disks F G, the barb forming apparatus consisting of knives M screwed to surface or edge of disks by means of screws and plates N, and regulated by screwed ends O, the knives matching with corresponding grooves P in opposite disk. 3rd. In combination with the apparatus the pickers Q with openings R R for receiving the strips as the barbs are cut, and relieving them from the knives and disks.

No. 14,445. Improvements on Mail Bags.

(*Perfectionemen ts aux valises à lettres.*)

Silas Smith and Jacob L. Engle, Middleburgh, N. Y., U. S., 6th May, 1882; for 5 years.

Claim.—In a mail bag a sliding leather fastening strip D, slotted to receive T-headed fastening pins B B, in combination with a slotted thickness of the mail bag and guard strip *v*.

No. 14,746. Improvements on Car Springs.

(*Perfectionnements aux ressorts des chars*)

Charles T. Schoen and Charles Scott, Philadelphia, Pa., U. S., 6th May, 1882; for 15 years.

Claim.—A graduated bolster spring for railroad cars, composed of a group of spirally coiled bars, placed side by side and in which the spiral (or spirals) having the greatest bearing and carrying capacity, is not acted on by the load, till after the other and weaker spirals of the group have been brought into action, and in which all the spirals under a given pressure shall become solid at the same time.

No. 14,747. Improvements in Hydro-Carbon Burners. (*Perfectionnements aux foyers à hydro carbures.*)

Evan A. Edwards, Los Angelos, Cal., U.S., 6th May, 1882; for 5 years.

Claim.—1st. In a hydro-carbon or liquid fuel burner, the oil passage B in connection with the oil supply and having a regulating valve *d* at its exit end, in combination with the steam passage E, in connection with the steam source, said steam passage having its exit end provided with spiral or inclined grooves or passages *e* opening out of the end of the burner, separately from the said oil passages. 2nd. The hydro-carbon burner consisting of the casting A, with the apertures *a b*, pipe B with its valve seat *c*, open ended hollow stem D with its valve *d* and bushing C, and the pipe E with its spiral or inclined grooves or channels *e*.

No. 14,748. Improvements in Salt Water Evaporating Apparatus. (*Perfectionnement aux appareils évaporatoires de l eau de mer.*)

Daniel H. Gowing, (Assignee of Oliver La F. Browney,) Syracuse, N.Y., U.S., 6th May, 1882; for 5 years.

Claim. 1st. The process of manufacturing salt from natural brine, by conveying the brine successively through preliminary evaporating and purifying tanks or vessels, to the final evaporating and granulating vessel, applying the primary and main heating agent to said granulating vessel and collecting from the latter the vapour emitted from the brine in process of granulation, and applying said vapour to the preliminary evaporating and purifying vessels for the purpose of heating the contents thereof. 2nd. Passing the crude brine through one or more preliminary heating and purifying tanks or vessels, to the final evaporating and graining vessel, applying the primary heating agent to the latter, and gathering the vapour generated in the said evaporating and graining vessel, and applying said vapour to the preliminary heating and purifying tanks in such a manner as to heat the brine contained therein, and bring the same to that degree of saturation at which oxide of iron, carbonate of lime and the usual attendant sulphates are precipitated, then introducing sal soda to neutralize and precipitate the chlorides of calcium and magnesium, and drawing off the purified brine into the final co-operating and graining vessel, and there reducing it to salt. 3rd. Introducing the brine into a suitable receptacle and admixing therewith a sufficient quantity of salt to increase its density to the degree of saturation, then allowing the impurities to settle, and subsequently drawing off the purified and saturated brine and conveying the same to the final evaporator or grainer, and there converting it into salt. 4th. A salt water evaporating apparatus comprising a granulator or final evaporator heated by the primary heating agent, vats or suitable receptacles for preliminary heating and purifying of the brine heated by the vapour emitted from the granulator, and suitable ducts for conveying the brine successively through said tank to the granulator. 5th. The combination and arrangement, in an evaporating apparatus having one or more evaporating vessels heated artificially, of a removable cover or covers for the respective vessels, and a vapour duct connected with said cover or covers and communicating with the furnace of the evaporating works. 6th. The combination, with an artificially heated evaporating vessel, of a removable cover, of a venti-duct connected with said cover, and a condenser applied to said venti-duct and intercepting the liquid on its way to the evaporating vessel. 7th. An evaporating apparatus comprising two or more evaporating vessels, or sets of such vessels, the primary heating agent being applied to the first vessel or set of vessels, and the succeeding vessels being heated by the vapour generated in the preceding vessel, and conducted to the said succeeding vessels by suitable ducts or passages, aided by the draft introduced by a pump or suction fan. 8th. The described means of utilizing the heat and products of condensation, consisting in the combination, with an evaporating vessel, or series of such vessels, of a receptacle adapted to collect the vapour arising from said evaporating vessel or vessels a vapour duct connected with said receptacle, a condenser, or condensers applied to the vapour duct, a trap to prevent the ingress of air through said duct, a receptacle to collect the products of condensation, and a suction fan or pump connected to the vapour duct. 9th. The combination, with an evaporating vessel or series of such vessels, of a receptacle adapted to collect the vapour from said vessels, a vapour duct connected with said receptacle, a condenser applied to said duct, and a pump or suction fan connected with the vapour duct and having its discharge directed to a furnace to apply thereto a blast. 10th. The evaporating tank or vessel D, having the extension *l* provided with the thimble *m*, and the cover F hinged to said extension. 11th. In combination with an evaporating vessel, the cover F having the diaphragm *u* with steam passages through it, and with a barrier around said passages, to prevent the return of the condensed steam to the evaporating vessel. 12th. The combination, with the evaporating vessel D and vapour duct *b*, of the valve *n* closed automatically by the opening of the cover F. 13th. A salt water evaporating apparatus comprising a grainer or final evaporator heated by the primary heating agent, vats or suitable receptacles for preliminary heating, evaporation and purification of the brine heated by the vapour emitted from the grainer or final evaporator, and settling tank interposed between the said grainer and preliminary heating and purifying tanks, the brine being conveyed successively through the said tanks to the grainer. 14th. A salt water evaporator consisting of the following appliances and arrangements, to wit: first, a receptacle for the crude brine, second, a brine saturating tank or vessel having communicative connection with the first receptacle, third, a tank arranged to receive the saturated brine of the second tank and allow the impurities of said brine to settle, fourth, a grainer or final evaporator communicating with the third tank, fifth, a steam generator, sixth, a steam duct extended from the steam generator through, or along the grainer or final evaporator, seventh, a cover applied to the top of the grainer, eight, a vapour duct extended from the cover through the brine saturating tank and the first crude brine receptacle, ninth, a suction fan or pump having its induction port communicating with the end of the aforesaid vapour duct, and its discharge directed to the fire box or furnace of the steam generator. 15th. The receptacle A, saturating tank B, settling tank C and grainer D1 communicating successively as described, in combination with the steam generator E having the steam pipe *a* extended through the grainer D1 and returned from there to the steam generator, the cover F having the vapour duct *b* extended through the saturating tank B and through the crude brine receptacle A and the fan G having its induction pipe *v* connected with the vapour duct *b*, and the crude brine receptacle, and its discharge pipe *d* communicating with the fire box of the steam generator E.

