Aug. 1, 1950 R. P. ALLEN, JR., ET AL 2,516,840

EXHAUST HOOD

Filed March 26, 1948 3 Sheets-Sheet 1

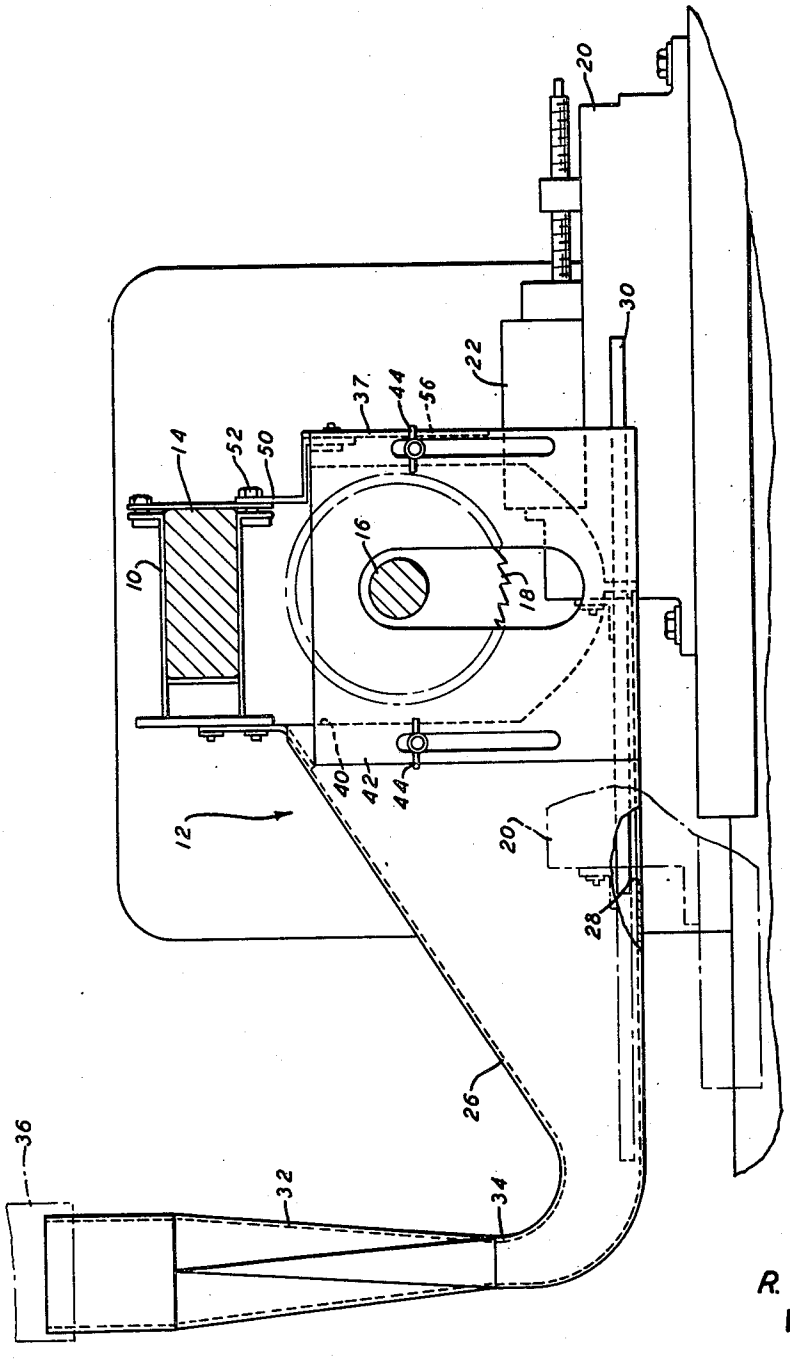


FIG. 1

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EXHAUST HOOD

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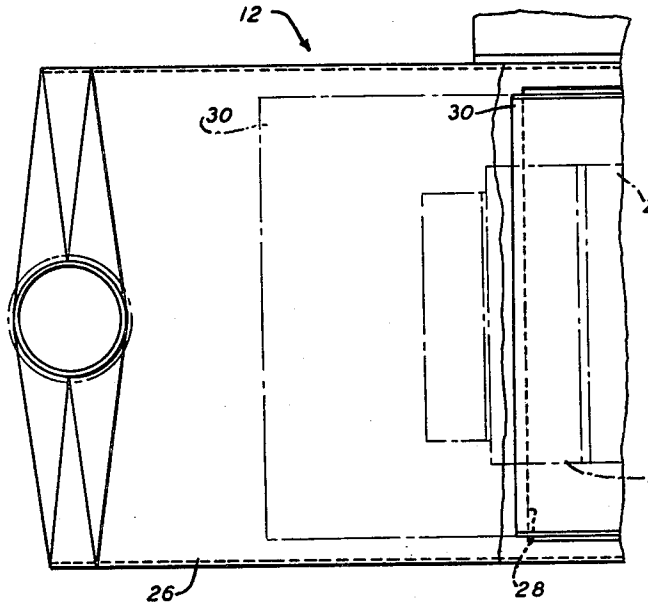


