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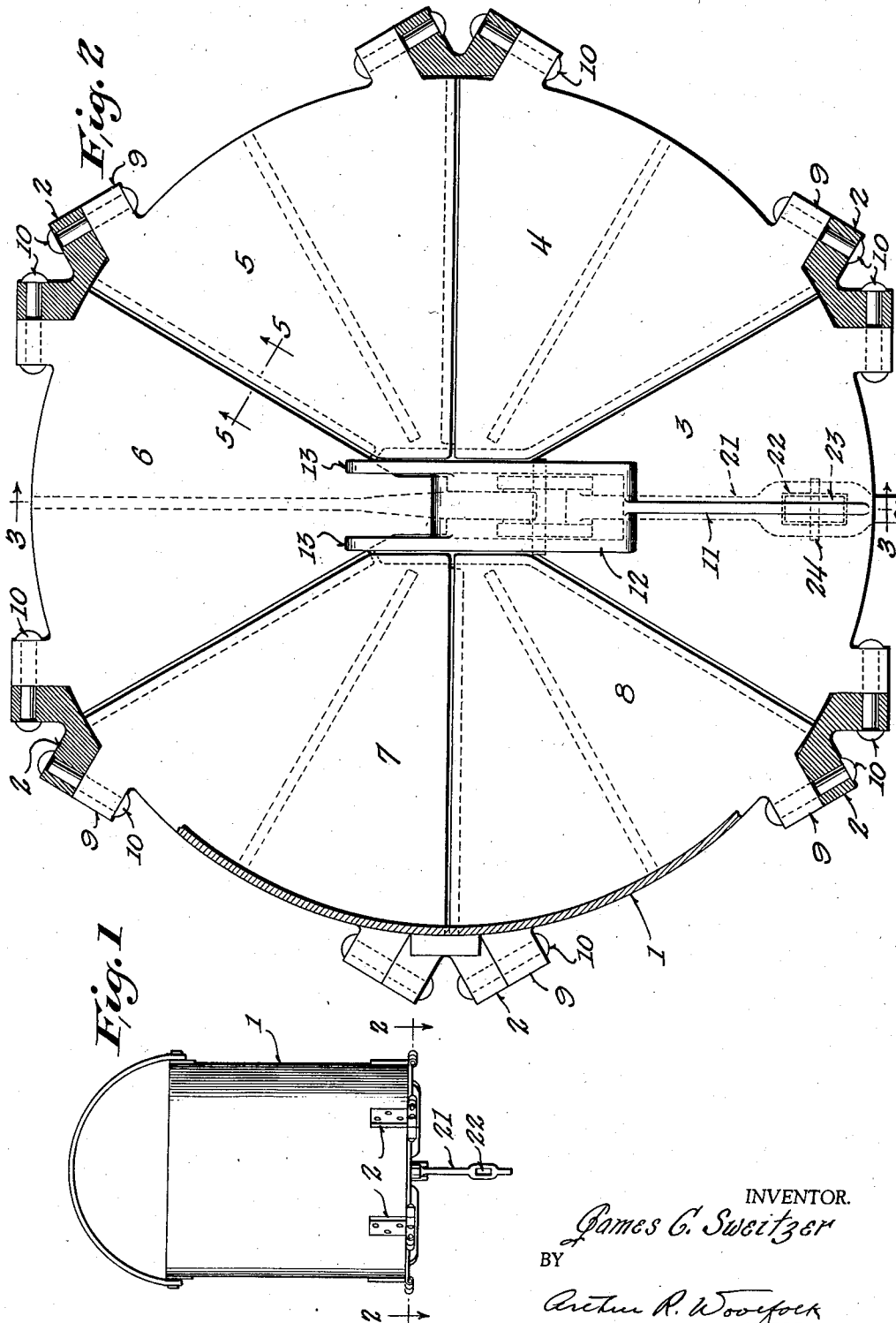
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2,163,386

