(No Model.) 6 Sheets—Sheet 1.

B. D. HYAM.

MACHINE FOR EXPEDITIOUSLY TANNING HIDES, SKINS, &c.

No. 290,885. Patented Dec. 25, 1883.

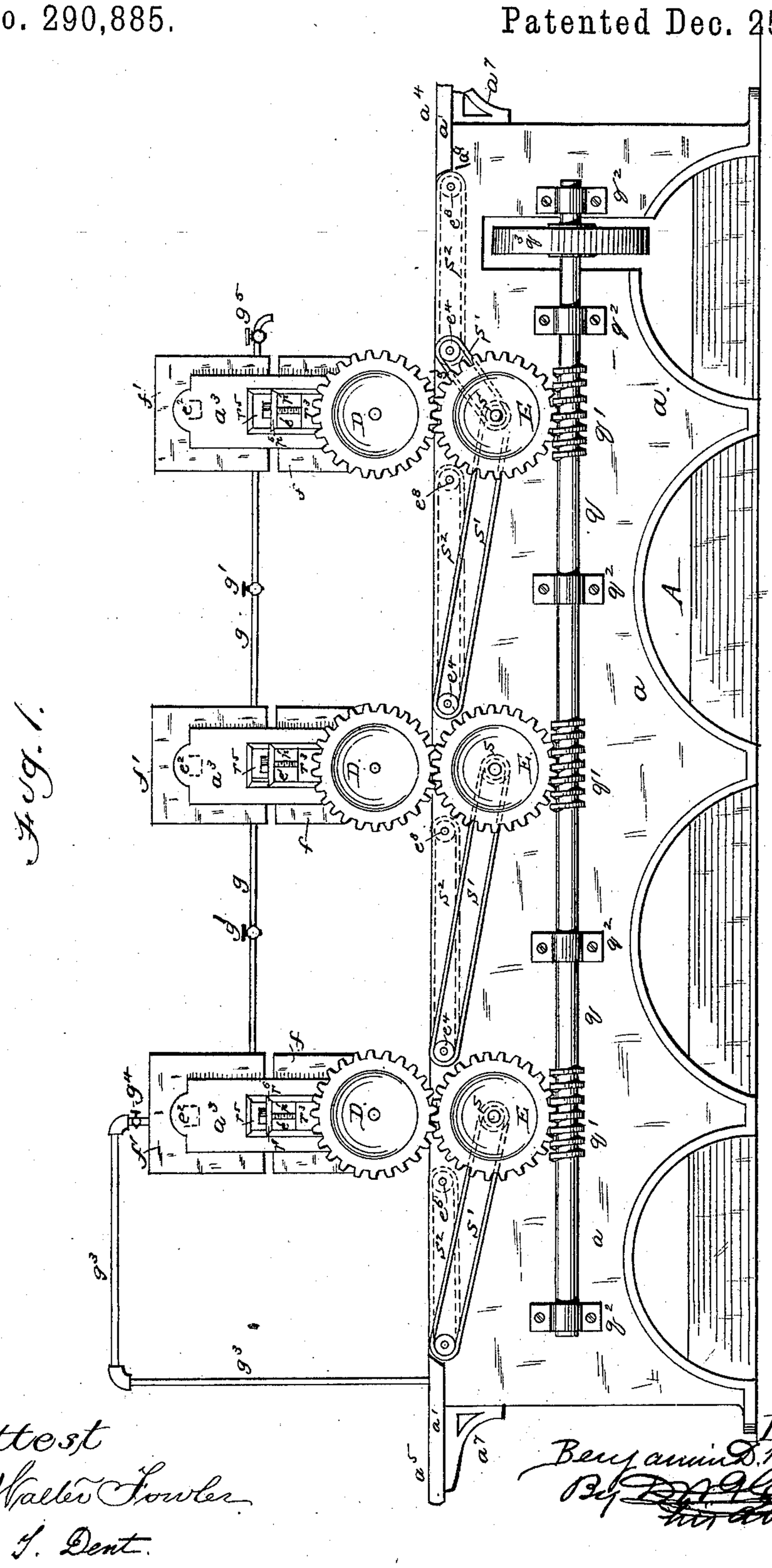

Fig. 1.

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By D. A. Glassie
his Attorney

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B. D. HYAM.

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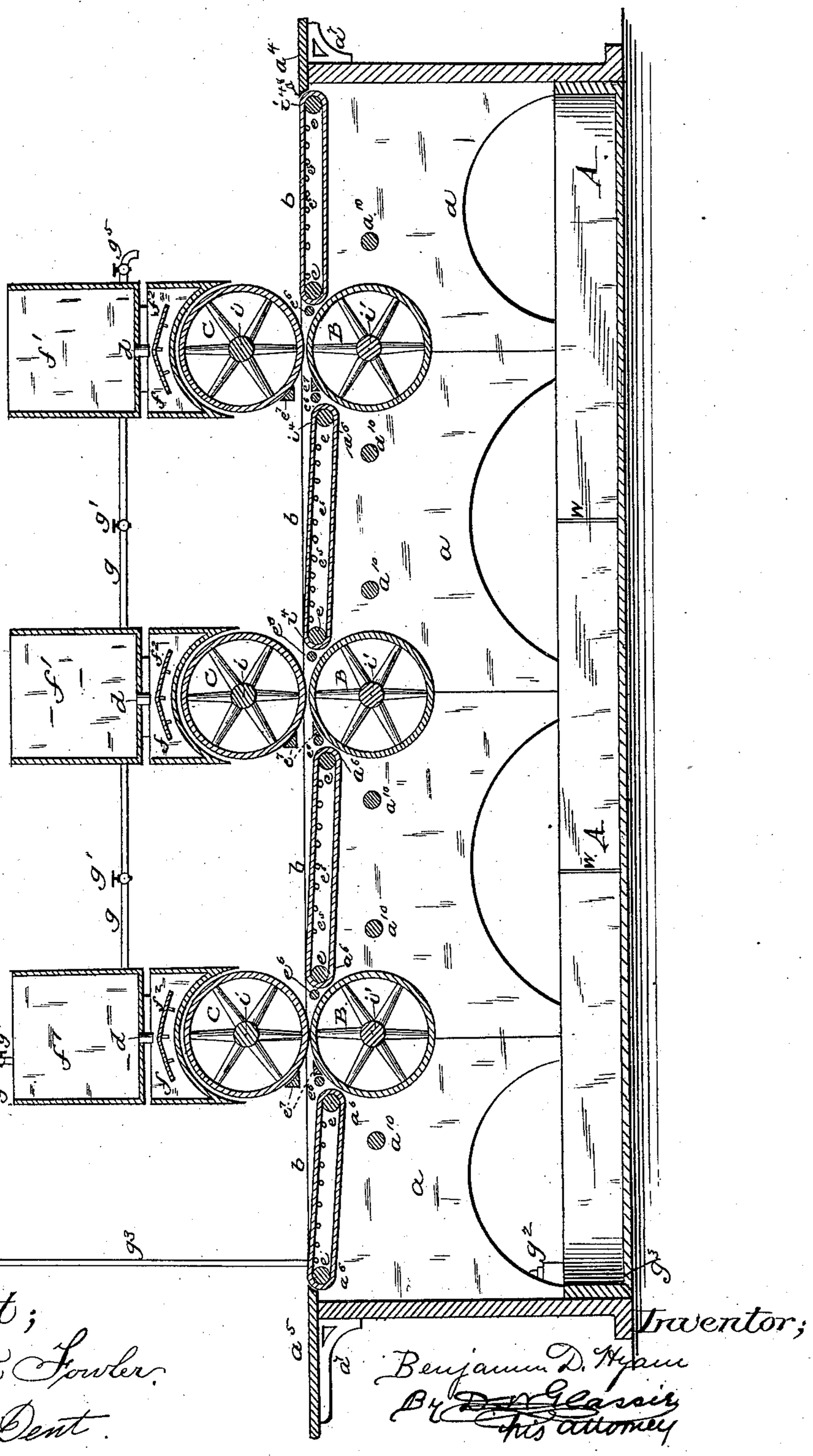

Fig. 2.