FIG. 3

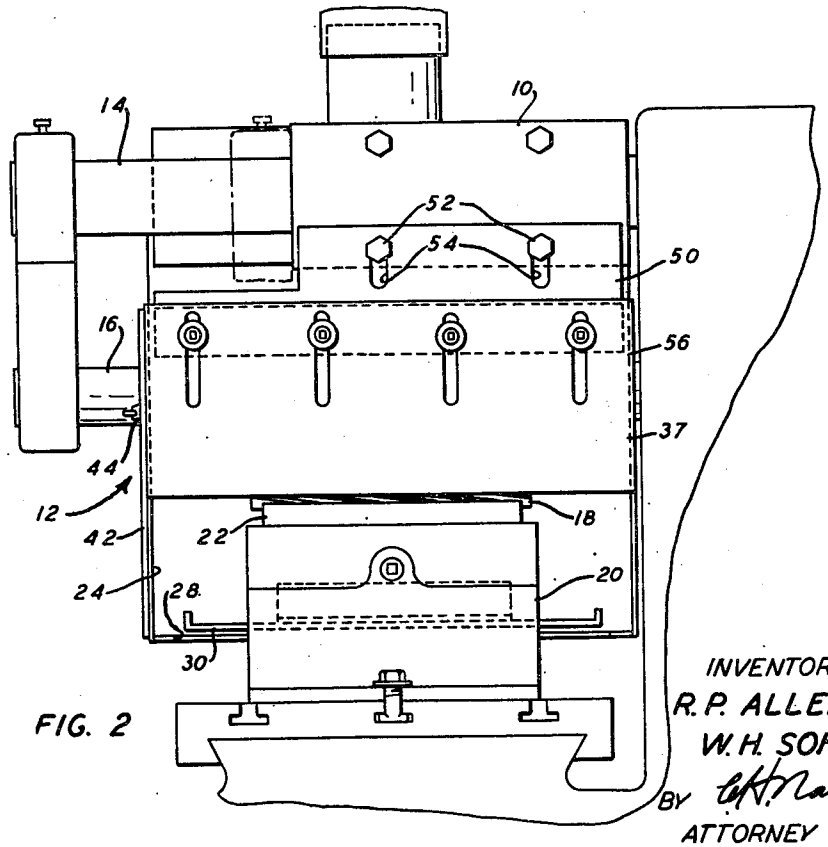


FIG. 2

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EXHAUST HOOD

Filed March 26, 1948 3 Sheets-Sheet 3

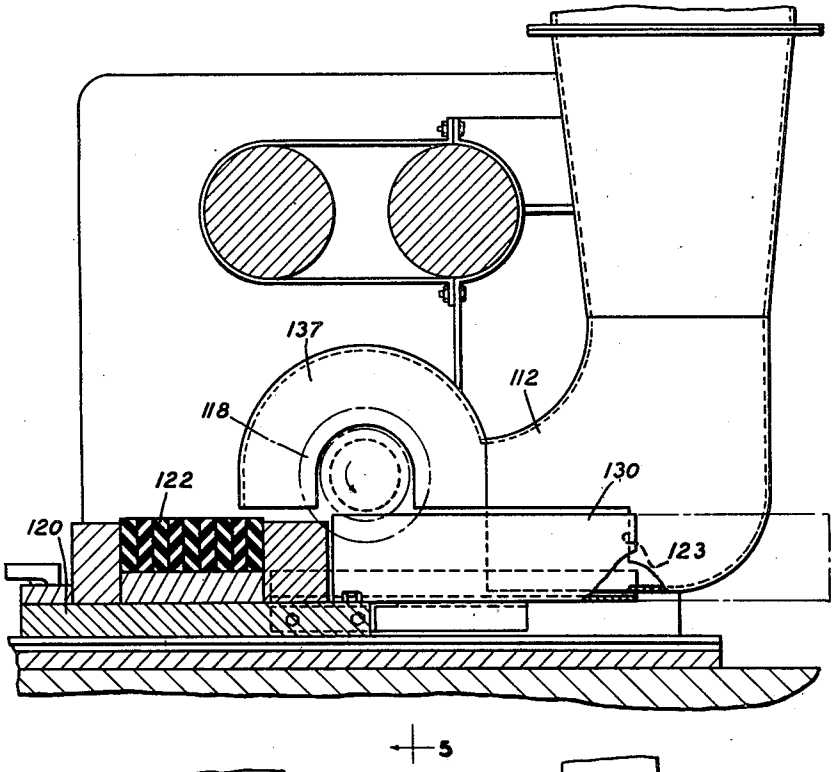


FIG. 5

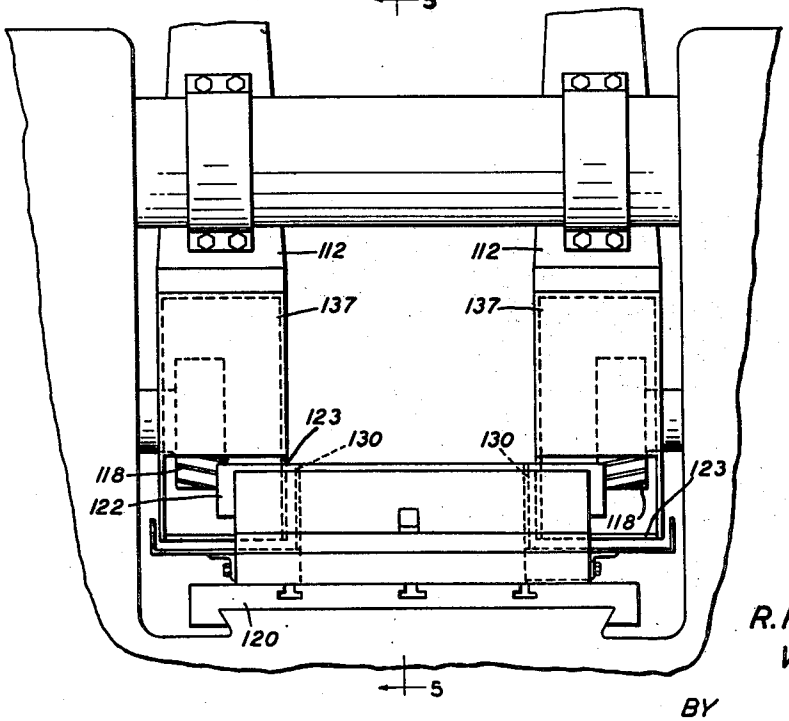


FIG. 4

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UNITED STATES PATENT OFFICE

2,516,840

EXHAUST HOOD

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Application March 26, 1948, Serial No. 17,195

9 Claims. (Cl. 90—11)

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This invention relates to exhaust hoods, and more particularly to exhaust hoods for catching and carrying away chips from cutting machines.

In the use of cutting machines to cut away portions of articles, the chips which are formed must be cleaned away from the machine. Exhaust hoods have been proposed for carrying away chips from cutting machines, but in machines where the work must be moved from positions outside exhaust hoods into engagement with the cutting tools of the machines, the exhaust hoods cannot completely enclose the cutting tools. Hence, the hoods known in the past have been ineffectual to prevent the escape of considerable portions of the chips to the area around the machine.

An object of the invention is to provide new and improved exhaust hools.

Another object of the invention is to provide new and improved exhaust hoods for catching and carrying away chips from cutting machines.

A further object of the invention is to provide new and improved exhaust hoods for substantially completely enclosing cutters during the operations of the cutters on workpieces and to permit the workpieces to be moved from positions outside the hoods into engagement with the cutters.

An exhaust hood illustrating certain features of the invention may include a nozzle positioned near a cutter and provided with an opening therein to permit a work carriage to be moved into operative relationship with a cutter, means for creating a stream of air having a high velocity through the nozzle to carry chips therethrough, and a covering carried by the carriage for closing the opening of the nozzle and fitting telescopically with respect to the nozzle to permit the carriage to be moved toward and away from the cutter.

A complete understanding of the invention may be obtained from the following detailed description of exhaust hoods forming specific embodiments thereof, when read in conjunction with the appended drawings, in which:

Fig. 1 is a vertical section of an apparatus including an exhaust hood forming one embodiment thereof;

Fig. 2 is a front elevation of the apparatus shown in Fig. 1;

Fig. 3 is a fragmentary, plan view of the apparatus shown in Fig. 1;

Fig. 4 is a front elevation of an apparatus including an exhaust hood forming an alternative embodiment of the invention, and

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Fig. 5 is an enlarged, vertical section taken along line 5—5 of Fig. 4.

