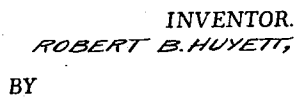


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BLASTING MACHINE

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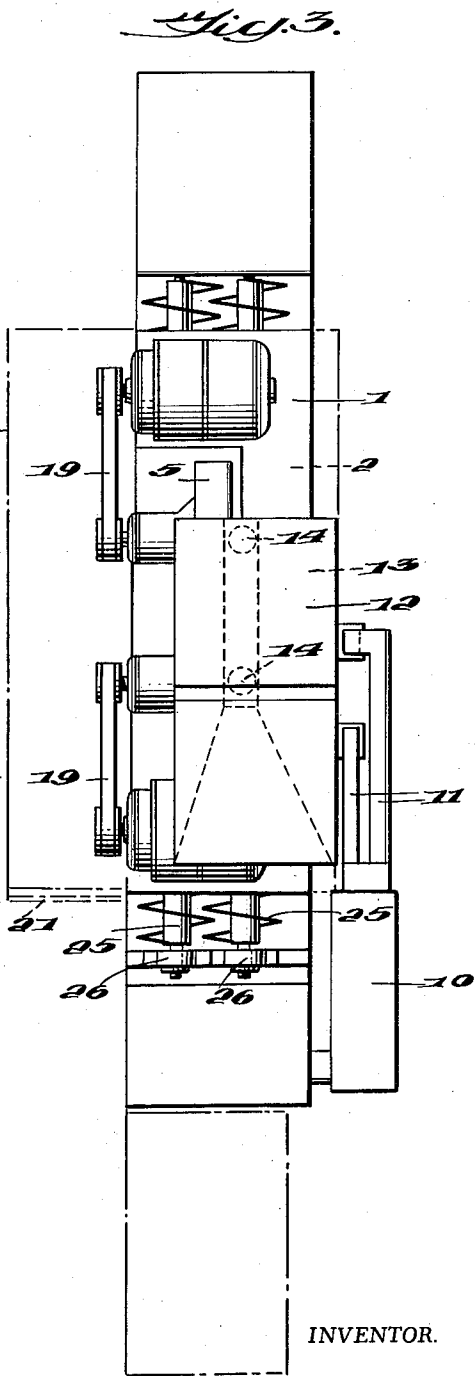
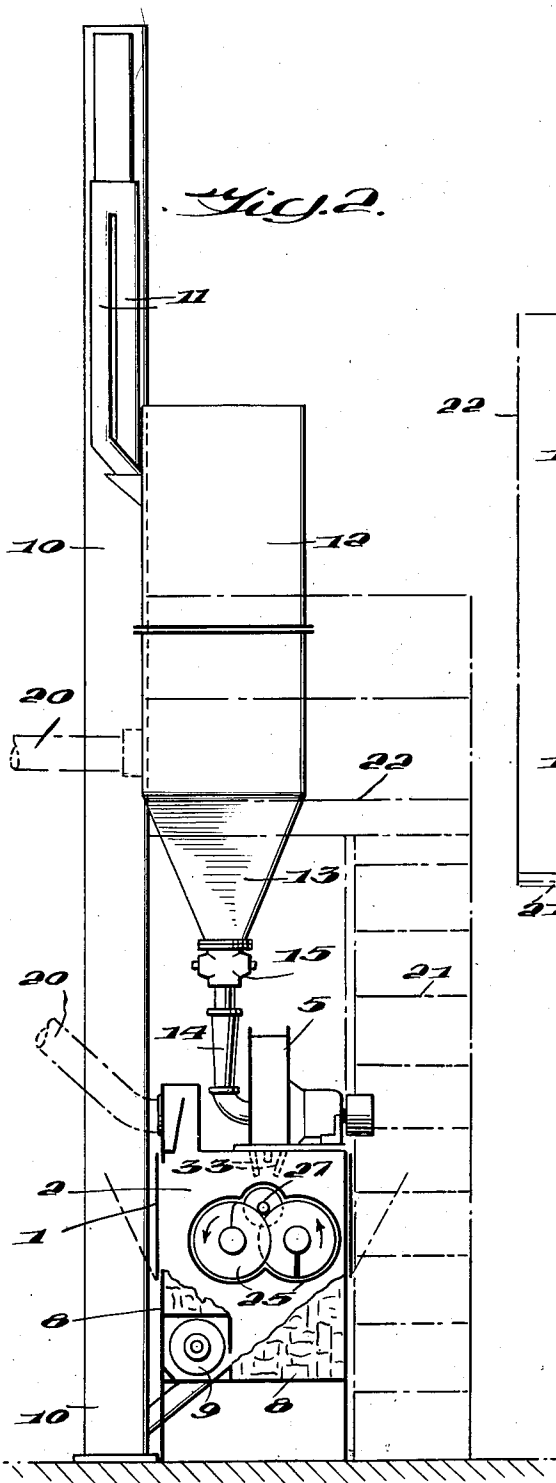
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BLASTING MACHINE