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B. D. HYAM.

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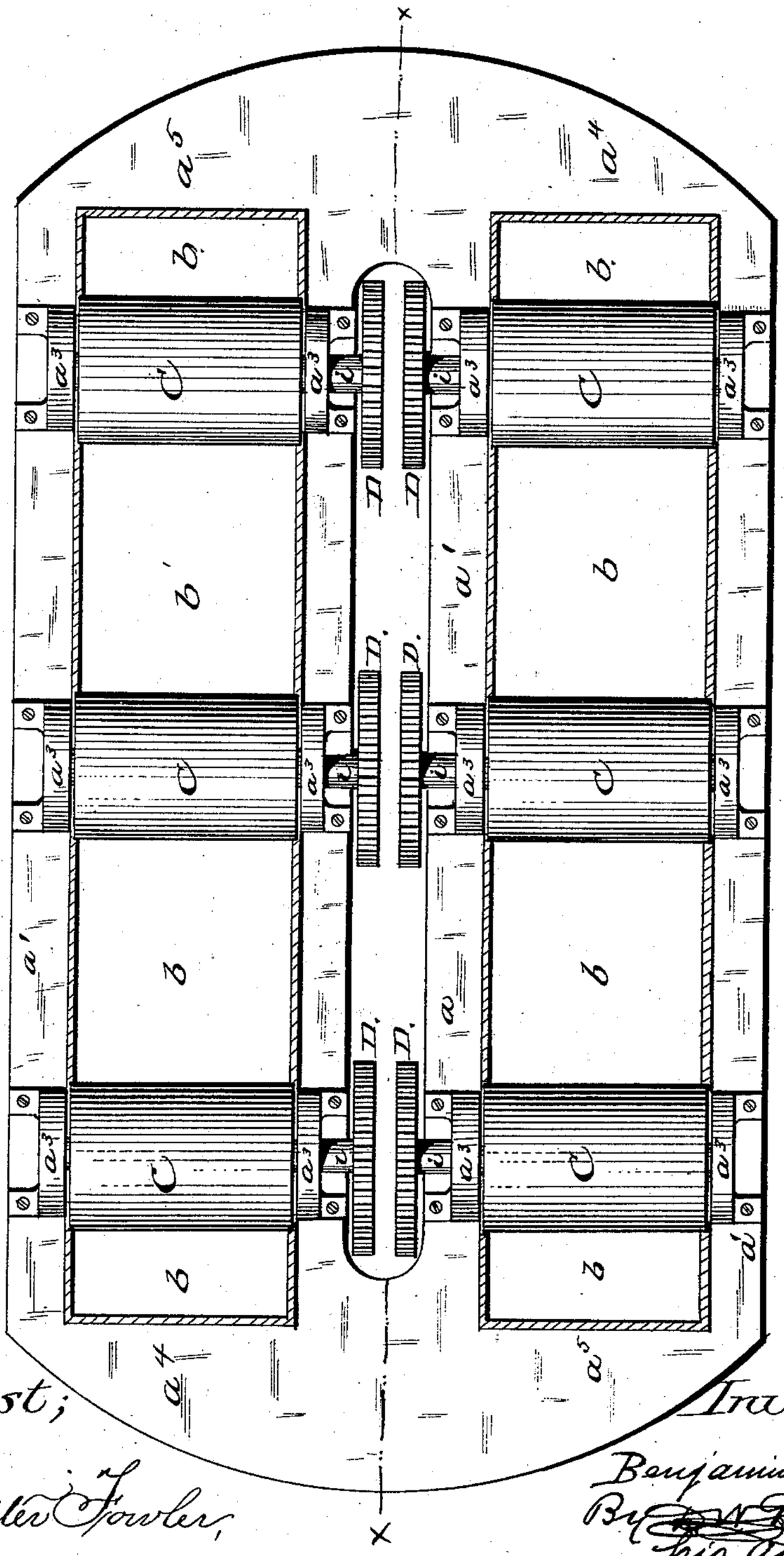

Fig. 3

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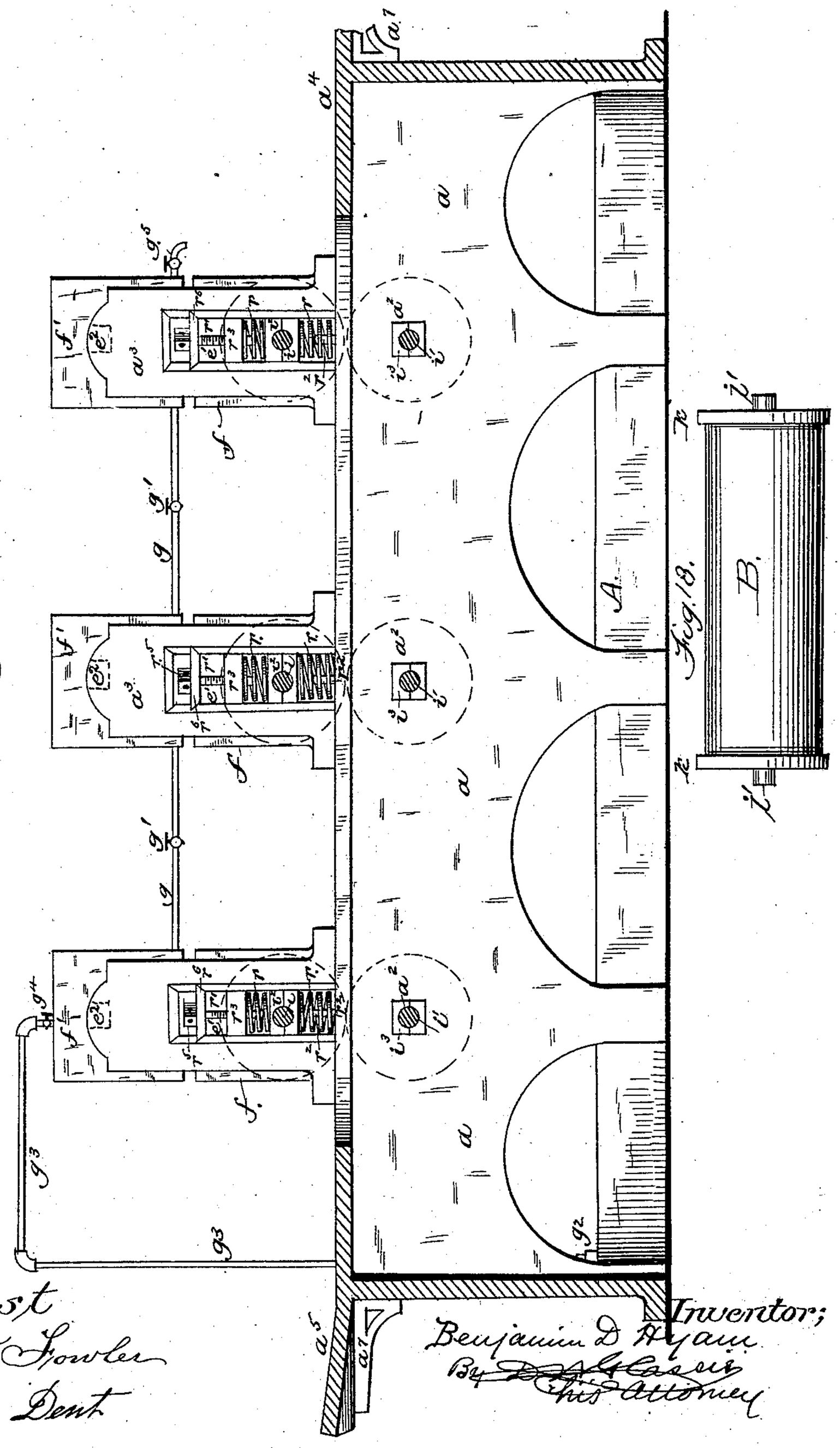
B. D. HYAM.