CHARGING BUCKET

Filed May 8, 1935

2 Sheets-Sheet 1



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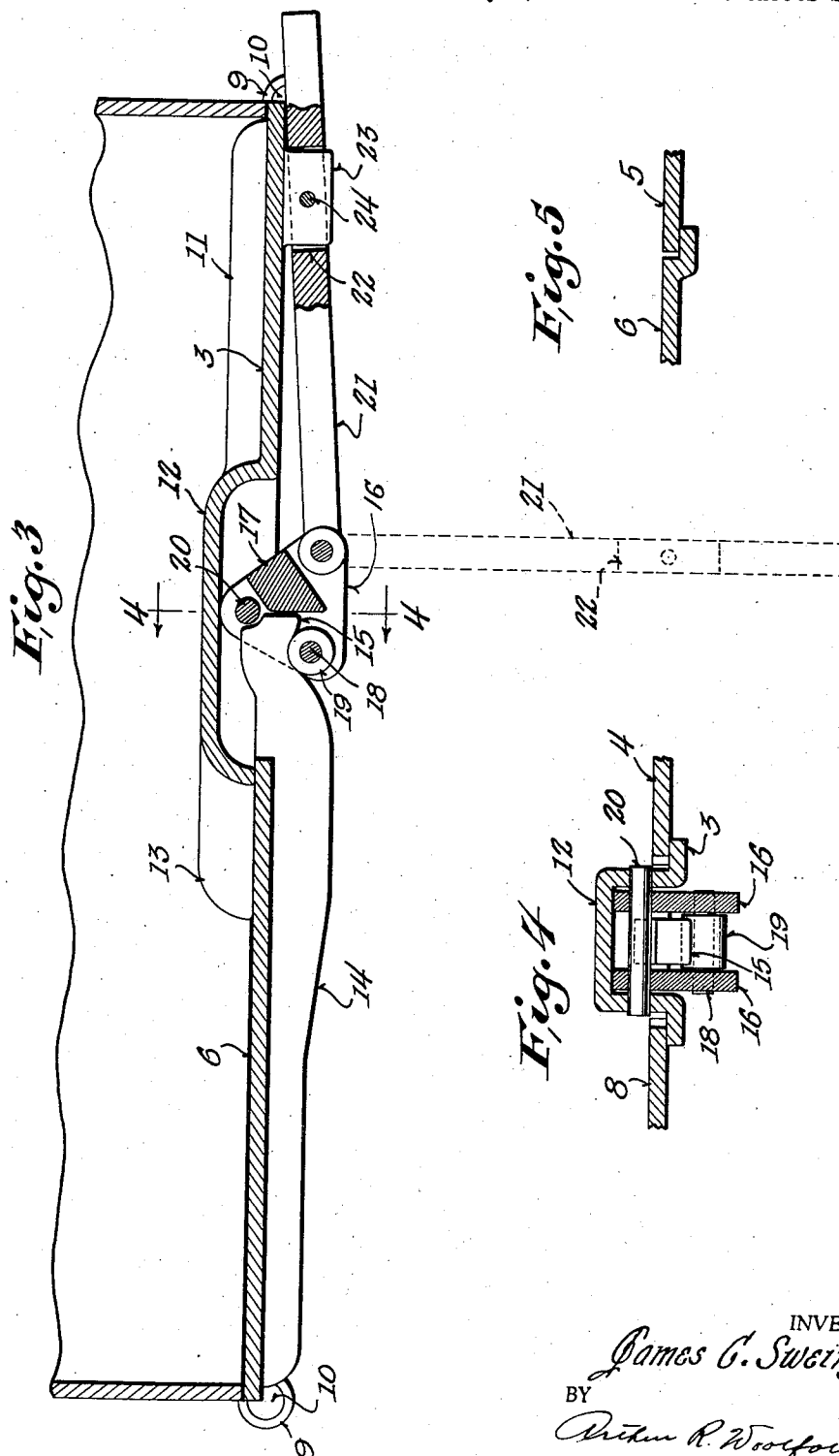
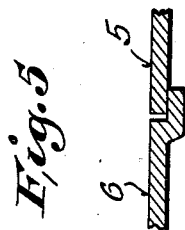
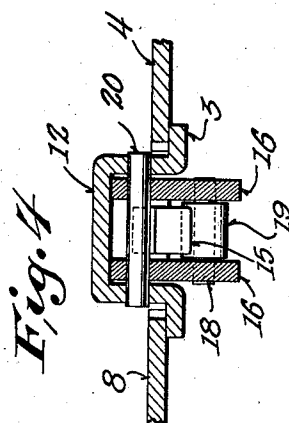
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UNITED STATES PATENT OFFICE

