receive either flat or round traces, said curved pieces being pivotally connected at their inner ends to the neck bar of the collar, and bolts and nuts connecting said parts together, and to the traces, substantially as set forth. 7th. The combination, with a metallic collar and metallic harness saddle, a pair of longitudinally adjustable holdback springs for connecting said collar and saddle, and regulating the distance between the same, and brace springs bracing and connecting said collar to the holdback springs, substantially as set forth. 8th. A metallic harness saddle composed of an arched tree having downwardly and outwardly projecting perforated prongs, a pad composed of a pair of downwardly curved plates of pliable sheet metal, each having upturned edges, and curved or swelled under portion, and connected at the upper part to the tree, and plate springs adjustably connected to said saddle and tree for the purpose of adjusting the pad and tree to fit different horses. 9th. The combination, with a metallic harness saddle, of a metallic spring girth composed of an inner sheet or strip of pliable metal having outwardly-curved edges, an outer band of spring metal fitting between the out-turned edges of the inner band and having studs on their opposite ends, and strips of spring metal hinged at one end to the saddle and having perforated lower ends to receive the studs on the strips connecting the girth to the saddle, substantially as set forth. 10th. The combination, with a metallic harness saddle having a cap or thimble near its lower end, and a loop or hinge at its lower end, of a spring trace-support hooked at its lower end into said loop or hinge, and at its upper end slipped within the thimble on the saddle, substantially as set forth. 11th. A metallic backband, or back-strap, composed of a flexible metallic rear portion having adjustment slots therein, and an under piece of metal having an upwardly-projecting button or stud to engage with said slots, so as to secure the longitudinal adjustment of the backband, and a front spring portion having a rear pivotal connection to the front portion of the band, and front connection on opposite sides of the harness pad, substantially as set forth. 12th. The combination, with a metallic backband, substantially as herein described, of a tubular metallic bifurcated crupper, one of the arms of which has vertical pivotal connection at its front portion to the backband, while the other arm is rigidly connected thereto, of said arms having inwardly-curved ends, or fingers, having each hinge connection with the inner portions, to permit of said fingers having vertical movement, substantially as and for the purpose set forth. 13th. The combination, with a flexible metallic backband, a metallic plate pivotally connected at its front portion thereto, and having up-turned side edges, and at its rear an upwardly-extending button, a tubular metallic bifurcated crupper, one arm of which is at its front end rigidly connected to said pivotal plate, while the other arm of said crupper is at its front end pivotally connected to said pivotal plate, to permit of the lateral movement of said member of said crupper, each of said arms of the crupper having in-turned rear ends pivotally connected to the main portion of the crupper, to permit of said rear ends moving vertically, as set forth, and said button being pivotally attached to the pivotal plate, and having an elongated head to adapt it to hold said crupper in position, substantially as set forth. 14th A flexible metallic breeching having a curved, or rounded, inner face, out-turned edges, a tension plate spring adjustably secured to the exterior of said curved metallic breeching to regulate the rotundity and rigidity thereof, and means for removably connecting said breeching to the backstrap, substantially as set forth. 15th In a harness, the combination, with a metallic backband having holes in its rear portion, and a flexible metallic breeching of a sectional curved hip-strap having perforated lower ends, and means, as described, for connecting said strap to the breeching, with capability of vertical adjustment thereon, a plate having a button for connecting the same with the backband, and having pivotal connection at or near each end to the respective sections of the hip-strap, substantially as set forth. 16th. The combination, with a flexible metallic breeching, a spring metal hip-strap having vertically adjustable connection with said breeching, clasps or bands having in-turned lips to embrace said hip-strap, and outwardly-extending perforated flanges or wings, braces pivotally connected at their upper ends to said clasps or bands, and extending outwardly therefrom, and pivotally connected at their lower ends to the breeching, substantially as and for the purpose set forth. 17th. The metallic hip-strap herein described, consisting of a pair of curved spring-metal plates, a connecting plate pivotally connecting the upper ends of said hip-strap, and means, substantially as described, for removably connecting said hip-strap, and connecting plate to the backband. 18th. In a harness, the combination, with a tug or trace, of a tubular clamp adapted at its rear end to receive the rear end of the trace, and having a split or bifurcated front end, and exteriorly screw-threaded, as described, an interiorly screw-threaded ring or nut to engage the threads on the clamp and gripe the jaws thereof upon the trace, and having outwardly-extending cheeks, or flanges, a cockeye, a tail extending therefrom at a right angle and placed between the cheeks or flanges on the ring, and a pivot-pin, or hinge, connecting the tail on the cockeye, and the flanges on the ring together, substantially as and for the purpose set forth. 19th. The herein described metallic thill-brace consisting of a metallic strap pivotally connected at its rear end to the front end of the breeching, and having a ring at its outer end to which the thill-strap is secured, substantially as set forth. 20th. The adjustable device herein described for connecting main and cross-line reins, consisting of a jawed tube embracing the main line, a ring or nut adapted to reciprocate along said tube and clamp, the jaws thereof upon the line, and a similarly jawed tube pivotally connected to said sliding ring, and having a jaw-griping ring, or nut, to clamp said tube on the cross line, and thus pivotally connect said lines together, arranged and operating substantially as and for the purpose described. 21st. The device herein described for connecting the front end of a rein to a bridle, consisting of a tubular jawed clamp within which the front end of the rein is inserted, a ring or nut adapted to reciprocate upon said tube to clamp the jaws thereof upon the rein, the oppositely-facing snap-hooks secured to the front end of said end of said tube, arranged and operating substantially as and for the purpose described. 22nd. The rein composed of one or more sections consisting of alternate flat lengths, and rings connecting the same together and to the main portion of the rein so as to form hand grasps, substantially as set forth. 23rd A cap or cover for enclosing the upwardly-projecting portion of the terrets, and bolts, and nuts consisting of a perforated base portion to receive the bolt and operate as a washer for the nut, a top hollow portion to receive the nut, and having slotted sides to permit of access to the enclosed nut, substantially as and for the purpose set forth.

