

**The Practice**  
**of**  
**Ventilation.**

**With a Comparison of the Advantages and Limits  
of Natural and Mechanical Systems.**

*(Illustrated.)*

**SUTCLIFFE FANS, 1905: MANCHESTER**

## CONCLUSION.

Although I have only been able to touch the fringe of my subject, I trust the few examples I have given will be useful, and especially that my remarks about the open window will bear some fruit. I strongly believe that it pays the manufacturer to have his workshop and factory as healthy and cleanly as possible. Fresh air is as necessary as good food if the best is to be obtained from any man, and many manufacturers already recognise this truth.

Every improvement in the factory laws has at first been opposed by the majority of employers, but as soon as the improvement has been made the manufacturer has wondered how he and his men tolerated the old conditions. The Home Office have generally done their work exceedingly well, and what is wanted now is a strong public opinion to wake up our Education Department to a sense of their duty! The air in the majority of the schools in the United Kingdom is a standing disgrace to the authorities, and a serious menace to the health of the nation.

## How to Choose a Fan!

The type of Fan is of the utmost importance to fan users if the best results are to be obtained. The nature of the work the Fan has to do, the volume of air to be moved, its velocity and pressure should all be carefully considered, and the following description of different types of Fans and their application will be found useful.

### The Sutcliffe Ventilating Fan

is of the well-known propellor type, and is shown and described on ps. 53-55. It is the most suitable Fan for moving large volumes of air against very small resistance, general ventilation, removing floating steam or dust, and is generally belt driven, but can be equally well coupled direct to an electric motor or steam engine as shewn on page 55. See page 54 for sizes, speeds, capacities, horse-powers, etc.

### The Sutcliffe Ventilating Steel Plate Fan

Is shown on page 42. It is designed for blowing or exhausting large volumes of air at a moderate pressure through ducts or other channels where the air passage is more or less restricted. It can be run at high speeds to give a water-gauge of 5in. or more, but is most suitably employed at pressures of from  $\frac{1}{2}$ in. to 3in. water-gauge. This Steel Plate Fan is made with casing to completely enclose the Fan wheel, called Full Housing Pattern as shewn on page 45, and also with three-quarter housing as page 46. The latter type is mostly used where the discharge is to be underground or height is important. A table of speeds, sizes, capacities and horse-powers will be found on page 47.

### The Sutcliffe Induced Draught Fan

is built on the same lines as the Ventilating Steel Plate Fan, but made stronger. It is illustrated on page 48, and a description of the salient points is given on page 43.

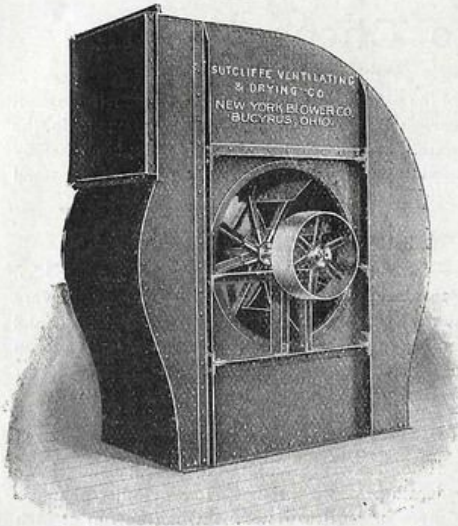
### The Sutcliffe P.M. Fan

Or Planing Mill Exhauster, on page 49, is the Fan to use for exhausting and conveying dust, shavings, chips, wool, &c., where high pressures are required. It will give a pressure up to 20in. water-gauge, and the sizes, &c. will be found on page 50.

### The Sutcliffe Peerless Fans

Are designed for blowing Cupolas, Smiths' Fires, and other work where high pressures are wanted, without a large volume of air being moved. The sizes are the same as the diameter of the inlet and outlet, but for any size above a No. 14, the P.M. Fan is usually preferable. The pressure of air delivered can be varied according to the speed from 1in. to 20in. water-gauge, and the general sizes, speeds and capacities are given on page 52.