MACHINE FOR EXPEDITIOUSLY TANNING HIDES, SKINS, &c.

No. 290,885. Patented Dec. 25, 1883.

Fig. 4.



Attest
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M. L. Dent

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(No Model.)

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B. D. HYAM.

MACHINE FOR EXPEDITIOUSLY TANNING HIDES, SKINS, &c.

No. 290,885. Patented Dec. 25, 1883.

Fig 5

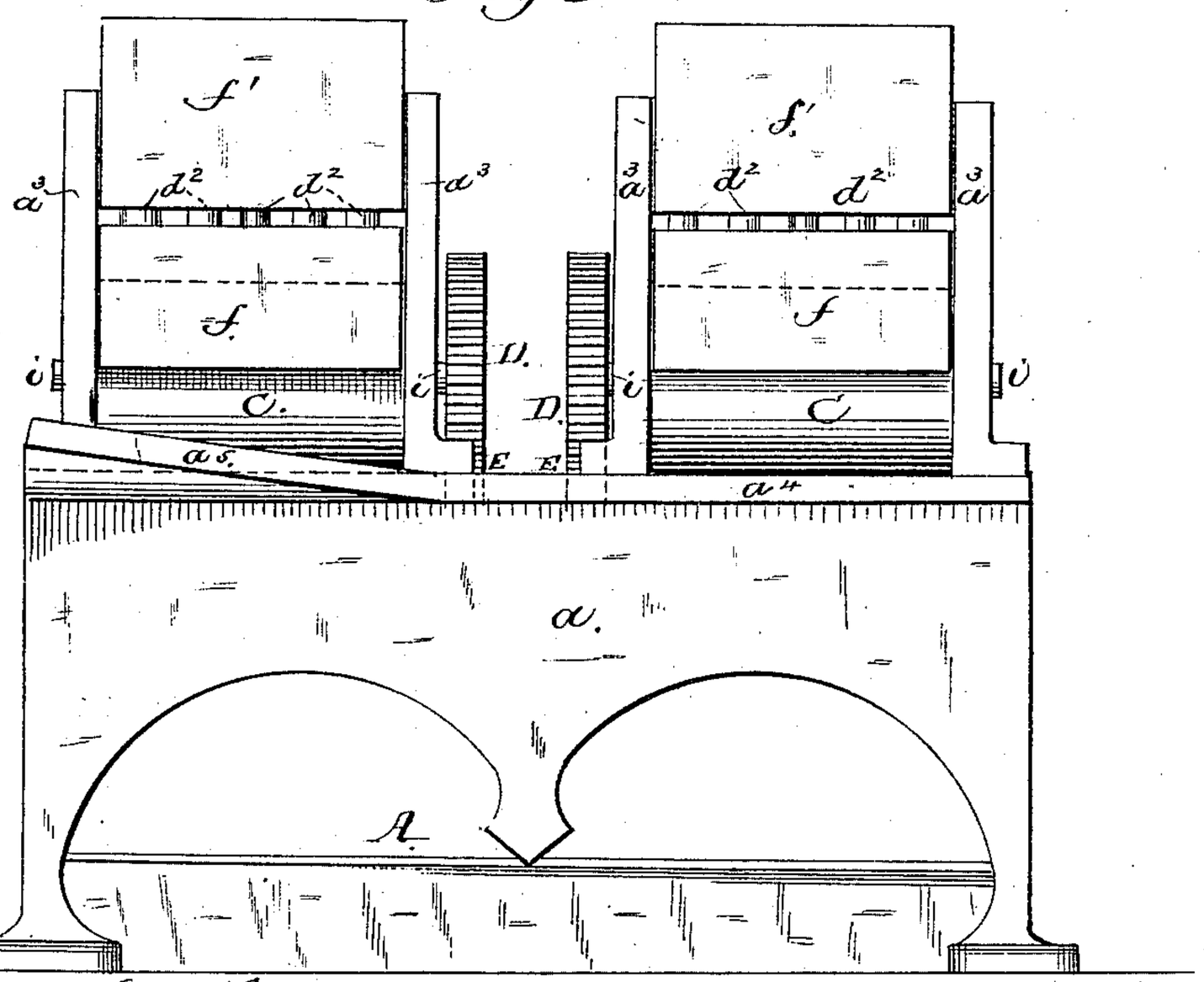


Fig. 16.