2,584,587

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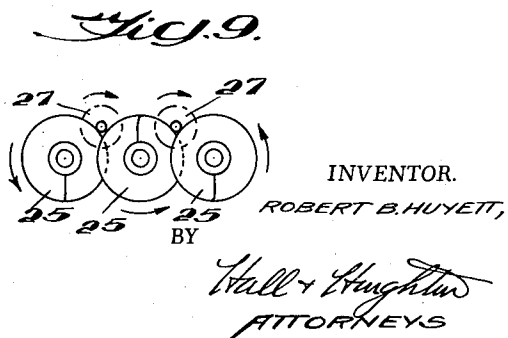
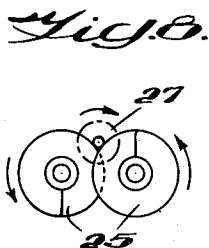
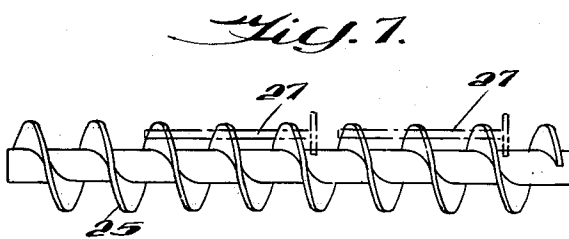
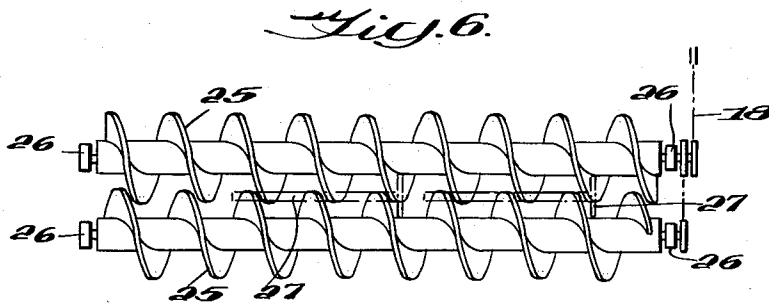
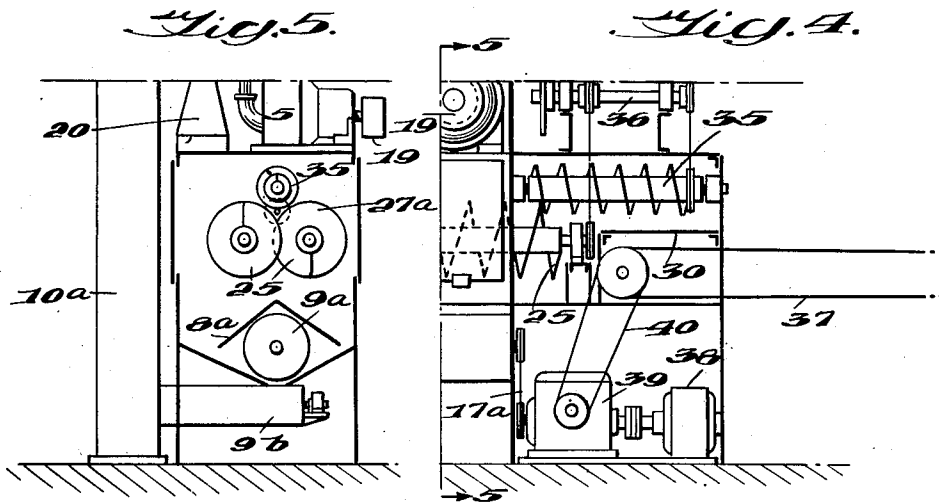
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BLASTING MACHINE

