hereinafter to be filed. The particular by-products produced, and consequently the treatment therefor, will depend to a great extent upon the proximity to the plant of markets for the products and upon the facilities of the plant for storage, etc. Also the cost of manufacture of chemicals in relation to the price obtainable from the products must be taken into consideration. For example, in some instances, it may be

preferable to treat the short fibres for the production of cellulose for news print manufacture, thus reducing the expense insofar as chemicals are concerned, but giving a poorer grade cellulose, whereas at other times it may prove more economical to condition solutions A and B in order to produce cellulose for artificial silk. Similarly, in some instances it may be preferable to sell the parenchym without treatment, while again, recovery of the sugars therein may be expedient.

The cellulose obtained by my improved process is of a particularly fine quality. It has a high alpha content and is readily bleachable to a pure white color.

I claim:

FAPECHT

1. A process for treating bagasse fibres which comprises first treating the fibres in a clear saturated solution of lime, later adding thereto a solution containing a suitable sulphite then treating the fibres in a solution containing caustic potash and a suitable sulphite and subsequently washing the fibres in a soap solution.

2. A process for treating bagasse fibres which comprises first treating the fibres in a clear saturated solution of lime, later adding thereto a solution of sodium sulphite, then treating the fibres in a solution containing caustic potash, caustic soda and sodium sulphite and subsequently washing the fibres in a soap solution.

3. A process for treating the bagasse of sugar cane which comprises first separating epidermis, parenchym, and other foreign materials from the fibres, then treating the separated fibres in a clear lime solution and heating the same while maintaining the temperature below the boiling point, then reducing the temperature while adding an alkaline solution containing sulphite ions and again heating to a temperature below the boiling point, then removing the solution and thereafter treating the fibres with a weak alkali solution.

4. A step in the process for treating the bagasse of sugar cane which comprises heating bagasse fibres with a clear lime solution to a temperature in the neighborhood of 90°C, then reducing the temperature to about 60°C by the addition of cold water and thereafter adding a solution of sodium sulphite and raising the temperature to its initial value.

FAPECT

5. A process for treating the bagasse of sugar cane, comprising first separating short fibres, epidermis, dust and parenchym from the longer fibres, then treating the separated longer fibres in a clear saturated solution of lime, followed by the addition thereto of a solution of sodium sulphite, then removing the solution, washing the fibres and then heating the same in a solution, containing caustic potash, caustic soda and sodium sulphite, then removing the solution and again washing the fibres, and finally beating the fibres in a heated solution of soap.

6. Additional steps in the process according to claim 5 comprising separating the shorter fibres from the other material separated from the longer fibres, then heating the separated short fibres with the alkali solution removed after the treatment of the longer fibres, then washing the shorter fibres and heating in a weak soap solution.

7. Steps in the process of treating the bagasse of sugar cane which comprises heating separated fibres of bagasse in a caustic solution containing caustic soda, caustic potash and sodium sulphite to a temperature of about 130°C. to remove the resinous matters and silica and to dissolve the glues, then removing the solution, washing the fibre, heating the washed fibre in a weak soap solution, and finally washing and bleaching the fibres.

8. A process for treating the bagasse of sugar cane which comprises first reducing the moisture content of the bagasse, then mechanically separating the longer fibres from the remainder of the bagasse, treating the separated fibres in a clear lime solution to which a solution of sodium sulphite is added thereafter, then removing the solution from the fibres, washing the fibres and subsequently treating the fibres in a weak caustic solution.

FARFCH

9. A step in the process of treating the bagasse of sugar cane which comprises treating separated fibres of bagasse in a clear lime solution while maintaining the temperature below the boiling point of the solution, then adding a cold solution of a suitable sulphite and reheating the mixture to a temperature below the boiling point.

10. The process according to claim 9 wherein the sulphite solution is sodium sulphite in amount equal to about one-half to two percent of the weight of the bagasse fibres.

FAPECH

IV A

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Manipulacion del Bagazo tal como viene del Ingenio:

El Bagazo al venir delos Trapiches del Ingenio contiene aproximadamente 50% de Humedad.

Para poder preparar y almacenar etc. el Bagazo se somete al procedimiento de Flotation al Aire o secamento al Vacio con Vapor.

Por consecuencia:-

2.900 kilos de Bagazo humedo contienen 1450 kilos de BAGAZO SECO, y el valor calorifico de una tonelada de Bagzo SECO, es igual a 42 gals. de Petroleo Crudo.