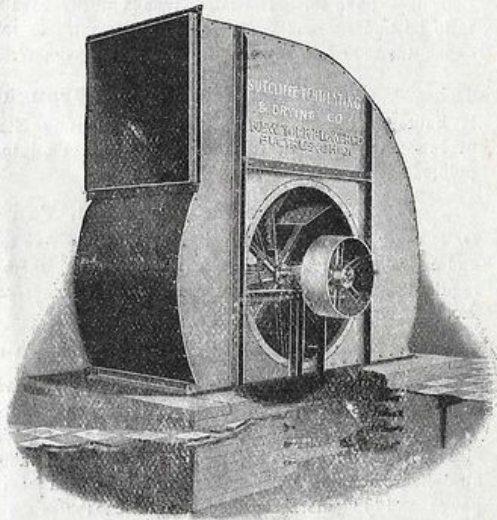
**SUTCLIFFE STEEL PLATE VENTILATING FANS,  
BELT-DRIVEN FANS.**



Right Hand Top  
Horizontal  
Discharge Full  
Housing Type Fan,  
with  
Overhung Pulley.

Our Three-quarter Housed Fans are constructed on the same lines and principles as our Full Housed Fans. They are mostly used in positions where the height is insufficient for a Full Housed Fan and are necessary with under-ground ducts where the discharge is directly into the ducts.

Right-hand Top  
Horizontal  
Discharge Three-  
quarter Housing  
Type Fan, with  
Overhung Pulley.



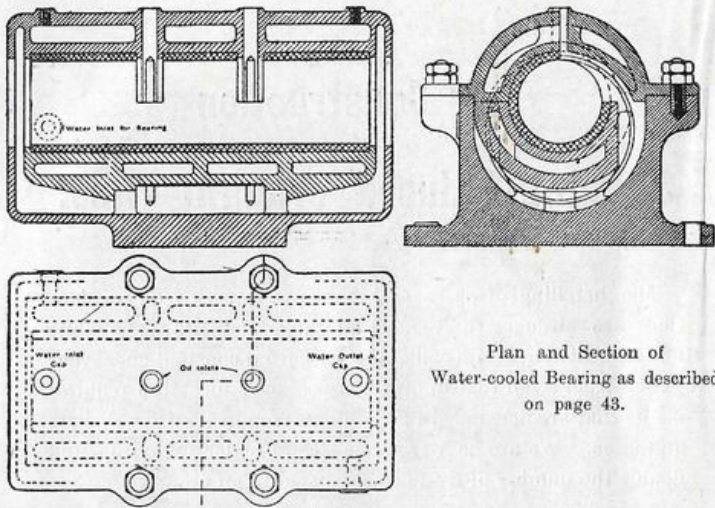
## The Construction OF Sutcliffe Induced Draught Fans.

The handling of gases at high temperatures requires fans that are stronger and more durable than fans handling hot air heated by steam coils. It has been our constant endeavour to construct a fan that in every respect will meet the requirements that are demanded in a fan handling gases from boilers and kilns. We use heavier gauge steel, heavier angle iron, and double the number of rivets as compared to an ordinary fan.

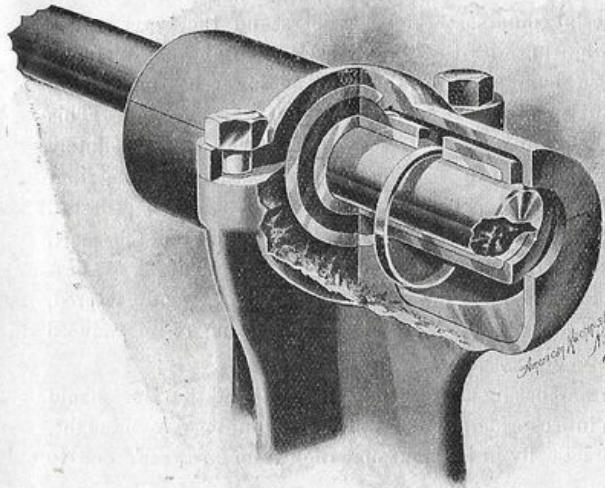
One of the strong points of our Induced Draught Fan is the water-cooled bearing, illustrated on page 44. This bearing consists of a heavy sole plate, which rests on the grillage. The pedestal contains the oil chambers and the lower water-jacketed bearing with the water-jacketed cap above. Water is introduced by pipes into the cap and lower bearing, giving a constant circulation of water entirely around the shaft. This keeps the temperature of the shaft down, and absolutely prevents heating of the bearing. These boxes are double ring-oiling, the oil being contained in chambers in the pedestal. The rings passing through this oil and revolving on the shaft, maintain a perfect lubrication of the bearing. This is the best constructed and most durable water-cooled box manufactured, and is an essential to the successful working of an Induced Draught Fan.