No. 30,311. Thill Coupling. (*Armon de limonière.*)

George Brownlees, Jr., Penola, South Australia, 1st December, 1888; 5 years.

Claim.—In a thill coupling, the combination, of the clip or shackle A, having the jaws or eyes *a*, one of which is provided with a hinged segment *a*1, and the thill iron B having the T-head or trunnion *b* provided with the disk or flange *b*1, and arc-shaped plate *b*2, substantially as herein described

No. 30,312. Blast Pipe. (*Porte-vent.*)

Henry Appleby, Limerick, Ireland, 1st December, 1888, 5 years.

Claim. 1st. The improved blast-pipe, constructed substantially as herein described, and having a central steam nozzle *a*, a surrounding annular steam passage *a*2 communicating therewith, and an annular valve *a*3 arranged to work in an axial direction or rotatively, and serving to control the escape of steam by way of the said supplementary passage. 2nd. In a blast pipe constructed with a central steam-nozzle, and an annular steam passage surrounding the same, an annular valve, such as *a*3, operating substantially as herein described, for controlling the escape of steam by way of the supplementary passage.

No. 30,313. Machine Belting.

(*Courroie sans fin.*)

Fenelon B. Brock, Washington, D.C., U.S., 1st December, 1888, 5 years.

Claim.—An edge-laid link, or strip-belt, constructed substantially as described and for the purpose set forth

No. 30,314. Centrifugal Cream Separator.

(*Séparateur centrifuge de la crême*)

Sven Jonsson, Copenhagen, Denmark, 1st December, 1888; 5 years.

Claim.—1st. A centrifugal machine consisting of the drum G, with supply pipe G1, the vanes G11, and the skim milk outlet pipes *h*, holes *s*, pegs *k*11, cover H, pipes I and K, spring L, and nut M, substantially as described and shown in the drawings. 2nd. In centrifugal machines, the nut M (or other suitable means as screws, eccentrics, etc.), and a pipe K, substantially as set forth and shown in the drawings. 3rd. In centrifugal creamers, the perfectly closed drum G.

No. 30,315. Thill Support. (*Armon de limonière*)

Nathan Linney, George Cahill and James Stewart, Watertown, N.Y., U.S, 1st December, 1888, 5 years.

Claim.—The combination, with the clip *c* and coupling *b*, of the rearwardly projecting spring *g* secured to the underside of the axle by the legs of the clip, and nuts thereon, and a catch *h* secured to the thills, and engaging the free end of the spring to support the thills in a vertical position.

No. 30,316. Furnace, Cooking Range and Stove, etc. (*Calorifère, landier et poêle de cuisine, etc.*)

John Burns, (co-inventor with Frederick J. Gilmant, Montreal, Que., 1st December, 1888; 5 years.

Claim.—1st. In a heating furnace, cooking range, or stove, a vertical shifting fire grate, and frame E, operated substantially as described 2nd. In combination, with a vertical shifting fire grate, a lever bar F having two or more cams to raise or lower the said grate, and a circular head with holes to receive the pin H, substantially as described. 3rd. In combination, with a vertical shifting grate, the double frames E and C fastened only in the centre, as and for the purposes hereinbefore set forth 4th. In combination, with a dumping fire grate balanced in frame E, a bolt I operated by a long spindle and handle, as and for the purposes hereinbefore set forth.

No. 30,317. Dynamo Electrical Machine or Motor. (*Machine ou moteur dynamo-electrique.*)

James Boyce, Baltimore, Md. (assignee of Samuel H. Tacy, New York, N.Y.), U.S., 1st December, 1888, 5 years.

Claim.—In combination with the commutator and brushes of a dynamo-electrical machine, or an electrical motor, a flame intercepting envelope, substantially as and for the purpose specified.

No. 30,318. Blast Pipe and Means for Regulating the Draught Created Thereby. (*Porte-vent et moyens d'en régler le tirage*)

Henry Appleby (co-inventor with John G. Robinson), Limerick, Ireland, 1st December, 1888, 5 years.

Claim.—1st. For use with a locomotive, the improved means, substantially as herein described, whereby the effective action of the blast may be readily varied from the foot-plate or similar conveniently accessible position, such means consisting of the combination of a main steam nozzle *a*1, a supplementary steam passage *a*4, provision, such as the passages *a*9, for opening communication between the former and the latter, outlets, and suitable connections, such as *b*, *b*1, *b*2, *b*3, *a*9, for controlling from the operator's position the escape of