Para los calculos siguientes se fijo el precio de un bbl. de Petroleo crudo en Dls. 1.50 y el precio del Bagazo al Ingenio en Dls. 3.00 por tonelada de 1000 kilos, material seco.-

C a l c u l o s:

1.450 kilos de Bagazo seco (entregado c/50% humedad) á Dls. 3.oo la tonelada Dls. 4.35

Costo de:-
Secamento, Vapor o Flotacion al aire, Electricidad, tratamiento de separacion en Molino sistema Cruz-Martillos, prensar la fibra larga, hasta llevarle el bagazo a los cocedores, inclusive mano de obra etc. etc. ..... " 4.40

450 kilos productos secundarios abajo enumerados, dejan un rendimiento neto de.....

1.000 kilos de Bagazo Fibra larga, limpia, puesta a los Cocedores con un precio de..... Dls. 8.75.

Productos secundarios

120 kilos de Fibra corta, muy limpia
120 idem Parenchym
180 idem Polvo (Fertilizante)
30 idem perdida de manipulacion

450 kilos total, cuyo costo esta cargado al precio de la Fibra larga arriba mencionada.

E.C.H.V.
1-20-31

IV B 48

Precio de Costo de manufactura
de

CELUBAGAZ, Celulosa con 85-90% de contenido ALPHA.

2.000 kilos de Bagazo, Fibra larga
á Dls. 8.75 los 1000 kos. Dls. 17.55

Valor de productos quimicos empleados
en el procedimiento de vaporizacion y
coccion ..... " 27.50

Rendimiento: Dls. 45.05

1.300 kilos de Celubagaz, sin blanquear Dls. 45.05
o sean
2.000 lbs. idem con 10% humedad Dls. 28.35

Blanqueo:

3 a 4 % de Chlorine, hypochlorite de Sodium o
otro material a proposito, calculado
sobre los 1300 kilos Celubagaz seco, Dls. 4.50
100 kilos de Perdida en blanqueo, maquilaje etc.
dejan un
Rendimiento neto de

1.200 kilos de CELUBAGAZ, AI blanqueado con un
Contenido de apr.90% ALPHA.....

Dls. 49.55

Por consecuencia cuesten

2.000 libras de Celubagaz, blanqueada etc. Dls. 33.78

Mano de Obra,
Vapor y Electricidad
á Dls. 10.oo por 1000 kilos. " 9.00

Dls. 42.78
10% de Gastos Generales etc. ..... " 4.27

Total Dls. 47.05

RESUMEN:-

2.000 lbs. Celubagaz, AI blanqueada de 90% ALPHA = Dls. 47.05

y

2.000 lbs. Celubagaz, FACILMENTE BLANQUEABLE
con 85-90% ALPHA..... = Dls. 38.90

Precio en U.S. Dls. 85.oo á Dls.95.oo por 2000 lbs.90% dry.

FAPECFT

ANALYSIS

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C O P Y

VIRGINIA CELLULOSE CO.
WILMINGTON, Del.

Febr.22nd.1929.

American British Chemical Supplies
New York City.

Gentlemen:-

Regarding the recent sample of

SUGAR CANE PULP

which you sent us, we have analyzed the material and it is as follows:-

VISCOSITY.....	28 seconds
SODA SOLUBLE.....	20.64%
ASH.....	.94%
ETHER EXTRACTIVE MATTER.....	.12%
ALPHA CELLULOSE.....	89.7%
COPPER NUMBER.....	1.2%
IRON.....	280 PPM.

From the above analysis, it is about the same quality as an average grade wood pulp.-

Very truly yours

(sgd.) P.B.Stull

FAPECFT

Extract Copy of letter from Mexico, giving the following

D A T A .

ANALYSIS MADE BY THE

LABORATORIES of "CRUZ AZUL"
Compañia de Cemento, Mexico, D.F.

Sample of compressed

CELULOSE, "CELUBAGAZ".

MATERIAS VOLATILES..... 81.28%

CARBON FIJÔ 16.77%

CENIZAS..... 1.95%

100.00

CENIZAS

$Si\ O_2$ 2.98%

Ca O 73.08%

CENIZAS..... 2.64%

Agosto 27 de 1928

firmado DANIEL CASTRO L.

97.36 % MATERIAS ORGANICAS

2.64 % MINERAL

firmado MONTIEL.

FAPESP

SECRETARIA DE INDUSTRIA,COMERCIO Y TRABAJO

DICTAMEN QUE RINDE EL "LABORATORIO DE BOTANICA DEL DEPARTAMENTO DE INDUSTRIAS" sobre la .....