Referring now in detail to the drawings, a bracket 10 secures a hood 12 to an overarm 14 of a milling machine, which includes a cutting spindle 16 having a cutter 18 mounted thereon, which rotates in a clockwise direction, as viewed in Fig. 1. A work carriage 20 may be slid from the left, as viewed in Fig. 1, to move work 22 through an opening 24 in the hood 12 into engagement with the cutter 18, which cuts chips from the work and throws them toward a tapered portion 26 of the hood 12.

The hood 12 has an opening 28 at the bottom portion thereof to permit the carriage to be moved into working relationship with respect to the cutter 18, and to prevent chips from falling through the opening 28, a pan 30 secured to the carriage fits telescopically into the lower portion of the hood and covers the opening 28 at all times that the cutter 18 is in engagement with the work.

A duct 32 connected to a restricted portion 34 of the tapered portion 26 is connected to a header 36 in which the pressure is substantially less than that of the atmosphere. The low pressure in the header 36 causes air to be drawn through the hood 12 and through the duct 32 at a very high velocity so that the chips, which are thrown toward the small end of the tapered portion 26 of the hood 12, are carried into the header from the hood 12. Part of the chips are carried by the air stream directly into the header and part fall on the pan 30 and the carriage. The chips falling on the pan and the carriage are picked up by the air stream travelling at a high velocity near the restricted portion of the hood as the pan is moved toward the small end of the tapered portion of the hood. Since the tapered portion 26 of the hood 12 is mounted in facing relationship with respect to the chips from the work 22 as the chips are thrown by the cutter, a guard portion 37 of the hood 12 enclosing the cutter 18 may be very large. That is, the chips thrown by the cutter 18 are carried by the pan and the carriage sufficiently far into the tapered portion 26 of the hood 12 to permit the stream of air flowing in the portion of the hood 12 adjacent to the cutter 18 to travel at a relatively low velocity, and the velocity of the air stream in the portion of the hood 12 over the pan 30 is high so that the chips are picked up and carried into the header.

The hood 12 is provided with a large opening 40 at an end of the spindle 16 so that after a plate 42 normally secured to the hood 12 over the open-

ing 40 by wing nuts 44—44 is removed from the hood, the spindle 16 may be detached from the machine and withdrawn with the cutter thereon for sharpening the cutter or other maintenance operations without dismantling the hood from the machine. The portion of the hood immediately adjacent to the cutter 18 is substantially larger than the cutter 18. Hence, removal of the spindle of the machine is facilitated, and due to the position of the hood with respect to the cutter, the exhaust function of the hood is not impaired by this large clearance.

A bracket 50 (Fig. 2) is secured adjustably to the bracket 10 by cap screws 52—52, which project through slots 54—54 formed in the bracket 50. A front cover 56 similarly is secured to the bracket 50 to increase the range of adjustment of the front cover with respect to the bracket 10 so that the cover 56 may always be positioned close to the top of the work throughout a wide variation in the height of work to be milled. The cover 50 increases the velocity of the air stream over the carriage, and acts as a guard against injury from contact with the cutter 18.

Certain features of the exhaust hood 12 are disclosed and claimed in copending application Serial No. 17,194, filed March 26, 1948, by R. P. Allen, Jr., F. D. Johnston and W. H. Sohn for "Exhaust Hoods."

An exhaust hook (Figs. 4 and 5) forming an alternative embodiment of the invention includes a pair of suction nozzles 112—112, which are mounted at edges of duplex cutters 118—118 and create air streams of high velocities across the faces of the cutters. In order to position the nozzles 112—112 close to the cutters 118—118 and still provide clearance for a work carriage 120 and work 122 as the carriage moves work 122 into engagement with the lower portions of the cutters, the nozzles are provided with L-shaped cutout portions 123—123. Generally L-shaped closure plates 130—130 carried by the carriage fit telescopically with respect to the housings 112—112 to completely close the cutout portions at all times while the work is in engagement with the cutters 118—118. The telescopic closure plates serve to deflect chips thrown thereagainst by the cutters back toward the nozzles 112—112, and also create high velocity air streams drawn to the nozzles 112—112 past the faces of the cutters. Guards 137—137 cover the upper portions of the cutters and cause the air being drawn into the nozzles to flow primarily across the ends of the work. The closure plates 130—130 fit around the nozzles, and carry the chips thereto.

The above-described exhaust hoods serve to remove chips formed by the cutters 18 and 118—118 much more effectively than do exhaust hoods hitherto known, and facilitate maintenance of the cutting machines with which they are associated. They maintain high air velocity air streams at the critical points and substantially cover the cutting elements throughout the cutting operations without interfering with the feed of work to the cutting elements.