2,584,587

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UNITED STATES PATENT OFFICE

2,584,587

BLASTING MACHINE

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5 Claims. (Cl. 51—14)

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This invention relates to work blasting machines and aims generally to improve the same. In particular, it aims to provide an improved cabinet-type blasting machine for handling and treating flanged cylindrical objects to be blasted. Examples of such articles are end-flanged rear axle shafts, and the like.

In the treating of such flanged cylindrical objects, of steel, iron, wood or other relatively rigid materials, with projected treating material, considerable difficulty is experienced in obtaining uniform treatment of the work. An important object of the present invention is to provide means for supporting, advancing and rotating such articles so as to obtain maximum uniformity in treatment thereof. Other objects are to improve the cheapness and efficiency of such blasting procedure, to provide arrangements for advancing such articles substantially longitudinally at a predetermined rate while rotating them at a predetermined rate, and to provide arrangements for so doing without obscuring the ends of the articles. Still further objects will appear from the following detailed description of preferred embodiments of the invention, including the provision of improved details of construction and arrangements of parts contributing to the attainment of various of the aforesaid objects.

The invention itself consists in the new and useful features and combinations herein described and particularly pointed out in the appended claims.

In the accompanying more or less diagrammatic drawings of exemplary embodiments of the invention:

Figs. 1 and 2 are side and end elevations of a blasting machine including one form of the invention.

Fig. 3 is a plan view thereof.

Fig. 4 is a side elevational detail of a modified arrangement.

Fig. 5 is a section taken generally on the plane 5—5 of Fig. 4 in the direction of the arrows.

Figs. 6 to 8 are plan, elevation, and end views the work conveying means.

Fig. 9 is an end view of a modified form of work conveyor.

General arrangement

In the illustrative form of Figs. 1 to 3 the blasting machine comprises a housing 1 defining a blasting chamber 2 shown as extending longitudinally of the machine from its entrance end 3 to its discharge end 4.

Blasting means 5, of any form suitable to the operation to be performed, is arranged to discharge into the chamber 2. For shot and grit peening and blasting operations the blasting means 5 may be of the airless centrifugal wheel type, exemplified for example in Rosenberger and Keefer Patent No. 2,352,588, issued June 27,

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1944. Such machines, as indicated in Fig. 1, project the blastant material in a fan-shaped stream as diagrammatically indicated at 6. In the arrangement of Figs. 1 to 3 two such wheels 5 are employed, and these machines are preferably arranged to rotate in opposite directions in substantially the same plane, and may project their fan-shaped streams from the ends of the blasting chamber 2 toward the center thereof along the work-path extending through the blasting chamber.

As is usual in shot and grit blasting, the machine of Figs. 1 to 3 comprises, below the work-path, means for collecting the spent abrasive; herein shown as an abrasive pan 8, which may be filled with scrap metal, as indicated in Fig. 2, if desired. The spent blastant collected in the pan 8 is delivered to a screw conveyor 9 which conveys the spent blastant to the foot of a blastant elevator 10, of any conventional form, a chain-bucket elevator being the form usually employed. The elevator 10, at its upper end, delivers to chute means 11 by which the abrasive or other blastant is returned through classifying and separating means 12 to supply hopper means 13, from which the blastant is supplied through feed conduits 14 to the blasting means 5. Suitable valve means 15 are interposed in the conduits 14, and such valve means are preferably interconnected as shown, and remote-controlled as by solenoid or fluid-pressure actuating means exemplified at 16.