When purchasing a fan for induced draught the fact should be taken into consideration that the fan is running day and night, and is practically in constant operation from one year's end to the other.

For this kind of service the best is none too good, and you will make no mistake in installing one of our fans. They have stood the test, and will not fail at the critical time.



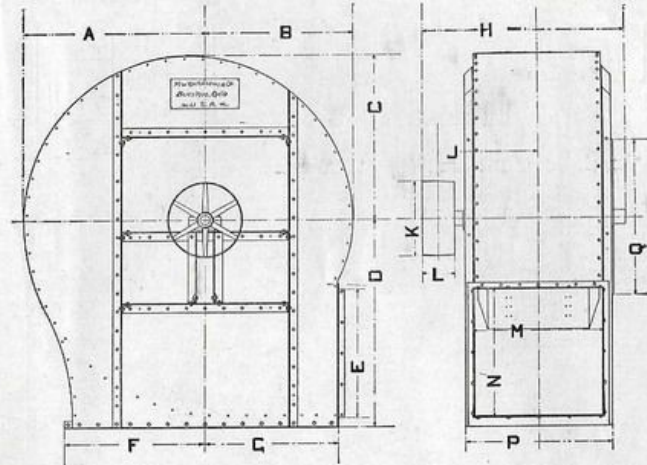
Plan and Section of Water-cooled Bearing as described on page 43.



This Journal Box is our Standard Ring oiling Ball and Socket Type; it consists of an internal sleeve mounted in a substantial casting. The alignment is absolutely perfect, and as the sleeve is protected by the outer casing, it is impossible to accidentally disturb the adjustment.

The outer casing is utilised as an oil-reservoir. The oil is fed from this reservoir to the shaft by the ring.

Wherever conditions make it advisable we furnish a water-jacketed bearing. This is especially desirable where fans are used for handling hot gases from cooling kilns and in mechanical draught plants.



Full Housing Type, Bottom Horizontal Discharge Steel Plate Exhausters with Overhung Pulleys.

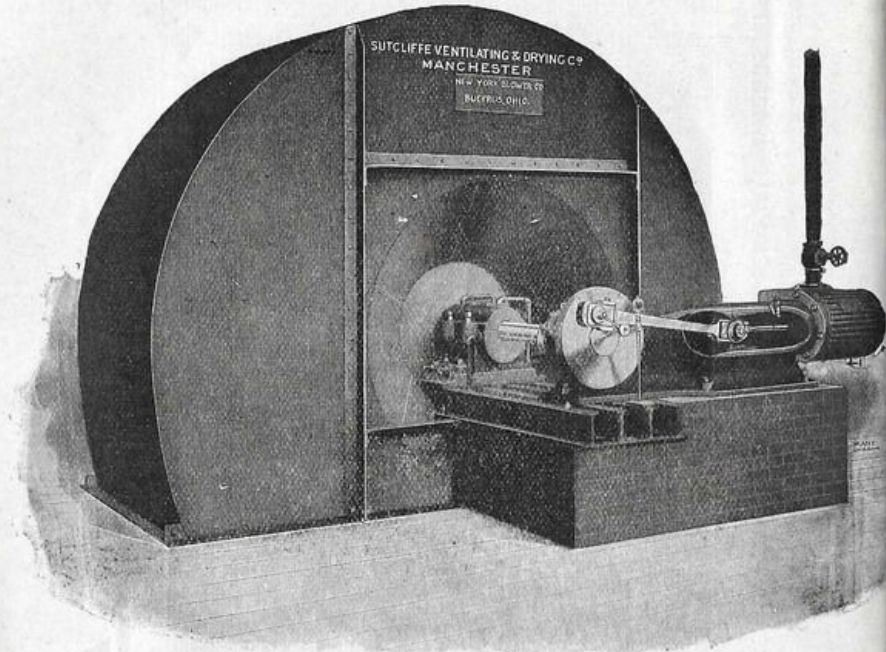
Table of Principal Dimensions.