What is claimed is:

1. An exhaust hood for a machine having a rotary cutter and a work carriage, which comprises a nozzle positioned near the cutter and provided with an opening in a wall thereof to permit the work carriage to be moved into operative relationship with the cutter and past the cutter, means for creating a high velocity air stream through the nozzle to carry chips therethrough, and a covering carried by the carriage for closing said opening of the nozzle and fitting telescopically with respect to the nozzle to permit the carriage to be moved toward and away from the cutter.

2. An exhaust hood for a machine having a cutter and a work carriage, which comprises a nozzle positioned on the recess side of and near the cutter and provided with an opening in the side wall thereof to permit the work carriage to be moved into operative relationship with the cutter and past the cutter, means for creating a high velocity air stream through the nozzle to carry chips therethrough, and a covering carried by the carriage for closing the open portion of the nozzle and fitting telescopically with respect to the nozzle to permit the carriage to be moved toward and away from the cutter.

3. An exhaust hood for a machine having a cutter and a work carriage, which comprises an exhaust housing positioned partially over the cutter and provided with an opening therein to permit the work carriage to be moved into operative relationship with and past the cutter, means for creating high velocity air stream through the housing to carry chips therethrough, and a covering carried by the carriage for closing the opening in the portion of the housing not closed by the carriage and fitting telescopically with respect to the nozzle to permit the carriage to be moved toward and away from the cutter.

4. An exhaust hood for a machine having a cutting tool and a carriage, which comprises a suction nozzle mounted at the side of the cutting tool opposite that toward which work is moved and adjacent to the cutting tool and being provided with a slot in the wall thereof for providing clearance for the carriage and work as the carriage moves work past the cutter toward the nozzle, and a cover mounted on the carriage and fitting the nozzle telescopically for covering the slot.

5. An exhaust hood for a machine including a cutting tool and a carriage for moving work into engagement with and past the tool, which comprises a housing, a portion of the housing fitting partially over the cutting tool for providing clearance for the carriage as the carriage moves work past the cutter, the remainder of the housing mounted on the carriage and fitting the first-mentioned portion of the housing telescopically.

6. An exhaust hood for removing chips from a machine having a rotary working tool and a reciprocatory work carriage, which comprises a housing closely surrounding the tool and having an opening in the bottom thereof to permit the reciprocatory work carriage to advance into and out of operative relationship with respect to the tool, a floor mounted on the carriage for closing the opening beneath the tool.

7. An exhaust hood for removing chips from a machine having a rotary working tool and a reciprocatory work carriage, which comprises a housing closely surrounding the tool and having an opening in the bottom thereof to permit the reciprocatory work carriage to advance into and out of operative reationship with respect to the tool, a floor fitting telescopically into the housing and mounted on the carriage, said floor constantly closing the opening beneath the tool.

8. In an apparatus including a cutter and a carriage for moving work in a predetermined direction into engagement with and past the cutter, an improved exhaust hood, which comprises a suction nozzle having an opening in the side wall thereof mounted at the side of the cutter

opposite to that toward which the work is moved and in a position pointed in a direction opposite to said direction of movement of the carriage, said opening in the nozzle serving to provide clearance for the carriage and the work as the work is moved past the cutter, and a cover carried by the carriage and fitting the nozzle telescopically to cover the portion of the opening not occupied by the carriage and the work.

9. In an apparatus including an end cutter and a carriage for moving work in a predetermined direction into engagement with and past the cutter, an improved exhaust hood, which comprises a suction nozzle generally rectangular and having L-shaped openings in adjacent walls thereof mounted at the side of the cutter opposite to that toward the work is moved and in a position pointed in a direction opposite to said direction of movement of the carriage, said opening in the

nozzle serving to provide clearance for the carriage and the work as the work is moved past the cutter, and an L-shaped cover carried by the carriage and fitting the nozzle telescopically to cover the portion of the opening not occupied by the carriage and the work.

RAYMOND P. ALLEN, JR.
WILLIAM H. SOHN.

REFERENCES CITED

The following references are of record in the file of this patent:

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Certificate of Correction

Patent No. 2,516,840 August 1, 1950

RAYMOND P. ALLEN, JR., ET AL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows:

Column 1, line 18, for "hools" read *hoods*; column 3, line 30, for the word "hook" read *hood*; column 5, line 17, after "toward" insert *which*;

and that the said Letters Patent should be read as corrected above, so that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 13th day of February, A. D. 1951.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.