Suitable electric motor or other driving means are provided for the various conveying and projecting means, herein exemplified by the motor, reducer and belt drive 17 for the screw conveyor 9 and elevator 10; the motor, reducer and belt drive 18, for the work-handling screws herein-after described; and the motor and belt drives 19 for the centrifugal wheels 5. Suitable ventilating arrangements 20 and access ladders and platforms 21, 22 are also usually provided.

Work-handling means

Referring now to Figs. 1 to 3 and 6 to 8, as is there shown the work-conveying means of the preferred embodiment comprises a pair of parallel screws 25 extending lengthwise through the blasting chamber 2, in mutually spaced relation, to define a work-supporting notch between them generally aligned with the plane of the fan-shaped blast streams 6 (Fig. 1). The screws 25 are supported in suitable bearings 26 at their ends (Figs. 1, 3 and 6), and as shown in Fig. 8 are rotated in the same sense so that the flanged cylindrical work-pieces 27 resting in the notch between their outer perimeters, with their flanged portions descending between their vanes, are rotated in the opposite sense.

The rate of advance of the work-pieces 27 along the screws 25 is determined by the pitch

and rate of rotation of the screws, and the rate of rotation of the cylindrical object or work lying in the notch or valley between outer perimeters of the screws is determined by the rate of rotation of the screws and the relative rolling diameters of the screws and of the work-pieces.

The diameters of the conveying screws 25 may be of any convenient or practicable size, and their vanes may interleave as shown in Figs. 6 and 8 or may be spaced apart by a distance less than the rolling diameter of the articles of work being rotated thereon. The screws 25 may be revolved at any practical speed dependent upon their pitch and the desired lengthwise advance of the work per unit of time.

The diameters of the flanged cylindrical objects or work-pieces 27 may be of any practical size within the limitations of the screw spacing and other physical relationships of the particular machine in which the invention is embodied. The screw spacing may be varied by suitable adjustment of the roll bearings 26, to enable a given machine to accommodate a series of small, medium or large diameters and to effect various predetermined rates of advance of the articles. This type of conveyor may therefore be flexible in its use for various kinds of flanged cylindrical objects.

The work-pieces may be delivered to and from the work conveyor 25 in any desired way, and the machine is particularly flexible in this regard. Feed and delivery over the ends of the rolls through hanging rubber curtains 28 or other abrasive-trapping means is preferable when the plant layout renders straight linear handling desirable. As shown in Figs. 1 to 3, a feeding platform, conveyor, or chute 29 may be provided adjacent the inlet end 3 of the machine, and the flanged articles 27 may be advanced thereon or thereby until their flanges are picked up by the entrance ends of the screw vanes 25, which will then draw the articles into the notch or valley and feed them therealong. Even though the articles may be fed in this manner in spaced relation so that their ends will be fully exposed to the blast stream; as they reach the discharge end of the machine following articles, being positively advanced by the screw vanes, will abut and push out of the machine and onto a receiving platform, chute or the like 30 those articles whose flanges have passed out of contact with the vanes, as indicated at 27a in Fig. 1. If desired the platform 30 may be provided with a supporting ramp 31 to prevent the rear, smaller end of an article from dropping below the flanged forward end of the following article before the leading article 27a has been advanced to such extent that it will tilt over the forward end of the platform and be delivered to take-away means such as the tote-box 32, for example. As shown in Fig. 1 the bearings 26 at the unloading end of the screws are so located that they do not interfere with the unloading.

Where little treatment of the ends of the work-pieces is desired, they may be fed in close formation. If fed in open formation substantially uniform spacing of the articles is maintained and the ends of the articles are not obscured and are exposed to the blastant, since the vanes contact only such parts of the flanges as are out of line with the blast stream.