Size	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
40	18½	15½	17	23	12½	16½	14½	25½	12½	8	4½	12½	12½	17½	18
45	20½	17½	19	25½	14	18	16½	26½	13½	9	4½	14	14	19	20
50	23½	19½	21½	28½	15½	20½	18	29½	14½	10	6½	15½	15½	20½	22
55	25½	21½	23½	31	17	21½	19	30½	14½	11	6½	17	17	22	24
60	28½	23½	26	34	20½	23½	21½	34½	16½	12	6½	20½	20½	25½	26
70	33½	27½	30½	39½	24	27½	25	40½	19½	14	6½	24	24	29	30
80	38½	31½	35	45	27½	30½	28½	44½	21½	16	6½	27½	27½	32½	34
90	43½	35½	39½	50½	31	34½	32	51½	24½	18	8½	31	31	36	38
100	48½	39½	44	56	34½	38½	35½	54½	26½	20	8½	34½	34½	39½	42
110	53½	43½	48½	61½	38	41½	39	60½	29½	22	8½	38	38	43	46
120	58½	47½	53	67	41½	45½	42½	65½	32½	24	10½	41½	41½	46½	50
130	63½	51½	57½	73	45	49½	46	70½	34½	26	10½	44½	45	51½	54
140	68½	55½	62	78½	48½	53½	49½	78½	35½	28	10½	47	48½	54	58
150	73½	59½	66½	84	52	57	53	77½	37½	30	10½	49½	52	56½	62
160	78½	63½	71	89½	55½	60½	56½	80½	39½	32	10½	52½	55½	59½	66
170	83½	67½	75½	95	59	64½	60	88½	40½	34	10½	55½	59	62½	70
180	88½	71½	80	100½	62½	67½	63½	86½	42½	36	10½	58	62½	65	74
190	93½	75½	84½	106	66	71½	67	90½	44½	38	10½	60½	66	67½	78
200	98½	79½	89	112½	69½	75½	70½	93½	45½	40	10½	63½	69½	72½	82
220	108½	87½	98	123½	76½	82½	77½	100½	48½	44	12½	69	76½	78	90
240	118½	95½	107	134½	83½	90½	84½	108½	53½	48	12½	74	83½	83½	98
260	128½	103½	116	145½	90½	97½	91½	118½	55½	52	12½	80	90½	89	106
280	138½	111½	125	156½	97½	104½	98½			56	14½	85½	97½	94½	114
300	148½	119½	134	167½	104½	111½	106½			60	14½	91	104½	100	122
320	158½	127½	143	178½	111½	119½	112½			64	14½	96½	111½	106½	130

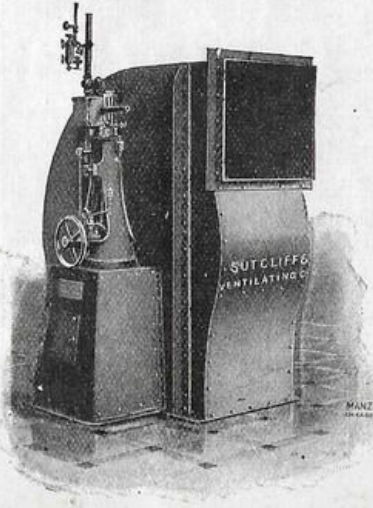
Note.—All Dimensions are in inches. Dimensions of inlet and outlet are outside measurements.