C E L U L O S A

que presentò el Sr.Arana Silva, Vocal 2º de la ....

CELULOSA HEMMER VALET S.A. .....

La CELULOSA DE BAGAZO se puede emplear muy biên para fabricar PAPEL especialmente el llamado "GLASSINE" o sea PAPEL MUY RESISTENTE, MUY DELGADO Y TRANSPARENTE.

Tambien puede emplearse para fabricar PAPEL DE LIBROS, y PAPEL SECANTE, siempre que para este ùltimo el tratamiento sea adecuado.-

La CELULOSA EN CUESTION tiene la VENTAJA de exigir un tratamiento MUY REDUCIDO (muy corto) en pila por... HIDRATARSE LA FIBRA MUY FACILMENTE.-.....

El producto ofrecerà una ventaja sobre las demas.... Celulosas, siempre que su precio por tonelada sea inferior al de los productos analogos empleados con .. tal fin.-

Mexico,D.F. 18 de Septiembre de 1928

LUIS DE LA BORBOLLA

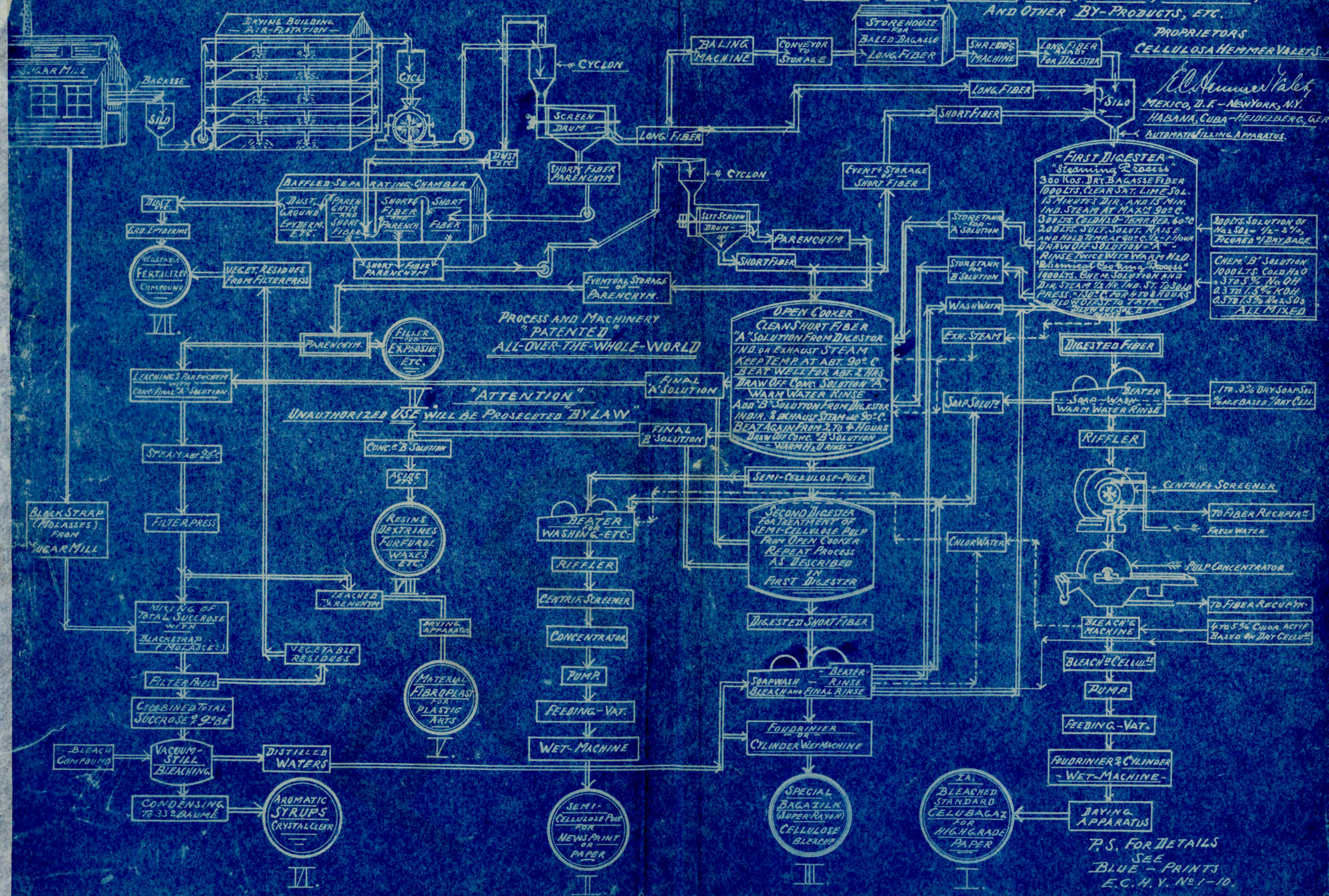
(firmado y rubricado)