As is best shown in Fig. 2, confining walls or baffles 33, which may be rubber-covered, may be disposed at either side of the blast stream to assure delivery of only a narrow stream of

blastant against the upper side of the work passing along the notch between the screws. Where the diameter of the work permits, the tops of the vanes of the screws 25 may be spaced apart a distance greater than the width of the blast stream. In either case the screws themselves are afforded maximum protection against the action of the abrading medium, since direct impact thereof is substantially limited to impingement against the work, and when no work is present the blastant, or a substantial part of it, may pass downwardly between the screws and impinge thereupon, if at all, only at a narrow angle of minimum effectiveness for abrading them. In addition, the screws, or desired portions of them, may be rubber-surfaced or otherwise formed to improve their resistance to the action of the blasting medium.

As above noted, Fig. 1 illustrates a particularly simple arrangement for delivering the treated articles from the machine. The machine may embody other delivery arrangements however, one of which is illustrated in Figs. 4 and 5. In this arrangement a delivery screw 35 is positioned above the delivery ends of the conveyor screws 25 and suitably driven, preferably in timed relation thereto, as by the countershaft drive 36. A take-away means, shown as a belt conveyor 37 suitably driven, as by motor 38, reducer 39 and chain or belt-drive 40, may also be provided in underlying relation to the delivery platform 30. This motor and reducer unit may also drive the screw conveyors 9a, 9b and elevator 10a for spent abrasive, if desired, as indicated at 17a, Fig. 4. With this arrangement the work-piece 27a approaching the delivery end of the conveyor screws 25 is picked up by the overlying screw 35 and positively advanced and delivered to the take-away belt 37, which may take the articles away at a relatively rapid rate and in rather widely spaced relation for delivery for subsequent handling or treating operations. In the form of machine indicated in Fig. 5, an alternative arrangement of blastant pan 8a is shown, comprising an inverted V-shaped baffle plate, which may be rubber-surfaced, under which the grit conveyor 9a operates. A lateral screw conveyor 9b is there employed to deliver the spent blastant to the elevator 10, as is desirable when the machine is to be set as low as possible.

For purposes of simplicity, a single pair of screws 25 will usually be employed, but three or more screws may be used to convey a plurality of lines of work through the machine, as indicated in Fig. 9.

While the present invention cooperates particularly well with airless-type centrifugal blasting machines, which project relatively narrow fan-shaped patterns of treating material, with less advantage compressed air nozzles or other forms of treating material projectors may be employed, singly or in multiple. The treatment practiced may be a peening or cleaning treatment, or a surface-finishing treatment removing or adding a coating to the work-pieces. In its broader aspects, features of the invention may be applied to machines for treating work with rust-inhibiting solutions or other coating materials, especially where the treatment is to be practiced over the entire exposed circumference, length and flanged portions of a generally transversely rollable object. The embodiments shown are therefore to be regarded as illustrative and not restrictive of the invention, the scope of which

is defined in the appended claims, and all modifications and changes which come within the meaning and range of equivalency of the claims are intended to be included therein.

I claim:

1. In a machine for blast treating laterally rollable flanged articles, a blasting chamber, a pair of work supporting screws extending longitudinally in said chamber, means for rotating said screws in the same direction, said screws lying substantially parallel to each other and presenting a notch or valley between the tops of their vanes for supporting the laterally rollable flanged articles with the flanges thereof descending between their vanes for causing them to advance lengthwise of said notch as they are rotated transversely therein, means for projecting blastant downwardly in said chamber in a fan-wise stream directed longitudinally of said notch and against the upper sides of flanged articles being rolled and advanced therein, and baffle means for confining the stream of blastant for direct impingement thereof only against the top surfaces of said articles.