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CHARGING BUCKET

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Application May 8, 1935, Serial No. 20,381

18 Claims. (Cl. 294—69)

This invention relates to a charging bucket and is particularly directed to a charging bucket for a furnace.

In charging electric furnaces considerable time is lost in putting the scrap iron into the furnace. The usual practice is to employ a furnace that has a rotating or tilting top that opens up and the bucket is then lowered into the furnace and the material dumped therein. The charging time is ordinarily about 16 minutes. In the course of a twenty-four hour operation the loss in time during charging is considerable.

This invention is designed to provide a charging bucket for a furnace which is so constructed that a very rapid operation is secured and the charging time reduced to a small fraction of that heretofore required.

Further objects of this invention are to provide a novel form of charging bucket in which the bucket is provided with a bottom formed of a plurality of leaves or flaps which may be quickly locked in closed position and may be automatically unlocked when the bucket is lowered into the furnace, thus materially simplifying these operations as heretofore practiced.

Further objects of this invention are to provide a bucket in which the bottom portion of the bucket is formed of a plurality of sector-shaped leaves or flaps, certain of which overlap and all of which are locked by a link mechanism having a trip lever.

Further objects are to provide a charging bucket which has a trip lever adapted to be locked temporarily against motion and which when unlocked hangs downwardly to provide an automatic trigger like member so that when the bottom of the furnace is struck during the lowering of the bucket, the trip lever or trigger is pressed upwardly and thus unlatches the locking mechanism, allowing all of the flaps to open and the bucket to thereby discharge its contents into the furnace, the construction being such that the bottom of the bucket may be very quickly closed and again locked so that it can be lowered into the filling pit and recharged.

Further objects are to provide a charging bucket which is of simple construction, which is sturdy, and which is easy to produce.

An embodiment of the invention is shown in the accompanying drawings, in which:

Figure 1 is a side elevation of the bucket, showing it with the trip lever in its active position ready to be tripped.

Figure 2 is an enlarged sectional view, with

parts broken away, taken on the line 2—2 of Figure 1.

Figure 3 is a sectional view on the line 3—3 of Figure 2.

Figure 4 is a line sectional view on the line 4—4 of Figure 3.

Figure 5 is a fragmentary line sectional view on the line 5—5 of Figure 2.

Referring to the drawings, it will be seen that the bucket comprises a body portion 1 which may be of cylindrical contour and which is equipped with a plurality of hinge members provided with ears 2, as shown most clearly in Figures 1 and 2.

The bottom of the bucket is formed of a plurality of sector-shaped leaves of flaps. In the form shown six flaps are employed, though obviously the number may be varied. The flaps are indicated by the reference characters 3, 4, 5, 6, 7 and 8. These flaps are each provided with spaced ears 9 which form, with the ears 2, hinge members, short pintle pins 10 being employed, as shown in Figure 2. Preferably each of the flaps is ribbed on its under side with the exception of the flap 3. This flap is preferably ribbed on its upper side, as indicated at 11 in Figures 2 and 3, the ribbing providing additional stiffness and strength for the leaves or flaps.

The flap 3 is also provided with a housing or upwardly projecting portion 12, as shown most clearly in Figure 3, and with a pair of outwardly projecting arms 13 which overlap the flap 6. The rib 14 of the flap 6 is longer than the ribs on the other flaps and terminates in an outwardly projecting, downwardly hooked tongue 15, see Figure 3.