No. 14,749. Improvements in Grate Bars.

(*Perfectionnements aux barres des grilles.*)

John C. Knoeppel, Milwaukee, Wis., U. S., 6th May, 1882; for 5 years.

Claim.—1st. In grate bars for furnaces, a solid central web provided with one or more services of open spaces or air passages formed transversely through said web, as adapted to facilitate the admission of air, whereby the temperature of the bar is lowered and the draft of the furnace is promoted. 2nd. A solid central web of a waved or corrugated form, adapted by such waved or corrugated form to resist the warping tendency of the bar, when expanded or contracted under varying temperature. 3rd. The combination of the waved or corrugated web, provided with transverse slots or perforations, with top and bottom flanges. 4th. A waved or corrugated web provided with two or more series of transverse slots or perforations arranged alternately, in combination with top and bottom flanges. 5th. A reversible furnace grate bar having a waved or corrugated web straight at each end, and provided with transverse slots or perforations, and top and bottom flanges. 6th. A reversible furnace grate bar having top and bottom flanges, and a waved or corrugated web straight at each end, and provided with two or more series of transverse slots or perforations. 7th. A reversible furnace grate bar with straight web and flanges at each end, and intermediate waved or corrugated web, and waved top and bottom flanges. 8th. A reversible furnace grate bar with straight web and flanges at each end, and intermediate waved top and bottom flanges, and waved or corrugated web provided with transverse slots or perforations. 9th. A reversible furnace grate bar with straight web and flanges at each end, and intermediate waved top and bottom flanges, and waved and corrugated web provided with two or more series of transverse slots or perforations. 10th. A reversible furnace grate bar, provided with top and bottom flanges having lugs cast thereon, and a waved or corrugated web. 11th. A reversible furnace grate bar, provided with top and bottom flanges having lugs cast thereon, and a waved or corrugated web having transverse slots or perforations. 12th. A reversible furnace grate bar provided with top and bottom flanges having lugs cast thereon, and a waved or corrugated web having two or more series of transverse slots or perforations. 13th. A reversible furnace grate bar with straight web and flanges at each end, and intermediate waved top and bottom flanges having lugs cast thereon, and waved or corrugated web having two or more series of transverse slots or perforations arranged alternately. 14th. In furnaces, the seat for the ends of grate bars consisting in the combination of bed plate H, partition I, bar J, flanges R adapted to support the ends of the respective bars, and retaining them in the proper relative position to each other. 15th. In furnace grates, the combination of a series of two or more waved or corrugated bars, so formed and arranged that the convex surfaces of one bar conforms to the concave surface of the next opposite bar of such series, whereby a uniform waved or zigzag space is formed between the respective bars of the grate. 16th. In grate bars, the combination of the bars described with the seat G, consisting of the bed plate H, partitions I, bar J and flanges K.

No. 14,750. Improvements on Indexes.

(*Perfectionnements aux index.*)

John H. Wagstaff, St. John, N. B., 8th May, 1882; for 5 years.

Claim.—An index in which the successive pages or sheets have the letters of the alphabet arranged in a row, in one or more places across each page, and representing the letters as though printed from top to bottom of the page, and provided with a marginal alphabetical index

No. 14,751. Improvement in Neck Yoke Rings. (*Perfectionnement des anneaux de jougs.*)

Charles Shuman, Rockford, Ill., U.S., 8th May, 1882; for 5 years.