2. In a machine for blast treating automotive axle shafts having projecting flanges: a blasting chamber; a pair of work supporting and advancing screws in said blasting chamber; journal means rotatably holding said screws substantially parallel for rotation about their longitudinal axes, said screws having generally cylindrical hubs from which vane-like threads extend a distance at least far enough to receive the entire projecting portions of the flanges of said shafts, the vane-like threads of the respective screws intermeshing to form a shaft-guiding notch between them for supporting the axle shafts, and the spaces between the turns of said threads cooperating to receive the flanges of said supported axle shafts; driving structure connected to rotate the intermeshed screws in the same direction about their respective axes for rotating the supported shafts while causing the threads of said screws to advance the shafts from a loading end to a delivery end of said notch; and blasting means positioned for projecting blastant against the shaft surfaces being presented by said shaft rotation and advancement to substantially uniformly blast all exposed portions of said shafts.

3. In a machine for blast treating automotive axle shafts having projecting flanges: a blasting chamber having inlet and outlet ends; a pair of work supporting and advancing screws extending through said blasting chamber and out of said ends; journal means rotatably holding said screws substantially parallel for rotation about their longitudinal axes, said screws having generally cylindrical hubs from which vane-like threads extend a distance at least far enough to receive the entire projecting portions of the flanges of said shafts, the vane-like threads of the respective screws intermeshing to form a shaft-guiding notch between them for supporting the axle shafts, and the spaces between the turns of said threads cooperating to receive the flanges of said supported axle shafts; driving structure connected to rotate the intermeshed screws in the same direction about their respective axes for rotating the supported shafts while causing the threads of said screws to advance the shafts from a loading end to a delivery end of said notch; blasting means positioned for projecting blastant against the shaft surfaces being presented by said shaft rotation and advancement to substan-

tially uniformly blast all exposed portions of said shafts; and a set of deflectable blastant shielding curtains closing the ends of said blasting chamber and cooperating with said screw-vanes to prevent the escape of blastant from said chamber without interfering with the passage of said shafts through said chamber.

4. In a machine for blast treating automotive axle shafts having projecting flanges: a blasting chamber; a pair of work supporting and advancing screws in said blasting chamber; journal means rotatably holding said screws substantially parallel for rotation about their longitudinal axes, said screws having generally cylindrical hubs from which vane-like threads extend a distance at least far enough to receive the entire projecting portions of the flanges of said shafts, the vane-like threads of the respective screws intermeshing to form a shaft-guiding notch between them for supporting the axle shafts, and the spaces between the turns of said threads cooperating to receive the flanges of said supported axle shafts; driving structure connected to rotate the intermeshed screws in the same direction about their respective axes for rotating the supported shafts while causing the threads of said screws to advance the shafts from a loading end to a delivery end of said notch; blasting means positioned for projecting blastant against the shaft surfaces being presented by said shaft rotation and advancement to substantially uniformly blast all exposed portions of said shafts; and an unloading screw adjacent the delivery end of said notch for engaging the flanges of said axle shafts and pulling said shafts out from engagement with said supporting screws.

5. In a machine for blast treating automotive axle shafts having projecting flanges: a blasting chamber; a pair of work supporting and advancing screws in said blasting chamber; journal means rotatably holding said screws substantially parallel for rotation about their longitudinal axes, said screws having generally cylindrical hubs from which vane-like threads extend a distance at least far enough to receive the entire projecting portions of the flanges of said shafts, the vane-like threads of the respective screws intermeshing to form a shaft-guiding notch between them for supporting the axle shafts, and the spaces between the turns of said threads cooperating to receive the flanges of said supported axle shafts; driving structure connected to rotate the intermeshed screws in the same direction about their respective axes for rotating the supported shafts while causing the threads of said screws to advance the shafts from a loading end to a delivery end of said notch; and blasting means positioned for projecting blastant against the shaft surfaces being presented by said shaft rotation and advancement to substantially uniformly blast all exposed portions of said shafts, said journal means at the delivery end of said notch being immediately adjacent the ends of the respective threads and being recessed away from said notch to provide an unobstructed unloading passageway for said advancing shafts.

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