The locking mechanism includes a triangular shaped lever 16 which is preferably provided with triangular portions on opposite sides with these portions joined by an integral spacing member 17.

Preferably a roller 19 is carried on the pin 18 so as to reduce friction as there is considerable pressure when the bucket is fully loaded. It is apparent from an examination of Figure 3 that when the device is in locking position, further clockwise rotation of the lever 16 is prevented by the roller 19 engaging beneath the tongue 15 of the lever 14.

Also it is clear that when the member 16 is tripped by the longitudinal upward motion of the tripping member 21, which is pivoted to the lever 16 and hangs vertically downwardly therefrom when in operative position, the flaps swing outwardly clear of the outline of the bucket as

they are hinged adjacent the bottom edge and beyond the outline of the bucket, as is apparent from an examination of Figure 2. Also the tripping member or rod 21 hangs vertically downwardly from the lever 16 and thus the bucket may be freely withdrawn from the furnace.

It is apparent that the tripping member is easy to operate, irrespective of the load on the bottom of the flaps, and that additionally the bucket may be of approximately the same size as the furnace which it charges and the flaps do not require any material room after they have opened as they do not swing outwardly from pivot points located above the bottom of the bucket. Further it is clear that the bottom of the bucket is completely opened and is unrestricted by any mechanism whatsoever and consequently the device may be used for large scrap material in the charging of the furnace. As an actual example, a hopper six feet in overall diameter will unload perfectly in a furnace about six and one-quarter feet inside diameter. This permits a larger diameter hopper for a given furnace, so that there is a less violent unloading shock to the furnace, and so that larger pieces of scrap may be charged into the furnace with the hopper.

The lever 16 is pivoted as indicated at 20 to the flap 3, the housing 12 providing room for the pivot pin and for the upper portion of the lever 16. The trip arm consists of a link 21 whose inner end is pivoted to the lever 16 and whose outer end when in locked position projects beyond the marginal edge of the bucket. This link is provided with an aperture 22 so that when it is rocked to locked position, as shown in full lines in Figure 3, the aperture receives a projecting lug 23 formed on the leaf or flap 3. A removable pin 24 is passed through the lever and the lug and serves to prevent inadvertent detachment of the lever.

In using the device, the bucket is held closed as shown in Figure 3, and is lowered into the charging pit. It is filled with scrap iron or whatever material is to be supplied the furnace. Thereafter the bucket is hoisted and the pin 24 removed. The link or trip member 21 swings to the dotted line position shown in Figure 3 and also shown in full lines in Figure 1.

The bucket is now lowered into the furnace and when the trip rod or member 21 strikes the bottom of the furnace, it rocks the lever or locking member 16 in a counter-clockwise direction and consequently releases the lever or tongue 15 allowing all of the flaps or leaves to open downwardly and thus discharge the contents of the bucket. The rod 21 or link has the additional function of determining the height at which the discharge of the bucket occurs with reference to the bottom of the furnace. This prevents dropping the charge an unnecessarily great distance.

The bucket is immediately raised after it is discharged. These operations can be performed with extreme rapidity, as the time for charging the furnace is very much reduced due to the semi-automatic nature of the operation of the bucket and the ease with which the bucket may be again closed for refilling.

It will be seen that the construction is free of complicated or delicate parts, but instead is rugged and very serviceable. In actual use it has been found extremely fast in operation and to greatly reduce the time usually lost in charging the furnace.

It is also to be noted that the bucket is cheap to make and very easy to operate.

Although this invention has been described in considerable detail, it is to be understood that such description is intended as illustrative rather than limiting, as the invention may be variously embodied and is to be interpreted as claimed.