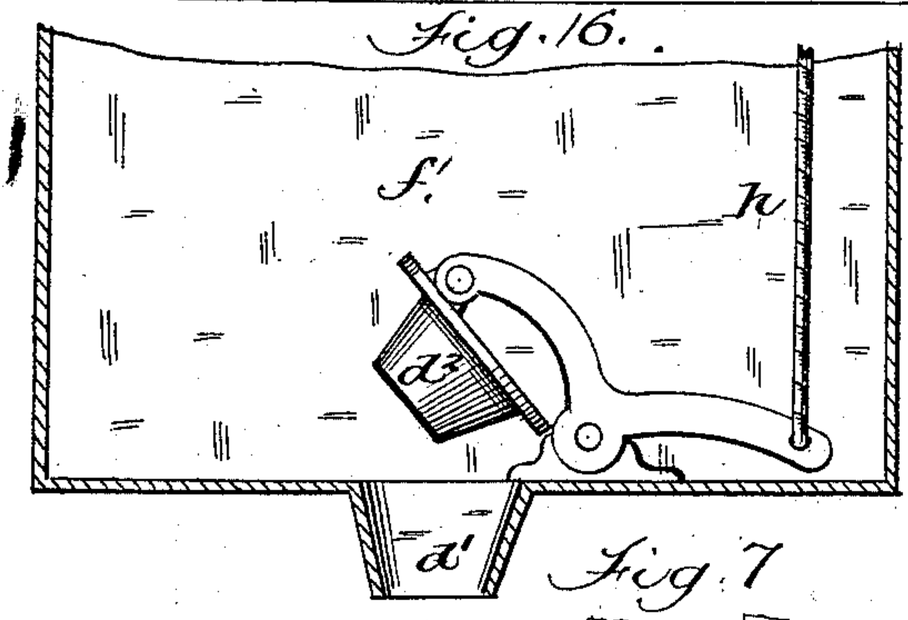


Fig. 7

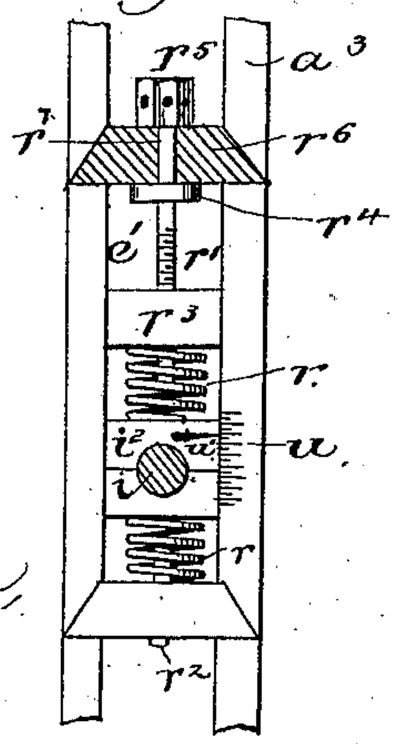
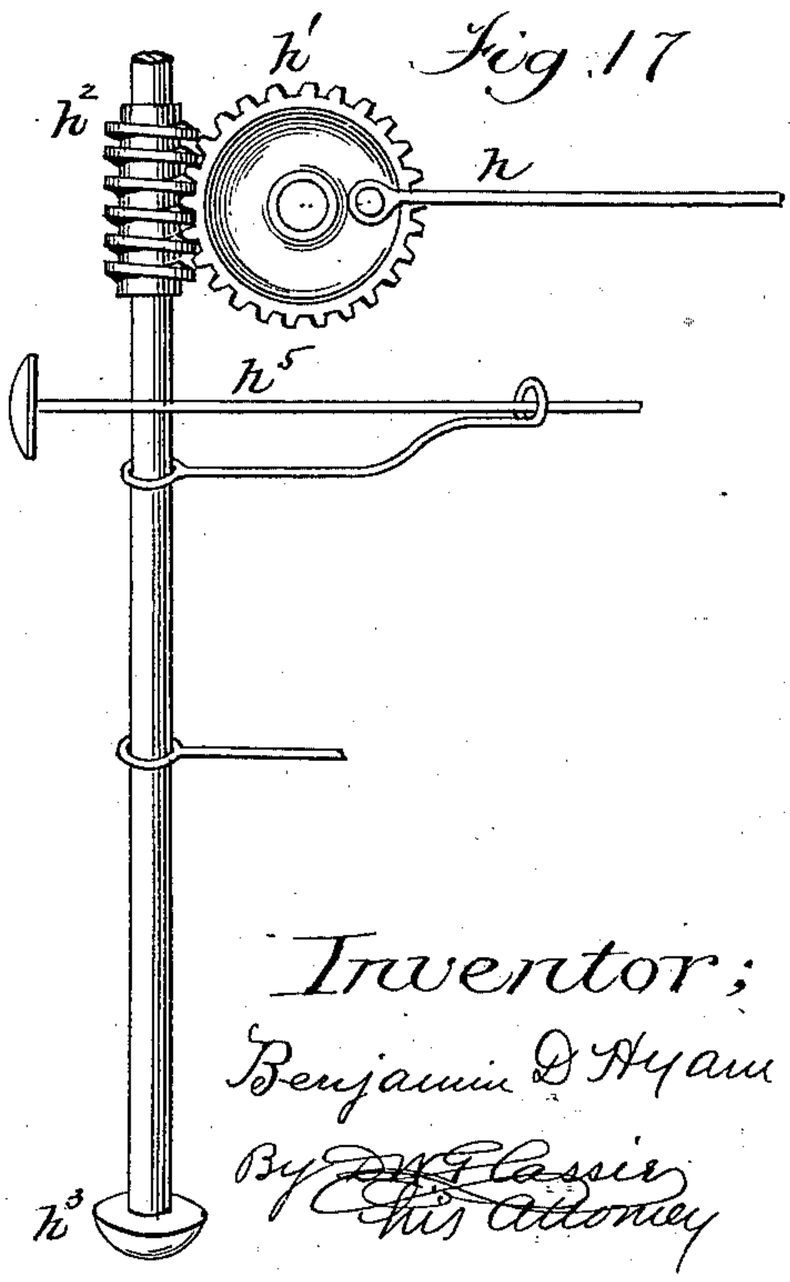


Fig. 17



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By Glassie

his Attorney

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B. D. HYAM.

MACHINE FOR EXPEDITIOUSLY TANNING HIDES, SKINS, &c.

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Fig. 11

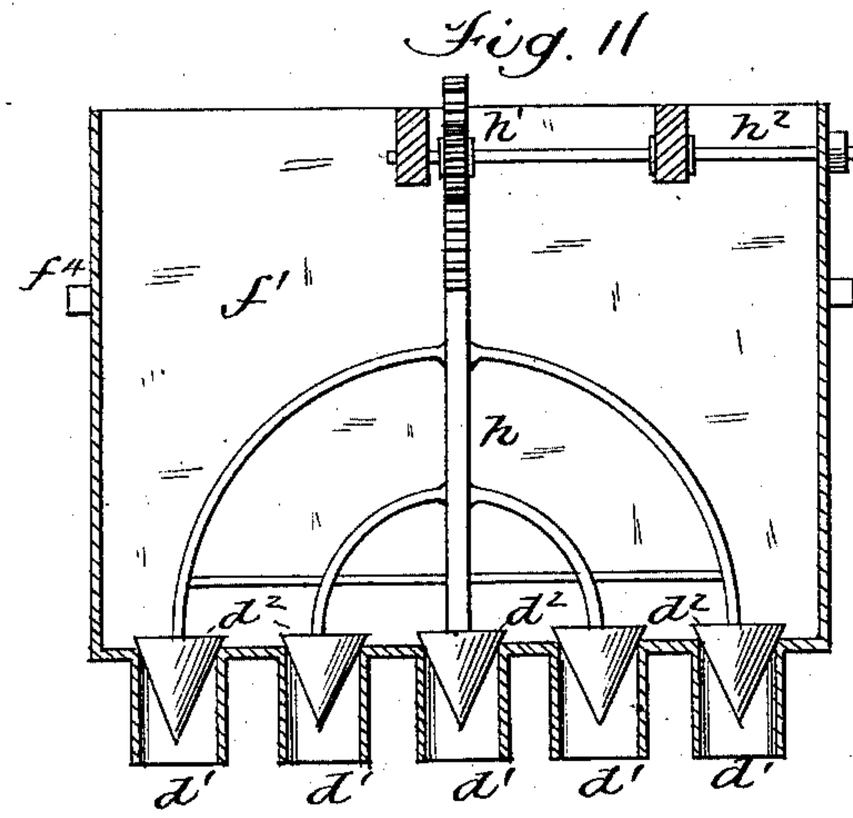


Fig. 12

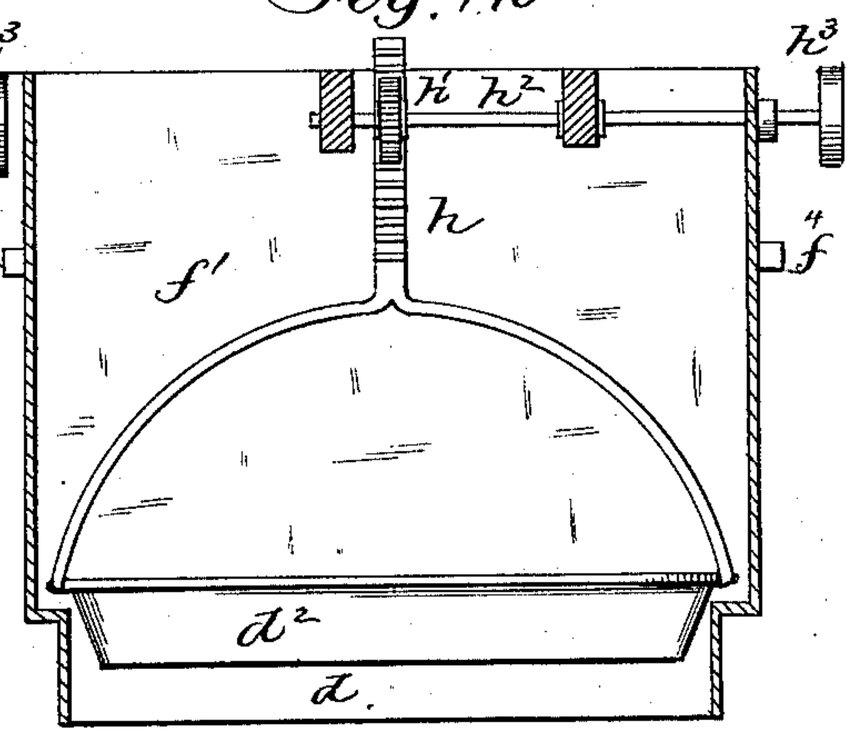


Fig. 10

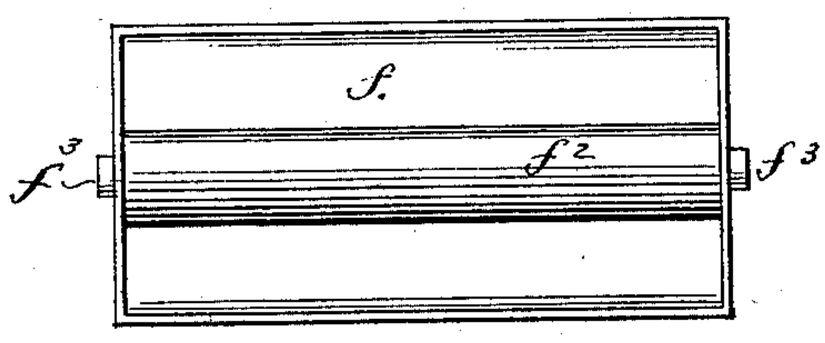


Fig 8

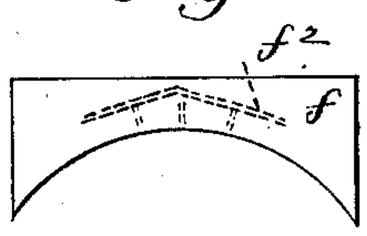


Fig. 9.