**SUTCLIFFE INDUCED DRAUGHT FAN.  
FANS DIRECT COUPLED TO STEAM ENGINES.**



Three-quarter Housing Type, with Water-cooling Bearing and Special Grillage for Over-hung Fan Wheel and Direct-coupled Engine.  
All our Fans are fitted with Ring-oiling Ball and Socket Bearings.

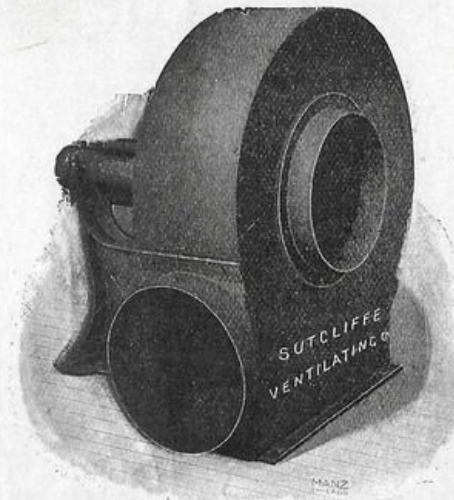


In application and usage our Steam-driven Fans are identical with our Pulley Fans. The direct-connected Engine makes them independent, and variation in speed is easily attainable. Fans can be run with Horizontal or Vertical Engines, or with Electric Motors as preferred.

## **Sutcliffe P.M. Exhausters.**

For circulating large volumes of Air for Induced Draught, Heating and Ventilating, Drying, and any purpose where a moderate pressure only is required, users cannot do better than order one of the Fans illustrated on the preceding pages. We make them in all the sizes shown, and they will move from 1,200 to 300,000 cubic feet of air per minute at pressures from  $\frac{1}{4}$  oz. to 8 oz.

The Removal of Shavings and Sawdust from Wood-working Shops, Dust and Trimmings from Tanneries, Dust from Emery and Polishing Wheels, the Conveying of Cotton, Wool, &c., demands a higher pressure, and for this purpose we recommend our Steel Plate P.M. Exhauster as illustrated below. This Exhauster, with the exception of the cast-iron base plate, inlet and outlet rings, and the heavy pedestal, is made throughout of steel plate reinforced by substantial wrought-iron frame. This construction enables the Exhauster to sustain the sudden strain caused by blocks, &c., passing through it, and which would quickly wreck an ordinary cast-iron Exhauster. It is made in the sizes given on the opposite page, and will give any water gauge up to 8 oz.



Inlet Side of Left-hand Bottom Horizontal Discharge Exhauster.

These Steel Plate Exhausters are regularly built to discharge horizontally or vertically, at the top or bottom, and are carried in stock with the inlet on either side. Customers should be particular to specify the Discharge and Hand of Exhauster they desire.

Table of Dimensions of  
Bottom Horizontal Discharge Steel Plate P.M. Exhausters.