Es copia
CELULOSA HEMMER VALET S.A.
J.Cuspinera Sanmarti,
Director Gerente

FAPECFT

APROXIMATE FLOW SHEET OF "HEMMER VALET PROCESS" FOR THE MANUFACTURE OF CELUBAGAZ, BAGAZILK, NEWS PRINT PULP OR PAPER, FIBROPLAST, AROMATIC SYRUPS, RESINS, DEXTRINES, WAXES, FURFUROL, FERTILIZERS, AND OTHER BY-PRODUCTS, ETC.

PROPRIETORS
CELLULOSA HEMMER VALETS
E. C. Hemmer Valet
MEXICO, D.F. – NEW YORK, N.Y.
HABANA, CUBA – HEIDELBERG, GER.



A N E X O N U M E R O C I N C O .

Proporciones que se obtienen en CELULOSA y SUBPRODUCTOS de UNA TONELADA de BAGZO de CANA de AZUCAR por el ..... procedimiento HEMMER VALET.

FAPECFT

DIAGRAMA 5

PROPORCIONES

QUE SE OBTIENEN

EN

CELULOSA Y SUBPRODUCTOS

DE UNA

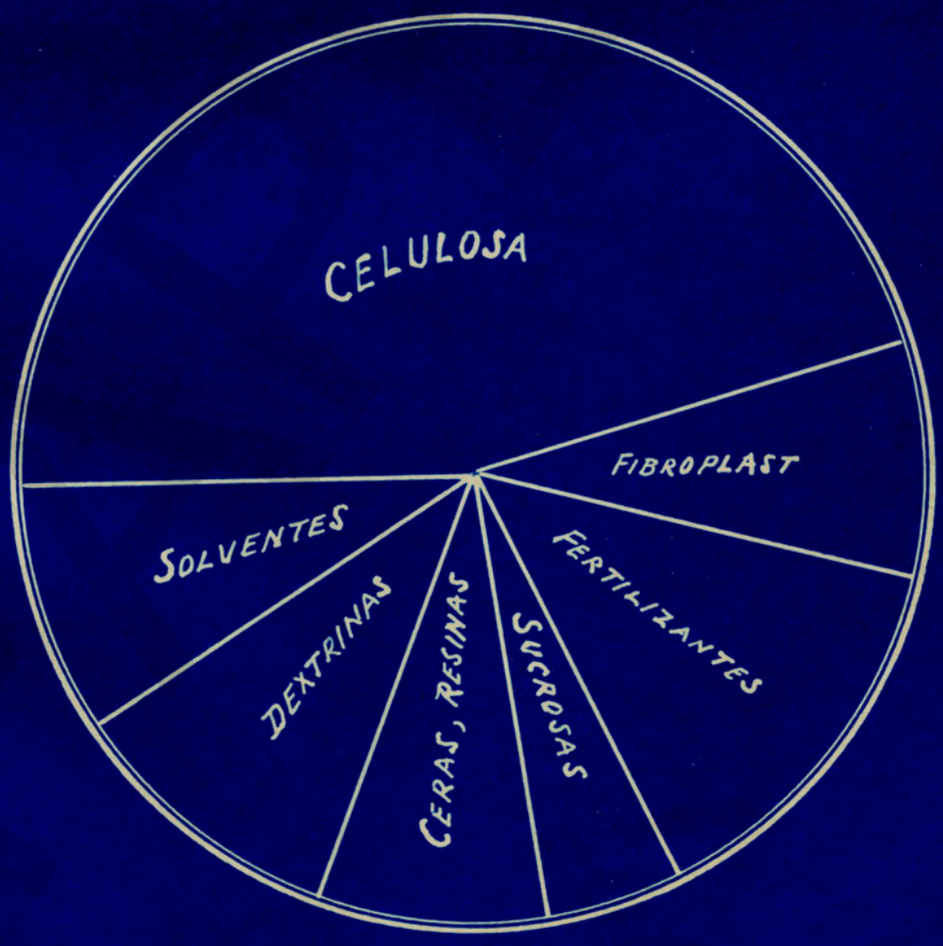
TONELADA DE BAGAZO

DE

CAÑA DE AZUCAR

POR EL PROCEDIMIENTO

HEMMER VALET



A N E X O N U M E R O S E I S .