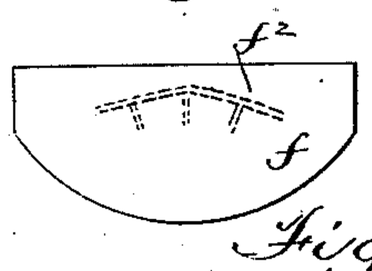


Fig. 13

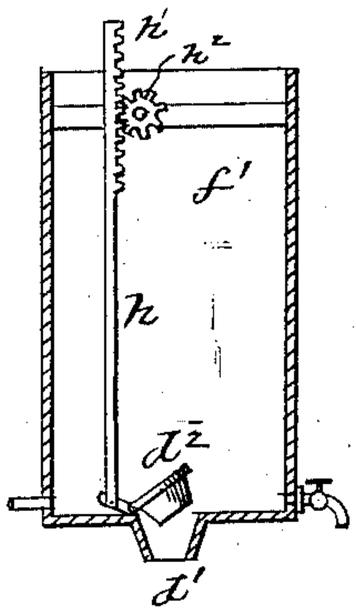


Fig. 14

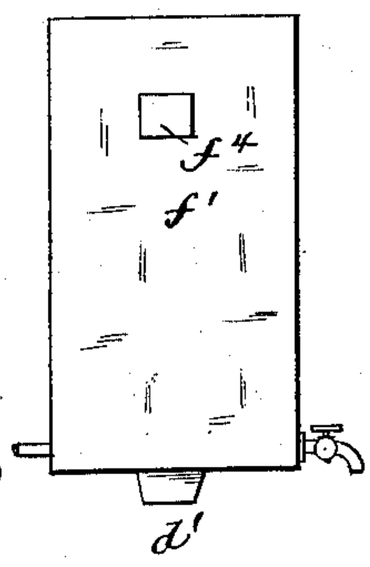


Fig. 6

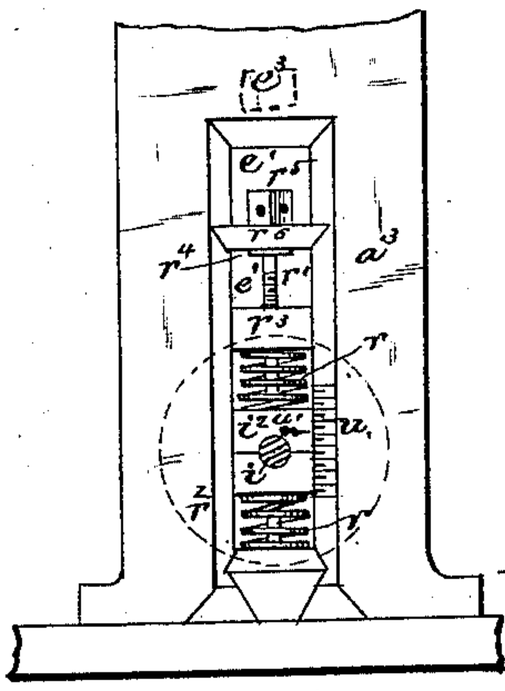
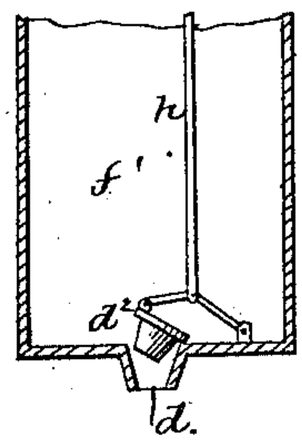


Fig 15



Attest:

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M. I. Dent

Inventor;

Benjamin D. Hyam

By D. G. Cassidy

His Attorney

UNITED STATES PATENT OFFICE.

BENJAMIN D. HYAM, OF WASHINGTON, DISTRICT OF COLUMBIA.

MACHINE FOR EXPEDITIOUSLY TANNING HIDES, SKINS, &c.

SPECIFICATION forming part of Letters Patent No. 290,885, dated December 25, 1883.

Application filed March 15, 1883. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN D. HYAM, a citizen of the United States, residing at Washington city, in the District of Columbia, have invented certain new and useful Improvements in Machines for Expeditiously Tanning Hides, Skins, &c., of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to certain new and useful improvements in expeditiously tanning hides, skins, &c.; and it consists in machinery for forcing them singly and under pressure between consecutive sets of pressure-rollers mounted on a suitable frame and actuated by a train of propulsive machinery, and in automatically carrying them from one set of rollers to another, at the same time subjecting them to repeated baths or showers of tanning-liquor—one before and one after having passed between the pressure-rollers.

It also consists in adjusting on the machine-frame, between the several sets of rollers, in lieu of a table, a series of continuously-moving endless carriages, actuated by propulsive machinery for automatically receiving and carrying the hides, skins, &c., to and from the several sets of pressure-rollers down through the entire machine; also, in introducing between the moving carriages and the pressure-rollers small rollers. actuated by additional machinery to conduct the article being tanned from the pressure-rollers onto the moving carriage, and off from the carriage into the next set of pressure-rollers.

It further consists in providing a machine with two trains of pressure-rollers, parallel to each other, and in so constructing the end sections at each end that the hides, skins, &c., being tanned will in process of tanning start from and be received back onto the same table after having passed around the entire machine through the two sets of pressure-rollers; also, in constructing the output and feed tables at each end, so that a hide, skin, &c., can readily be slipped from the one onto the other without exertion or wasting physical power.

It also consists in so adjusting the train of machinery that the several pressure-rollers, as well as the rollers which carry the carriage, will move with uniform speed.

It further consists in arranging longitudinally through the center of the liquor-distributing tank a liquor-shed having a convex top, and so constructed that the flow of tanning-liquor through the sluices from the supply-tank will fall upon the apex of the liquor-shed and flow down both sides and fall onto the rollers below, near their periphery, thus causing the tanning-liquor to fall uniformly onto the hides, skins, &c., being tanned, the entire width of the machine.

It further consists in placing within the liquor-supply tank a trap or check-valve, handled, regulated, and controlled by an endless screw provided with a gage, the screw being operated by a hand-wheel on the outside of the tank; also, in providing a float having a measure or gage attached in the supply-tank, so that the operator may be advised as to the quantity of liquor in store.

It further consists in placing in the frame, close to and on the outcome side of the pressure-rollers, scraper-guides to prevent the hide, skin, &c., being tanned from adhering to and following the pressure-roller, and in adjusting said guides with set-screws, so that while they may be sufficiently close they will not impinge upon the pressure-roller.

It also consists in adjusting on and combining with the upper pressure-rollers gages and pointers at each end, to enable the operator to regulate and make the pressure of the several rollers uniform, all of which will more at large appear hereinafter.