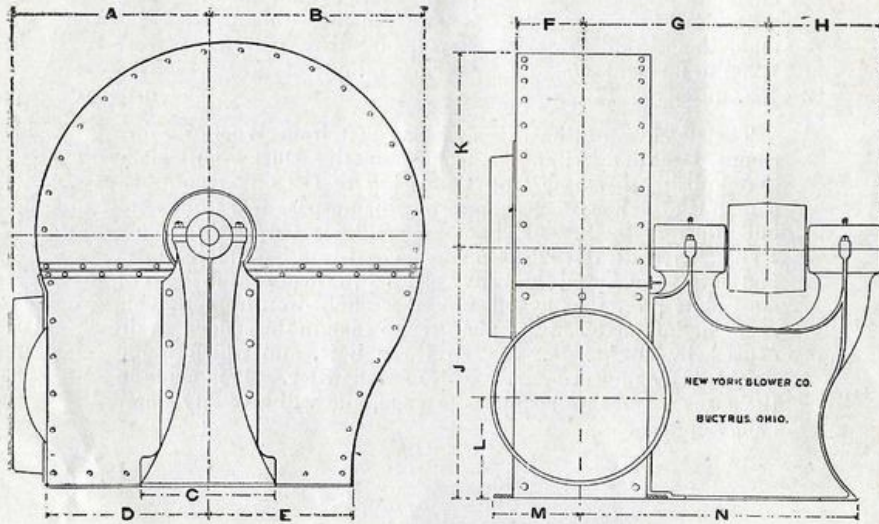


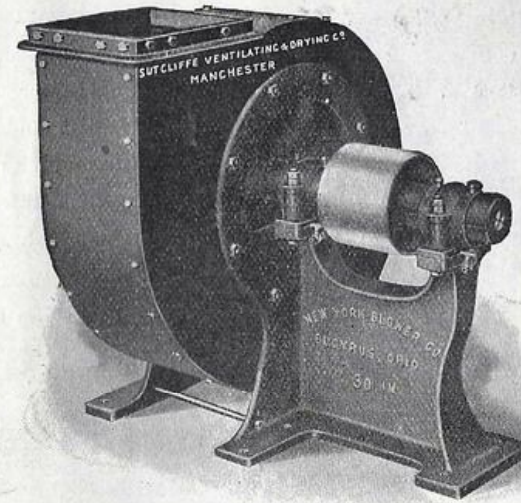
Table of Principal Dimensions,

Size	A	B	C	D	E	F	G	H	J	K	L	M	N	Diameter of Pipe Fitting Inlet.	Size of Pipe Fitting Outlet.	PULLEY	
																D	F
25	11 $\frac{3}{4}$	12 $\frac{1}{4}$	7 $\frac{1}{2}$	9 $\frac{1}{2}$	7 $\frac{3}{4}$	8 $\frac{3}{4}$	13 $\frac{1}{2}$	9 $\frac{1}{2}$	14	11	6	5 $\frac{1}{2}$	21 $\frac{1}{2}$	10 Diam.	10 Diam.	5	5
30	13 $\frac{3}{4}$	14 $\frac{3}{4}$	9	10 $\frac{1}{2}$	9 $\frac{1}{2}$	4 $\frac{1}{2}$	14 $\frac{1}{2}$	9 $\frac{1}{2}$	17	13	7	6 $\frac{1}{2}$	22 $\frac{1}{2}$	12	12	6	5 $\frac{1}{2}$
35	15 $\frac{3}{4}$	16 $\frac{1}{2}$	10 $\frac{1}{2}$	12 $\frac{3}{4}$	11 $\frac{3}{4}$	5 $\frac{1}{2}$	16 $\frac{1}{2}$	11	20	15	8 $\frac{1}{2}$	7	25 $\frac{1}{2}$	14	14	7	6
40	18 $\frac{1}{2}$	19 $\frac{1}{4}$	12	14 $\frac{3}{4}$	12 $\frac{1}{2}$	6	17 $\frac{1}{2}$	11 $\frac{1}{2}$	22 $\frac{1}{2}$	17 $\frac{1}{2}$	9 $\frac{1}{2}$	7 $\frac{1}{2}$	26 $\frac{1}{2}$	16	16	8	6 $\frac{1}{2}$
45	18 $\frac{1}{2}$	22	13 $\frac{1}{2}$	16 $\frac{1}{2}$	13 $\frac{1}{2}$	6 $\frac{1}{2}$	19 $\frac{1}{2}$	12 $\frac{1}{2}$	25	20	10 $\frac{1}{2}$	8 $\frac{1}{2}$	20 $\frac{1}{2}$	18	18	9	7 $\frac{1}{2}$
50	22 $\frac{1}{2}$	24 $\frac{1}{2}$	15	18 $\frac{1}{2}$	15 $\frac{1}{2}$	7 $\frac{1}{2}$	21 $\frac{1}{2}$	13 $\frac{1}{2}$	28	22	11 $\frac{1}{2}$	9 $\frac{1}{2}$	31 $\frac{1}{2}$	20	20	10	8 $\frac{1}{2}$
55	24 $\frac{1}{2}$	26 $\frac{1}{2}$	16 $\frac{1}{2}$	20	17	8 $\frac{1}{2}$	23 $\frac{1}{2}$	14 $\frac{1}{2}$	31	24	12 $\frac{1}{2}$	10 $\frac{1}{2}$	35 $\frac{1}{2}$	22	22	11	9 $\frac{1}{2}$
60	26 $\frac{1}{2}$	28 $\frac{1}{2}$	18	21 $\frac{1}{2}$	19 $\frac{1}{2}$	9	24 $\frac{1}{2}$	15 $\frac{1}{2}$	34	26	14	11	37 $\frac{1}{2}$	24	24	12	10 $\frac{1}{2}$
70	28 $\frac{1}{2}$	33 $\frac{1}{2}$	21	25	22	10 $\frac{1}{2}$	28 $\frac{1}{2}$	17 $\frac{1}{2}$	40	30	16 $\frac{1}{2}$	12 $\frac{1}{2}$	41 $\frac{1}{2}$	28	29 $\frac{1}{2}$ x 21 $\frac{1}{2}$	14	12 $\frac{1}{2}$
80	33 $\frac{1}{2}$	38 $\frac{1}{2}$	24	31	23	12	31	18 $\frac{1}{2}$	45	35	18 $\frac{1}{2}$	14 $\frac{1}{2}$	46 $\frac{1}{2}$	32	33 $\frac{1}{2}$ x 24 $\frac{1}{2}$	16	14 $\frac{1}{2}$

