vertical movements thereby, a bent shaft below the frame, a slotted arm secured to one end of the casing, and an adjusting arm secured at one end to one end of the shaft, and at the other end to the slotted arm. 4th. The combination of an outer casing as frame, two arms pivotally secured at their outer ends to the frame, a grooved nut engaging with the inner ends of said arms, a screw threaded bolt secured to the top of the casing and having their lower ends bent and secured to the central portions of said arms.

No. 31,862. Saw Mill Feed Work.

(Transmission de mouvement de scierie.)

Howard P. Heacock, Missoula, M. T., U. S., 1st August, 1889; 5 years.

Claim.—The combination, in a saw mill, of two belts driven from the saw arbor and running over pulleys on a shaft of the feed works, one of said belts having the same side in contact with both pulleys over which it runs, and the other belt having its opposite sides in contact with its respective pulleys, and a tightener adapted to operate alternately on said belts, substantially as described.

No. 31,863. Centrifugal Apparatus.

(Appareil centrifuge.)

Sven Jonsson, Copenhagen, Denmark, 1st August, 1889; 5 years.

Claim.—In centrifugal apparatus for separating milk, the employment of a passage for the skim milk, bounded by two walls R and P which come close up to the inner wall of the drum, and between which is provided the outflow opening, and which are arranged in such a manner as to allow of a narrow passage for the skim milk either behind the outer side of the one or of both of the said walls.

No. 31,864. Car Brake and Starter.

(Frein et impulseur de char.)

Amos M. Vereker and Stephen M. Yeates, Dublin, Ireland, 1st August, 1889; 5 years.

Claim.—1st. A car brake and starter employing clutching mechanism, a source of power connected therewith, and a clutch operating mechanism, substantially as described. 2nd. In a car brake and starter, the combination, with the car axles, of chain or belt gearing, clutch sections keyed on the car axles, other clutch sections sliding on the axles, and a clutch operating mechanism, substantially as described. 3rd. In a car brake and starter, the combination, with clutch mechanism, of an endless chain or belt acting directly on the car axles, and an operating system of levers working from both ends of the car, substantially as described. 4th. A car brake and starter employing clutching mechanism, a spring connected therewith, and a clutch operating mechanism, substantially as described. 5th. In a car brake and starter, the combination, with the axle, of clutch sections carried thereby, other clutch sections held to slide on the axles, a spring connection between one set of clutch sections and the spring, and a clutch operating mechanism, substantially as described. 6th. In a car brake and starter, the combination, with the axles, of a clutch section rigidly mounted thereon, clutch sections held to slide and turn thereon, spring connections between the springs and the sliding clutch sections, and a clutch operating mechanism, substantially as described. 7th. In a car brake and starter, the combination, with the axles, of clutch sections rigidly mounted thereon, other clutch sections held to slide and to turn upon the axles, levers carrying yokes which engage the sliding clutch sections, a spring which acts to throw the clutch sections into engagement, a spring 20, connections between the spring 20 and the sliding clutch sections, a transverse shaft provided with arms, connections between the yoke carrying levers and said arms, levers which extend to within reach of the driver and draw bars, connection between the levers, draw bars and the transverse shaft being established, substantially as described.

No. 31,865. Railway Car. *(Char de chemin de fer.)*

William W. Green and James Murison, Chicago, Ill., U. S., 1st August, 1889; 5 years.

Claim—1st. The combination of the spool-shaped metal struts *c* and the tie rods c^1, with a series of longitudinal members A, B arranged parallel to each other, and each composed of two metal plates *b* connected together by bolts or rivets *r* extending through an interposed spacing material, and by the tie rods c^1 extending through the struts *c* from side to side of the frame, substantially as described. 2nd. The combination of the series of longitudinal members A, B, and terminal spacing members *f*, with the outside metal plates *b* bent around the corners of the frame at b^1, and bolted to the spacing members *f*, substantially as described. 3rd. The combination of the longitudinal members A, B, the terminal spacing members *f*, and the outside metal plates *b* bent around the corners of the frame, with the transverse end plates *e* bolted to the bent plates *b*, and spacing members *f*, substantially as described. 4th. The combination of the composite longitudinal members A, B, the struts *c*, the tie rods c^1, the terminal spacing members *f*, the outside plates *b* bent around the corners of the frame, and the transverse end plates *e* bolted to the bent plates *b*, and spacing members *f*, substantially as described. 5th. The combination of the metal side pieces *d*, bent at their upper end to form the ribs d^2, with separable pieces d^1 for the arch or raised deck, substantially as described. 6th. The combination of the metal side pieces *d*, bent at their upper end to form the ribs d^2, with the separable pieces d^1 for the arch or raised deck, and the angle iron longitudinal member *g* connecting the parts d^1, d^2, substantially as described. 7th. In a metal car frame, the combination of the angle iron corner posts D^2 with the transverse frame pieces D, and their longitudinal connections, substantially as described. 8th. In a metal car frame, the combination of the transverse frame pieces D, their longitudinal connections and the sills B, with the braces d^3, substantially as described. 9th. In a metal car frame, the combination of the transverse frame pieces D, and the longitudinal members H, I, with the socket pieces T, substantially as described. 10th. In a metal car frame, the combination of the transverse frame pieces D, and the longitudinal members H, I, with the socket pieces T provided with the interior concavity t^2 and filling hole t^3, substantially as described.