Figure 1 is a side elevation of the tanning-machine, showing the position of the pressure-rollers, distributing and supply tanks, stanchion-supports, tension-springs, and screws, axles and axle-journals, supply-pipe and valves, pump, store-tank, connecting-pipes and valves, waste-pipe, and train of propulsive mechanism. Fig. 2 is a longitudinal vertical section of the machine taken through one series of pressure-rollers, showing the endless moving carriage, its propelling and supporting cylinders, the arrangement and form of construction of the pressure-rollers, the roller-guide between the pressure-rollers and end-

less carriage, the scraper-guides, store-tank, pump, supply-pipe, supply tank, showing the sluice and valve therein, and the distributing-tank, showing the liquor-shed with convex top therein. Fig. 3 is a plan of the same with the distributing and supply tanks removed, showing the arrangement of the parallel series of pressure-rollers, train of mechanism, the feed and output tables at each end, and the endless moving carriage. Fig. 4 is a side elevation of the inner side of the machine taken through the end sections at *x x*, showing the feed and output tables, &c. Fig. 5 is an end elevation of the same, showing particularly the arrangement of the feed and output tables at the end. Fig. 6 is an enlarged side elevation of the upright stanchion, showing the tension-screw, tension-springs, tension-gage, and journal-bearing for the upper pressure-roller. Fig. 7 is an enlarged elevation of the tension-screw, tension-springs, pressure-gage, and journal-bearings for upper pressure-roller. Fig. 8 is a vertical cross-section of a distributing-tank, having a concave perforated bottom, showing the liquor-shed with convex top. Fig. 9 is a vertical cross-section of a distributing-tank with convex perforated bottom, showing liquor-shed with convex top. Fig. 10 is a plan of the same, showing the supporting-lugs and the longitudinally-placed liquor-shed. Fig. 11 is a longitudinal vertical section of the liquor-supply tank, showing a series of valves for regulating the flow of the tanning-liquor, the endless screw, and the device for operating the valves. Fig. 12 is also a longitudinal vertical section of the supply-tank, showing one continuous longitudinal sluice, a trap-valve, a shaft, and endless screw for opening and closing the valve. Fig. 13 is a vertical cross-section of the supply-tank, showing the induction and eduction pipes and feed-sluice and trap-valve. Fig. 14 is an end elevation of the same, showing the lugs by which it is secured in place, the induction-pipe, outlet-cock, and sluice. Fig. 15 is a broken vertical cross-section of the liquor-supply tank, showing the trap-valve operated by a double toggle joint. Fig. 16 is the same, showing the trap-valve operated by a bell-crank device. Fig. 17 is an enlarged view of the endless screw and governing-shaft for regulating the action of the liquor-tank valves, operated by a disk having a toothed periphery and provided with an eccentric, showing also a float-gage. Fig. 18 is a side elevation of the under pressure-roller, B, showing the projecting flanges or lips, as well as the journal-axle.

Similar letters of reference indicate corresponding parts.

On a substantial frame, *a*, constructed, preferably, in sections, in such a manner that the machine may be extended indefinitely by introducing interposing sections carrying groups of rollers and tanks, or shortened by removing such sections, and so that the several sections may be coupled or secured together in a way to make the whole substantial, and so as to carry either a single line of pressure-rollers or two each, as may be desired, and provided with an upper projecting rim, *a'*, apertures a^2 for the journal-boxings of the under pressure-rollers, B, apertures a^6 for the journals of the cylinders *e* of the moving table *b*, upright stanchions a^3, feed-table a^4, and output-table a^5 at each end, and supported by brackets a^7, shoulders a^8, and recesses a^9, and lateral supports a^{10}, the said stanchion a^3 provided with a slot, *e'*, through the foot, and shoulders, recesses, or incisions e^2 e^3 on the inner side, which receive and secure the lugs f^3 f^4 and support in place the liquor-tanks *f f'*, mounted on suitable journal-axles, *i i'*, adjusted in suitable journal-boxings, i^2 i^3, the former adjusted between tension-springs *r*, governed by tension-screws r' r^2 in the stanchions a^3, rising from and forming part of the frame *a*, and in the frame *a*, I adjust a series of under and upper pressure-rollers, C B, respectively arranged in groups of two each at proper intervals throughout the machine; also, on the same frame, between the several sets of pressure-rollers B C, as well as between said pressure-rollers and the feed and output tables respectively adjusted on cylinders *e*, mounted in journal-bearings i^4 in the apertures a^6 in the frame *a*, in lieu of a table, I introduce an endless sheet of canvas, metal, or other proper material, which I call a "moving carriage," *b*, which moving carriage is actuated by propulsive machinery through a gear, band, or pulley wheel, or an eccentric, e^4, and is supported by a number of friction-rollers, e^5. The said carriage *b*, during the process of tanning, receives the hides, skins, &c., from the feed-table a^4 as well as from the sets of pressure-rollers B C, and delivers them to the next or following set of pressure-rollers or onto the output-table a^5, as the case may be; also, between the ends of the moving carriage *b* and the pressure-rollers B C, mounted on suitable journals in the frame *a*, I place small rollers e^6, which I call "guide-rollers," which tide the hides, skins, &c., being tanned over from the pressure-rollers B C to the carriage *b*, and vice versa, to prevent their sticking and packing; also, behind each of the pressure-rollers, secured in rests and governed by thumb-screws and springs, I place what I call "scraper-guides" e^7, sharp triangular pieces extending along the face of the pressure-rollers, and so placed as to take up the hide, skin, &c., being tanned to prevent it from adhering to and following the rollers and to direct it out onto the moving carriage *b*, and above each set of pressure-rollers I place a shallow liquor-distributing tank, *f*, of the length and about the same width as the diameter of the pressure-rollers B C beneath. This distributing-tank *f* is open on top, has a perforated bottom, preferably concave, for discharging the liquor in a shower or spray on the hides, skins, &c., passing between the rollers beneath, and is pro-

vided with a liquor-shed, f^2, having a convex top longitudinally arranged through the center for throwing the tanning-liquor toward the front and rear of the pressure-rollers. The tank f is maintained in place by lugs f^3, secured on the ends thereof, and fitted to rest in recesses or shoulders e^3 on the inner side of the stanchions a^3, and it receives the tanning-liquor through sluices d d' in the bottom of the tank f', placed between the stanchions a^3, and secured above it. A liquor-tank, f', of any size and form, and either open or closed—I prefer, however, to construct it in parallelopiped form and wholly inclose it—having lugs f^4 on the ends, by which it is secured in place in shouldered recesses a^2 on the inner sides of the stanchions a^3, is also mounted on the frame a. The tank f' has a single sluice, d, or a series of sluices, d', longitudinally arranged in and passing through the bottom, which sluices are about flush with the bottom, within the tank, and protrude outward several inches, so as to extend into the open upper side of the tank f, where the sluice d or d' discharges the tanning-liquor onto the liquor-shed f^2, from which it falls in a shower from both sides and passes through the perforated bottom of the distributing-tank f onto the pressure-roller C, and the hide, skin, &c., passing thereunder in the process of tanning. The tanks f' are connected one with the other by pipes or ducts g, having a cock, g', for regulating the flow and supply of the tanning-liquor in the several tanks, and are also connected with a general supply-tank, A, underlying the entire machine, through a pump, g^2, by an induction-pipe, g^3, provided with a cock, g^4, by which the supply of tanning-liquor is introduced and governed. The outlet-sluice d, or series of sluices d', longitudinally arranged in the bottom of tank f', are provided with check or trap valves d^2, which valves are handled by a hand-screw, h^3, or lever device h h' h^2, or other mechanical device, as hereinafter shown, and a float and liquor-gage, h^5. The tanks f' are also provided with an outlet tap and cock, g^5, for drawing off the liquor when it is desired to empty them, and on the said frame a, in suitable bearings, I secure a train of propulsive machinery, which gears together and with the several parts of the tanning-machine, and actuates the whole simultaneously in one general direction, as hereinafter described. The rollers B and C are cylinders, constructed of any hard material not subject to the action of tannic or other acid, or any other material used in tanning leather, of any character, of uniform diameter, the length thereof corresponding with the lateral dimensions of the frame a, and one of which, preferably the roller B, is provided with raised lips, fillets, or rims k k, one at each end, between which the companion roller adjusts in such a manner that when the faces of the two rollers are brought together the fillet or rim will break the joint thereby formed. These rollers B and C are provided with journal-axles i' i, on which they are mounted in suitable journal-bearings, i^2 and i^3, adjusted in the slot e' at the foot of the stanchion a^3, and in the aperture a^2 in the sides of the frame a, in such a manner that the pressure-rollers B C may be adjusted to press upon each other longitudinally, uniformly, or otherwise, as may be desired, throughout their entire length, so that a hide, skin, &c., passing through will receive pressure at all points, and to meet the exigency of passing hides, skins, &c., having thicker parts, &c., between the rollers and subjecting them to a uniform pressure.