Note.—All dimensions are in inches. Inlet and Outlet dimensions are outside measurements.

SUTCLIFFE

## Reversible Steel Plate P.M. Fan.



The Sutcliffe Reversible Steel Plate P.M. Fan is built on the same lines as our Standard P.M. Exhauster, except that the Fan casing may be turned so that the outlet points in any direction.

The wheel is of special design and construction, the back of the wheel being coned and the blades built up without rivets. There is no opportunity for stringy materials to lodge in the Fan, and it is specially suitable for handling long fibres of all kinds.

The casing on the pulley side is concave, allowing the Journal to come well inside the casing and reducing the overhang by 50%. The bearings are double-ring oiling and universal in their adjustment.

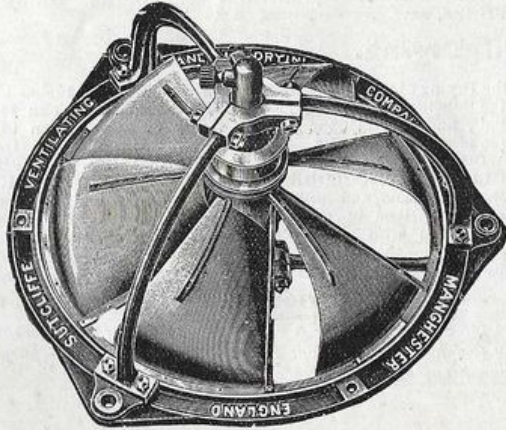
The standard sizes range from 30in. to 60in. at intervals of 5in., but larger Fans are furnished for special conveying plants, &c.

PRICES ON APPLICATION.

# PRICE LIST OF SUTCLIFFE FANS.

With Sizes, Capacities, &c.

PRICE	Diameter Max. in Inches.	Revolutions per minute.	Diameter of Pulley in Inches.	Width of Belt in Inches.	Cubic Feet of Air moved per minute.	Actual Horse Power required.	Area of Fan in Feet
d.	14	900 to 1,600	2½	1	1,100 to 1,800	½ to 1	1.0
2 10 0	18	700 " 1,300	3	1½	2,200 " 3,600	¾ to 1	1.7
4 0 0 0	24	500 " 900	4	2	4,200 " 8,000	1 to 1½	3.1
6 0 0 0	30	450 " 800	5	2½	5,800 " 10,500	1½ to 2	4.9
8 0 0 0	36	400 " 700	6	3	9,000 " 16,000	2 to 3	7.0
10 0 0 0	42	350 " 600	7	3½	14,000 " 23,000	3 to 4	9.5
13 0 0 0	48	300 " 550	8	4	16,000 " 34,000	4 to 5	12.5
16 0 0 0	60	250 " 420	10	6	23,000 " 50,000	5 to 7	19.6
26 0 0 0	72	200 " 350	14	6	30,000 " 65,000	7 to 10	28.2



Note.—All these Fans can be combined with our Electric Motor, and are very convenient to fix wherever electric current is available.