I claim:

1. A charging bucket having at least one movable flap forming the bottom thereof, latching means for temporarily holding said bottom in locked position, and an automatic trip release adapted to strike a portion of a furnace when the bucket is lowered into the furnace to release said flap, said trip release being inoperative when in horizontal position and being pivotally mounted to swing into vertical position for tripping action.

2. A charging bucket having a bottom having at least one movable flap, latching means for holding said bottom temporarily in closed position, said latching means being carried below the bottom of said bucket, and an automatic trip member extending downwardly from the bucket during the lowering of the bucket into a furnace, whereby said trip member is adapted to strike the bottom of a furnace and release the latching means allowing the flap to open and discharge the contents of the bucket, said trip member being longitudinally movable upwardly to releasing position.

3. A charging bucket having a plurality of movable flaps forming the bottom thereof, said flaps being pivoted adjacent the marginal edges of said bucket to leave an unobstructed full open bottom for the bucket when said flaps are open, latching means for temporarily holding said bottom in locked position, said latching means being carried below the bottom of said bucket, and an automatic trip release adapted to strike a portion of a furnace, when the bucket is lowered into the furnace, to release said flaps.

4. A charging bucket having a bottom formed of a plurality of movable flaps, said flaps being pivoted adjacent the bottom of said bucket and outside of and adjacent to the marginal outline of said bucket, latching means for holding said bottom temporarily in closed position, said latching means being carried below the bottom of said bucket, and an automatic trip member extending downwardly from the bucket during the lowering of the bucket into a furnace, whereby said trip member is adapted to strike the bottom of a furnace and release the latching means allowing the flaps to open and discharge the contents of the bucket.

5. A charging bucket having a bottom formed of a plurality of hinged interlocking flaps, a single latching means for holding all of the flaps temporarily latched, and an automatic trip means adapted to project downwardly from said latching means for striking the bottom of a furnace, said trip means being hinged to said latching means and being longitudinally movable upwardly to release said latching means, and releasing said latching means whereby said bucket may discharge the contents thereof into the furnace.

6. A charging bucket having a bottom formed of a plurality of movable flaps, latching means for said flaps for temporarily holding said flaps closed, an automatic trip rod projecting from said latching means and adapted to hang downwardly from beneath the bottom of said bucket to trip said latching means when said bucket is lowered into a furnace and said rod strikes the bottom of the furnace, and means adjacent the periphery of the bucket for temporarily locking said rod against releasing motion.

7. A charging bucket having a bottom formed of a plurality of movable flaps, latching means for said flaps for temporarily holding said flaps closed, an automatic trip rod pivoted to and projecting from said latching means and adapted to hang downwardly from beneath the bottom of said bucket to trip said latching means when said bucket is lowered into a furnace and said rod strikes the bottom of the furnace, and means for temporarily locking said rod against releasing motion, said means being accessible from adjacent the side of the bucket.

8. A charging bucket having a bottom formed of a plurality of movable flaps, latching means for said flaps for temporarily holding said flaps closed, an automatic trip rod pivoted to and projecting from said latching means and adapted to hang downwardly from the bottom of said bucket to trip said latching means when said bucket is lowered into a furnace and said rod strikes the bottom of the furnace, means for temporarily locking said rod against releasing motion, and locking means including a pin adjacent the side of the bucket for temporarily locking said releasing rod against motion.

9. A charging bucket having a bottom provided with a plurality of flaps hinged adjacent the sides and bottom edge of the bucket, two of said flaps being adapted to be locked together and the remaining of said flaps being supported by said two flaps, locking means for temporarily locking said two flaps against motion, and trip means projecting from said locking means and adapted to strike a portion of a furnace when said bucket is lowered into said furnace to thereby release said flaps.

10. A charging bucket having a bottom provided with a plurality of flaps hinged adjacent the sides and bottom edge of the bucket, two of said flaps being adapted to be locked together and the remaining of said flaps being supported by said two flaps, locking means for temporarily locking said two flaps against motion, trip means projecting from said locking means and adapted to strike a portion of a furnace when said bucket is lowered into said furnace to thereby release said flaps, and means for temporarily locking said releasing means against releasing motion.