The journal-bearings i^2 are governed by two pressure-springs, r, one beneath the journal-boxing i^2, between that and the top rim, a', of the frame a, into which is introduced, up through the rim a' of the frame a, a check-screw, r^2, and the other above the journal-boxing i^2, and between that and a block, r^3, provided with a female screw, and a tension-screw, r', constructed, preferably, with a blank neck, r^7, a flange, r^4, to prevent its being forced out of place, and an octagonal perforated head, r^5, through which it is operated and by which the pressure of rollers B C on the hides, skins, &c., passing between them is regulated, and that each set of pressure-rollers may be adjusted at the same gage and to enable the operator to put on a uniform pressure throughout the length of the roller, a graduated scale, u, is arranged on the side of the stanchion a^3, and a pointer, u', is secured on the journal-boxing i^2. On the journal-axles i of the pressure-roller C, I adjust an eccentric, or a band-pulley, toothed, or gear wheel, D, through which it is revolved on its axes, which wheel D gears with and is propelled by a band-pulley, toothed or gear wheel E, secured on the journal-axle i' of its companion under pressure-roller, B. When the cogged gear is employed, the gear-wheel E, besides being toothed on its periphery, may have a beveled screw-gearing cut near its outer rim, or the teeth on the periphery may be so cut that besides gearing with the wheel D it will gear with an endless screw, q', formed at intervals on a shaft, q, secured in brackets q^2, and adjusted longitudinally along the sides of the machine, through which, by the gear-wheel q^3, secured thereon, power is communicated, and the entire machine is simultaneously impelled and the process of tanning effected. In addition to the gear-wheel E on the axle-shaft i' of the under pressure-roller, B, I prefer to adjust and secure a small pulley-wheel, s, which carries the band s', that propels the endless carriage b.

b is an endless moving carriage of any flexible material suitable for the purpose, which extends from one set of pressure-rollers to another, from the feed-table to the first set of rollers, and from the last set of rollers to the output-table, the width being equal to or greater than the length of the pressure-rollers B C. (See Fig. 3.) The carriage b is adjusted on, carried over, supported, and propelled

by two drums or cylinders, *e*, one at each end, and the top portion is supported at intervals by small friction-rollers e^5, and the whole is actuated by any character of motor-gear. I prefer, however, pulley-wheels e^4 and e^8 and belts s' s^2 through a belt-wheel, *s*, secured on the axle-shaft i' of the pressure-roller B, as shown in Fig. 1, and the whole is so constructed and arranged that a hide, skin, &c., placed on the carriage *b* will be carried forward and delivered between the jaws of the following set of pressure-rollers, and the next section of the carriage will receive it after passing between the rollers, and carry and deliver it to the next set of rollers, and so on until it is finally delivered onto the output-table, where it is slipped to the opposite side of the table and started upon its return.

The cylinders *e* may be constructed of any length and diameter that will best serve the purpose and of any suitable material not subject to tannic or other acid or materials used in tanning. These cylinders are mounted in journal-bearings i^4 in apertures a^6 in the frame *a*, and carry gear-pulley or band-wheels e^4 e^8, by which they are revolved on their axes by endless belts s^2 s', connecting with the pulley-wheel *s* on the shaft of the gear-wheel E.

The small roller e^6, mounted on its axle in the frame *a*. between the carriage *b* and the pressure-roller B, for tiding the hide, skin, &c., being tanned from the carriage to the rollers, and the reverse, is also constructed of any material not injured by tannic acid or other materials used in tanning, and may be run as a friction-roller; or, if preferred, it may be connected through a suitable device secured on its axle by a belt, an eccentric, or a gear-wheel with the propulsive machinery, and be mechanically actuated.

The scraper-guides e^7 are so arranged that they can be set up sufficiently close to the rollers to remove the hides, skins, &c., being tanned without interfering with the free action or movement of the rollers.

The tank A is a large tank underlying the entire machine, which catches the tanning-liquor falling from the hides, skins, &c., being tanned, and from which it is again, through the pipe g^3, by the pump g^2, forced back into the tanks f'. Tank A on the inner side is intersected with grooves *w*, for the introduction of partitions when liquors of more than one degree of strength are employed at one time, and provided with a waste-plug for drawing off the liquor.

The valves *d* in the general supply-tank are opened and closed, and the flow of the tanning-liquor is thereby governed by any convenient mechanical device. I have shown several forms, any one of which on test I find performs efficiently the functions for which it is designed.

The upright shaft *h*. secured in guides having a racked face gearing with a pinion, h', secured on a shaft, h^2, arranged at right angles and handled by a hand-wheel, h^3, may be made to open and close the valves d^2 directly or through the lever, toggle-joint, or bell-crank, as shown in Figs. 11, 12, 13, 15, and 16; or it may be secured on an eccentric-pin on a toothed disk, h', and be open and closed by an endless screw, h^2, on a shaft arranged at right angles and handled by a hand-wheel, h^3. (See Fig. 17.)

The machine having been constructed and put together as shown, and the tanks f' supplied with tanning-liquor, the hides, skins, &c., being otherwise prepared for the tanning-liquor, and the machine started up are fed in consecutively, one following another in close succession, between the rollers B C at the feed-table end a^4, and the valves d^2 opened in the supply-tanks f' over each set of pressure-rollers, so that the tanning-liquor will fall upon the rollers B C in a shower sufficiently to saturate the hides, skins, &c., passing through. The article being tanned is carried through between the rollers B C, where it receives a bath of tanning-liquor on entering between the rollers, and then a pressure and another bath of tanning-liquor on emerging from the rollers on the other side, where it is then delivered onto the moving carriage *b*, and carried to the next set of pressure-rollers, where the same operation is performed, and so on consecutively until the article being tanned has been carried through the entire series on one side of the frame and delivered on the output-table a^5, from whence it is taken by hand and immediately started back through the series of rollers on the other side, where the same operation is continued, and so the hide, skin, &c., is passed continuously forward during the few hours that it requires to tan leather by my process, the tanning-liquor being changed from time to time for a stronger liquor.

Pelts, sheep, or other light skins may be tanned by my process; but in these, as in other thin, light, and porous skins or pelts, one to two days will suffice to perfectly tan them, care being taken to change the liquor during the process; or, if a long machine and many sets of rollers and numerous tanks are employed, by charging the tanks with liquors of different degrees of strength.

Scientific analysis has demonstrated that leather is an aggregated combination of tannic or other suitable acid or chemicals with the gelatine of the cellular tissue of hides or skins of every description of animal—land, water, or amphibious; wherefore, the end aimed at in tanning is to exclude all other matter and equally or proportionally to combine these elements. To this end some persons have sought to accomplish the process of expeditious tanning by a resort to hot liquors containing chemicals, which disintegrate and destroy the cellular tissues of the hides, skins, &c., and thus rendering the leather worthless. To avoid the destruction of the hide, skin, &c., others again have resorted to the slow process of sub-

jecting them to a bath of tanning-liquor for an indefinite period, a great part of which time is taken up in neutralizing the lime and other matter in the hide, skin, &c., taken in from the lime-vats and left there after removing the hair. By my process and machinery I avoid both of these difficulties, because I use no hot or other deleterious liquor, using only the most approved tanning-liquor, and then by means of the pressure-rollers I so force the tannic acid into every fiber and pore of the hide, skin, &c., no matter how thick and heavy, that a few days is sufficient to accomplish what by the slow vat system takes months.