Conditions.—These prices include packing and delivery at any Railway Station in the United Kingdom or f.o.b. at any British Port. We do not charge for Crates or Cases, and do not allow for them if returned.

Further particulars &c., from

**SUTCLIFFE VENTILATING AND DRYING Co. Ltd.,**

Cathedral Corner,

Fennel Street, **MANCHESTER.**

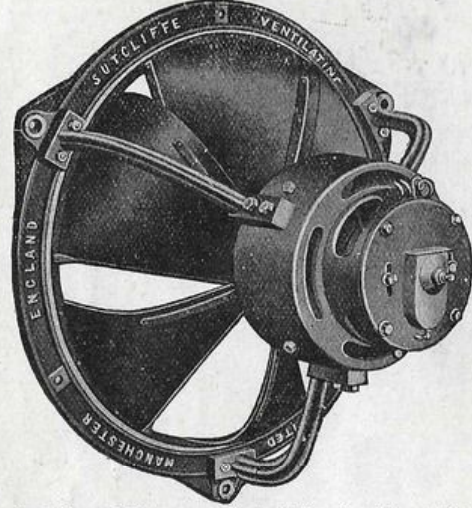
Telegrams:

"Ventilabro, Manchester."

Telephone: No. 3920.

# SUTCLIFFE ELECTRIC FAN.

The best and quietest Electric Fan on the market, and therefore



the most suitable for Ventilating Offices, Smoke Rooms, Restaurants, &c.

These combined Fans and Motors are made in all sizes from 14in. to 72in. diameter, and for any continuous current voltage up to 440. They can be fixed in any window, ceiling, or suitable opening, and are then ready for the electric wires connecting to the terminals on motor.

## SPECIFICATION OF SUTCLIFFE ELECTRIC FAN MOTORS.

- GENERAL.** These Motors are of the circular type, the yokes being constructed of steel into which wrought iron pole pieces containing field magnet coils are securely fixed. All sizes up to 36in. diameter are of the bi-polar type, larger sizes having four poles.
- ARMATURE.** The armature is built up of highest permeability charcoal sheet-iron stampings, slotted to contain armature coils.
- COMMUTATOR.** The commutator is built from hard drawn 100% conductivity bare copper strip, held together by strongly constructed driving bushes, the whole thoroughly insulated with prepared mica.
- BRUSH GEAR.** The brush gear in all cases consists of carbon brushes of ample proportions fitted to special carbon brush-holders of our own design.
- BEARINGS.** All Fans are constructed with two bearings only. Sizes above 24in. diameter are supplied with automatic ring oilers; smaller sizes having Stauffer lubricators. Whenever it is desired to fix the Fan with vertical spindle Stauffer lubricators are fitted.
- TESTING.** Before despatch all Fans are carefully balanced and tested for insulation, and also for running and general efficiency.
- CONNECTIONS.** Unless otherwise specified all Motors are series-wound, the two leads projecting through two insulated holes provided in upper side of motor shell.
- SWITCHES.** Starting switches can be supplied, single or double automatic type, for starting and regulating the Motor as may be desired.





THE VENTILATING & DRYING CO. LTD.

*Cathedral Gates*  
MANCHESTER

Telephone  
NO. 3920. CITY.

3rd. November 1914.

Messrs W. E. & J. Pebody Limited,

Lower Mount, NORTHAMPTON.

Dear Sirs,

We enclose herewith a card illustrating our new protected Hygrometer. If you do not already use Hygrometers in your drying rooms, may we suggest that it would be to your advantage to do so. When regularly noted they are most useful in assisting you to keep control over the drying.

Needless to say, we consider the Sutcliffe System of Drying is the one you should use to be able to regulate the drying independent of outside weather conditions.

We issue no catalogues of Drying Plant as each installation is designed to suit the circumstances in each case, but if you are wanting any further Drying Plant, or are prepared to consider improving your present drying installation, we shall be very pleased to tell you exactly what we can do to help you.

Yours faithfully.

P. PRO. SUTCLIFFE VENTILATING & DRYING CO., LTD.