CUADRO COMPARATIVO sobre RENDIMIENTO EN DOLARES de UNA TONELADA de CANA DE AZUCAR por el procedimiento A C T U A L y F U T U R O (Hemmer Valet).

6.

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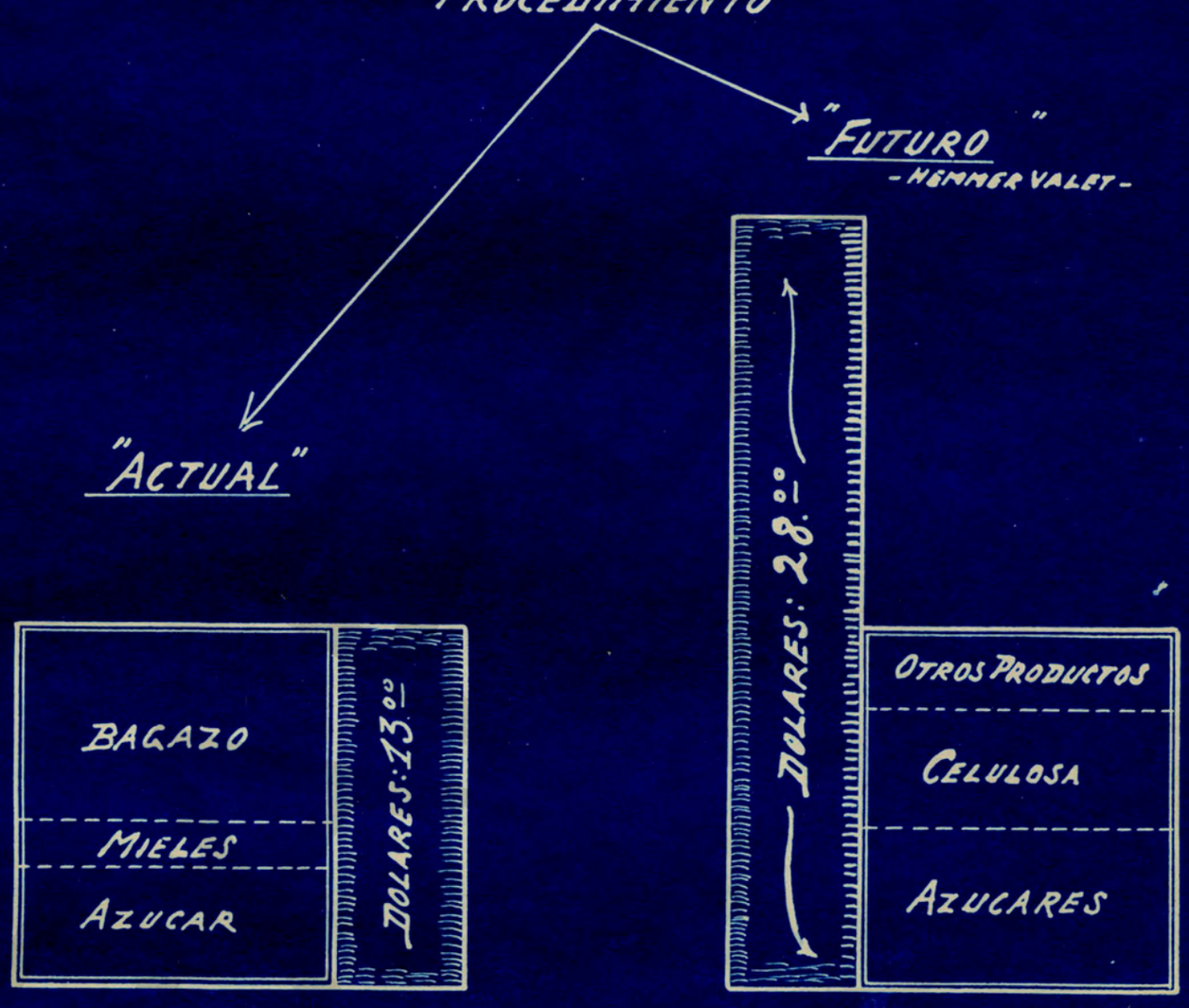
DIAGRAMA 6.

CUADRO COMPARATIVO SOBRE RENDIMIENTO EN DOLARES DE UNA TONELADA DE CAÑA DE AZUCAR POR PROCEDIMIENTO



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БАРЕСТ