Hides, skins, &c., tanned on my machine and by my process will produce a more durable, a finer, more pliant, and brighter leather than that manufactured by any other known system or process, as every part of gelatine has been converted into good healthy merchantable leather, and no part of the tissue has been destroyed either by heated or poisonous chemicals on the one hand, or by subjecting, by long maceration, to the action of tannic, gallic, or other powerful acids. In short, I produce by my quick tanning a first-class quality of merchantable leather of the various characters in use, and thus secure a rapid turning over of capital.

Having now described my method and device, and particularly pointed out the manner of constructing the machinery, and fully explained how it is to be used, as well as the method of expeditiously tanning hides, skins, &c.—in short, the manufacture of leather—

What I consider to be novel, original, and useful, and claim as my invention, and desire to secure by Letters Patent, is—

1. A machine for tanning hides, skins, &c., consisting of groups of pressure-rollers, interposed moving endless carriages or aprons, series of liquor supply and distributing tanks, and the train of actuating machinery, substantially as shown and described.

2. In a machine for tanning hides, skins, &c., two parallel series of upper and under pressure-rollers arranged in pairs, in combination with moving endless carriages or aprons, and the train of actuating machinery, substantially as shown and described.

3. In a machine for tanning hides, skins, &c., pairs of upper and under pressure-rollers, and intersecting moving endless carriages or aprons, in combination with interposed guide-rollers for directing the article being tanned to and from the pressure-rollers, substantially as shown and described.

4. In a machine for tanning hides, skins, &c., pairs of upper and under pressure-rollers, interposed moving endless carriages or aprons, and intervening guide-rollers for directing the article being tanned to and from the pressure-rollers, in combination with the general train of propulsive machinery, substantially as described, for actuating the whole with uniform speed, substantially as set forth.

5. Mounted under liquor supply and distributing tanks in a machine for tanning hides, skins, &c., groups of upper and under pressure-rollers arranged in parallel rows, interposed guide-rollers, in combination with the endless moving carriages or aprons, scraper-guides, and the train of propulsive machinery, arranged to actuate the whole at a uniform speed, substantially as shown and described.

6. In a machine for tanning hides, skins, &c., series of upper pressure-rollers mounted in journal-boxings, provided with pressure-indicators directed on a graduated scale secured on the side of the stanchion a^3, in which the journal-boxings are secured, for regulating the pressure of the rollers on the hides, skins, kips, and pelts to be tanned, substantially as shown and described.

7. In a machine for tanning hides, skins, &c., the combination of upper and under pressure-rollers, scraper-guides e^7, guide-rollers e^6, moving endless carriages or aprons b, and revolving cylinders e, substantially as shown and described.

8. In a tanning-machine, the frame a, constructed in sections, as described, carrying the trains of actuating machinery, the endless moving carriages or aprons b, supported on revolving-cylinders, the roller-guide e^6, the scraper-guides e^7, the series of upper and under pressure-rollers C and B, respectively arranged in pairs in slots e' in the stanchion a^3, placed between tension-springs r, and carrying the distributing-tanks f, having a liquor-shed, f^2, with a convex top, the supply-tank f', and feed-table a^4, output-table a^5, constructed and arranged substantially as shown and described.

9. In a machine for tanning hides, skins, &c., a distributing-tank with a perforated bottom, and provided with a liquor-shed having a convex top arranged longitudinally therein, substantially as shown and described.

10. In a machine for tanning hides, skins, &c., a liquor-supply tank, f', having discharge, sluices d, provided with check or trap valves d^2, operated by an angle-lever device for regulating the flow of the liquor, substantially as shown and described.

11. In a tanning-machine, the combination of the pressure-rollers C and B, arranged in groups, distributing-tank f, moving endless carriages or aprons b, gear-wheels D and E, band-wheels s e^4 e^8, and belts s' s^2, substantially as shown and described.

12. The combination of series of upper and lower pressure-rollers, B and C, mounted in pairs on a suitable frame constructed in sections, as shown, journal-bearings i^2, tension-springs r, set-screws r' r^2, stanchions a^3, frame a, distributing-tank f', and supply-tank f, substantially as shown and described.

13. The machine for tanning hides, skins, &c., consisting of supply-tank f', having sluices d longitudinally arranged in the bottom thereof, and provided with valves d^2, connecting-pipes g and g^3, and cocks g' g^4 g^5, dis-

tributing-tanks *f*, with perforated bottom, general supply-tank A, upper pressure-rollers, C, under pressure-rollers, B, the latter having a lip or flange, *k k*, at each end, gear-wheels D and E, screws *q'*, shaft *q*, spur-wheels q^3, pulley-wheels *s* e^4 e^8, pulley-belts *s' s²*, endless carriage or apron *b*, feed-table a^4, output-table a^5, and frame *a*, constructed in sections, substantially as shown and described.

14. In a machine for tanning hides, skins, &c., pressure-rollers B and C, arranged in groups, as shown, in combination with distributing-tanks having perforated bottoms, and provided with liquor-sheds having a convex top longitudinally secured therein and with actuating mechanism, substantially as shown and described.

15. A distributing-tank, *f*, open at the top and having a perforated bottom, and provided on the ends with lugs, by which it is secured in place, and a liquor-shed with a convex top longitudinally arranged on the inside, in combination with a supply-tank, *f'*, having sluices d^2, arranged longitudinally in the bottom thereof, pressure-rollers C and B, endless moving carriages or aprons, and the train of actuating machinery, substantially as shown and described.

16. In a machine for tanning hides, skins, &c., a train of propulsive mechanism, consisting of a longitudinal shaft, *q*, carrying a spur-wheel, q^3, and bearing at intervals screws *q'*, spur-wheels E, secured on the axle-shafts of the under pressure-rollers, B, gear-wheels D, secured on the axle-shaft of the upper pressure-roller, C, gear-wheels E and D, pulley-wheels *e'*, and belts *s' s²*, for simultaneously actuating the several parts, substantially as shown and described.

17. The combination, in a machine for tanning hides, skins, &c., of supply-tanks *f'*, sluices *d*, valves d^2, distributing-tanks *f*, the convex liquor-shed f^2, the parallel series of upper and under pressure-rollers C and B, arranged in pairs, the guide-rollers, the scraper-guides, the endless moving carriage or apron, and the train of mechanism for simultaneously actuating the machine, substantially as shown and described.

18. In a machine for tanning hides, skins, kips, and pelts, parallel series of upper and under pressure-rollers, interposed moving carriages or aprons mounted on cylinders and propelled by actuating machinery, guide-rollers, intervening the pressure-rollers, and moving carriages for directing the article being tanned to and from the pressure-rollers, in combination with the general train of propulsive machinery for actuating the whole with uniform speed, and with a frame constructed in sections, and provided with the feed and output tables a^4 and a^5, substantially as shown and described.

19. The machine for tanning hides, skins, &c., consisting of supply-tank *f'*, having sluices *d* longitudinally arranged in the bottom, and provided with valves d^2, connecting-pipes g^3, distributing-tank *f*, having a perforated bottom and a convex liquor-shed, f^2, general supply-tank A, upper pressure-roller, C, under pressure-rollers, B, the latter having a lip or flange, *k k*, at each end, gear-wheels D E, screw *q'*, shaft *q*, spur-wheels q^3, pulley-wheels *s* e^4 e^8, pulley-belts *s' s²*, endless carriage *b*, feed-table a^4, output-table a^5, and frame *a*, constructed in sections, the whole constructed and arranged substantially as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

BENJAMIN D. HYAM.

Witnesses:

MULFORD JENKINS,

ROGER H. LYON.