11. A charging bucket having a bottom provided with a plurality of flaps hinged adjacent the sides of the bucket, two of said flaps being adapted to be locked together and the remaining of said flaps being supported by said two flaps, locking means for temporarily locking said two flaps against motion, trip means projecting from said locking means and adapted to strike a portion of a furnace when said bucket is lowered into said furnace to thereby release said flaps, and a hood for protecting said locking means, said trip means and said flaps moving outwardly from the bottom of said bucket when released.

12. A charging bucket comprising a body portion having upwardly projecting side walls, a bottom having a plurality of flaps, locking means carried by one of said flaps, a second of said flaps having a projecting tongue normally engaging said locking means and held thereby, the remaining flaps resting upon the first and second mentioned flaps, and automatic releasing means adapted to strike a portion of a furnace when the charging bucket is lowered into the furnace to release said locking means, said releasing means and said flaps moving outwardly from the bottom of said bucket when released.

13. A charging bucket comprising a body portion having upwardly projecting side walls, a bottom having a plurality of flaps, locking means carried by one of said flaps, a second of said flaps having a projecting tongue normally engaging said locking means and held thereby, the remaining flaps resting upon the first and second mentioned flaps, and automatic releasing means adapted to strike a portion of a furnace when the charging bucket is lowered into the furnace to release said locking means, said releasing means and said flaps moving outwardly from the bottom of said bucket when released.

14. A charging bucket having side walls and having a bottom composed of a plurality of hinged flaps, one of said flaps having releasing means including a pair of spaced plates hinged to said flap and having a transverse spacer between said spaced plates, a second flap having a projecting tongue normally supported from said spacer and other flaps supported from said first and second mentioned flaps, and means for rocking said locking means to withdraw said spacer from said tongue.

15. A charging bucket having side walls and having a bottom composed of a plurality of hinged flaps, one of said flaps having releasing means including a pair of spaced plates hinged to said flap and having a transverse spacer between said spaced plates, a second flap having a projecting tongue normally supported from said spacer and other flaps supported from said first and second mentioned flaps, and a trip rod pivoted to said locking means and adapted to hang downwardly to trip said locking means when said trip rod strikes the bottom of a furnace upon lowering of the bucket into the furnace.

16. A charging bucket having side walls and having a bottom composed of a plurality of hinged flaps, one of said flaps having releasing means including a pair of spaced plates hinged to said flaps and having a transverse spacer between said spaced plates, a second flap having a projecting tongue normally supported from said spacer, and other flaps supported from said first and second mentioned flaps, a trip rod pivoted to said locking means and adapted to hang downwardly to trip said locking means when said trip rod strikes the bottom of a furnace upon lowering of the bucket into the furnace, and means for holding said trip rod out of vertical position and temporarily locking said trip rod against motion.

17. A charging bucket having vertical side walls and having a bottom composed of a plurality of hinged flaps, one of said flaps having locking means and a second of said flaps having a projecting tongue normally engaging said locking means and held thereby, the remaining flaps resting upon the first and second mentioned flaps, certain of said flaps having elongated flanges underlapping adjacent flaps for substantially the full length of the adjacent edges of said flaps, a rod pivoted to said locking means and adapted to swing downwardly into vertical position to trip said locking means when said bucket is lowered into a furnace and said rod strikes the bottom of said furnace, and means for holding said rod horizontally when said flaps are in closed position and for locking said rod against longitudinal motion.

18. A suspension charging bucket comprising a bucket body designed to receive a load through its top and thereafter discharge the same through the bottom thereof, a hinged bottom construction

for the lower end of said body, comprising triangular bottom sections each hinged at its base to the lower end of the bottom, and latching means below the bottom, comprising a hook fixed
5 on one section, an element pivoted on the opposite section to upwardly engage and downwardly

disengage said hook, for holding said sections in closed position, and means provided on the one section for disengaging said element from the hook.

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