No. 31,866. Range. *(Landier.)*

George H. Phillips, Geneva, N.Y., U.S., 1st August, 1889; 5 years.

Claim.—1st. The combination, with a suitable range plate A, of a suitable range shelf C having the hook C^2, substantially as and for the purpose set forth. 2nd. The combination, with a suitable range plate A, of a suitable range shelf C having the integral hook C^2, substantially as described. 3rd. The combination, with a suitable range shelf C having a hook C^2, of the collar B having the recess or depression B^1, substantially as and for the purpose set forth. 4th. The combination of the top range plate A and the collar B, with the shelf C and the hook C^2, substantially as specified. 5th. The combination of the top range plate A, the collar B, the recess or depression B^1 and an opening b^2, in the collar, with the shelf C, the hook C^2, substantially as and for the purpose set forth. 6th. The combination of the top range plate A, with the shelf C, the hook C^2, the shoulders d^1 and bolts E, substantially as and for the purpose specified.

No. 31,867. Rolling Mill for Making Tubes from Hollow Metal Ingots. *(Laminoir pour faire les tubes avec des lingots de métal creux.)*

Stephen P. M. Tasker, Philadelphia, Penn., U.S., 1st August, 1889; 5 years.

Claim.—1st. In a rolling mill, the combination of a roller mandrel having two or more mandrel rolls, gearing for positively driving said rolls, a prime mover for actuating said gearing and external compressing rolls, substantially as set forth. 2nd. In a rolling mill, the combination of a roller mandrel having two or more mandrel rolls, gearing for positively driving said rolls, a prime mover for actuating said gearing, external compressing rolls, gearing for positively driving said compressing rolls, and a prime mover for actuating said gearing, substantially as set forth. 3rd. In a rolling mill, the combination of a roller mandrel having two or more mandrel rolls, gearing for positively driving said rolls, a prime mover for actuating said gearing, external compressing rolls, and adjusting gearing for simultaneously setting up toward a common centre all of the external compressing rolls, substantially as set forth. 4th. In a rolling mill, the combination of a roller mandrel having two or more mandrel rolls, gearing for positively driving said rolls, a prime mover for actuating said gearing, external compressing rolls, gearing for positively driving said compressing rolls, a prime mover for actuating said gearing, and adjusting gearing for simultaneously setting up toward a common centre all of the external compressing rolls, substantially as set forth. 5th. In a rolling mill, the combination of a roller mandrel having two or more mandrel rolls, gearing for positively driving said rolls, a prime mover for actuating said gearing, external compressing rolls, and idler carrying rolls for carrying and supporting the ingot, substantially as set forth. 6th. In a rolling mill, the combination of a roller mandrel having two or more mandrel rolls, gearing for positively driving said rolls, a prime mover for actuating said gearing, external compressing rolls, adjusting gearing for simultaneously setting up toward a common centre all of the external compressing rolls, idler carrying rolls for carrying and supporting the ingot, and adjusting gearing for adjusting the vertical set of said carrying rolls, substantially as and for the purposes set forth. 7th. In a rolling mill, the combination of a roller mandrel having two or more mandrel rolls, gearing for positively driving said rolls, a prime mover for actuating said gearing, external compressing rolls, gearing for positively driving said compressing rolls, a prime mover for actuating said gearing, adjusting gearing for simultaneously setting up toward a common centre all of the external compressing rolls, idler carrying rolls for carrying and supporting the ingot, and adjusting gearing for adjusting the vertical set of said carrying rolls, substantially as and for the purposes set forth. 8th. In a rolling mill, the combination of a series of roller mandrels each containing two or more rolls, the rolls of said respective mandrels being alternated or indisposed, as set forth, gearing common to the rolls of all of the mandrels for positively driving said rolls, a prime mover for actuating said gearing, and a series of sets of external compressing rolls corresponding in number with the mandrels, the rolls of said respective sets being alternated or interdisposed, as set forth, and operating respectively in connection with corresponding rolls of corresponding mandrels, substantially as set forth. 9th. In a rolling mill, the combination, of a series of roller mandrels, each containing two or more rolls, the rolls of said respective mandrels being alternated or interdisposed, as set forth, gearing common to the rolls of all of the mandrels, for positively driving said rolls, a prime mover for actuating said gearing, a series of sets of external compressing rolls corresponding with the number of mandrels, the rolls of said respective sets being alternated or interdisposed, as set forth, and operating respectively in connection with corresponding rolls of corresponding mandrels, gearing for positively driving said compressing rolls, and a prime mover for actuating said gearing, substantially as set forth. 10th. In a rolling mill, the combination of a series of roller mandrels, each containing two or more rolls, the rolls of said respective mandrels being alternated or interdisposed, as set forth, gearing common to the rolls of all of the mandrels, for positively driving said rolls, a prime mover for actuating said gearing, a series of sets of external compressing rolls corresponding with the number of mandrels, the rolls of said respective sets being alternated or interdisposed, as set forth, and operating respectively in connection with corresponding rolls of corresponding mandrels, and adjusting gearing for simultaneously setting up toward a common centre, all of the compressing rolls of all of the sets, substantially as set forth. 11th. In a rolling mill, the