MALYSHEV, V.A.

Phenomenological theory of one-component diffusion. Izv. vys. ucheb. zav.; fiz. 8 no.2:70-72 '65. (MIRA 18:7)

1. Taganrogskiy radiotekhnicheskiy institut.

ALEKSANDROV, Nikita Mikhaylovich, kand. med. nauk; KLEMENTOV, Anatoliy Vasil'yevich, kand. med. nauk; MALYSHEV, Vasiliy Alekseyevich, kand. med. nauk; FEDOROVSKAYA, N.V., red.

[Emergency stomatological aid] Neotlozhnaia stomatologicheskaia pomoshch'. Leningrad, Meditsina, 1965. 116 p. (MIRA 18:6)

MALYSHEV, V.A.

Almost invariant measures. Vest. Mosk. un. Ser. 1: Mat., mekh. 19 no.6:48-50 N-D '64. (MIRA 18:2)

1. Kafedra teorii funktsii i funktsional'nogo analiza Moskovskogo universiteta.

Experimental checking ... S/139/63/000/001/022/027
E202/E420

frequency characteristics. Eq.(5) was checked for the case of the photoconductivity of CdS, using as samples industrial photo-resistors type ФС-К1 (FS-K1) and ФС-К1 (FS-K2). Experiments showed that the photo-characteristics of these photoresistors were substantially linear within the whole range of values of the light flux N when plotted as $i_ф = f(\sqrt{N})$. The light beam from a small lamp was modulated mechanically and produced a well defined square wave form. Comparison of the theoretical frequency characteristics with experimental data gave close agreement when σ/σ_1 was plotted against $f(x)$. At low frequencies the experimental points fell below the theoretical curve. This was attributed to the effect of the electron traps in CdS affecting the recombination processes. Hence in the determination of the magnitude of $\sqrt{N\alpha}$ a frequency was chosen at which $\sigma/\sigma_0 = 0.2$. There are 4 figures.

ASSOCIATION: Taganrogskiy radiotekhnicheskiy institut
(Taganrog Radiotechnical Institute)

SUBMITTED: January 3, 1962

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001032000044-6

frequency f and zero frequency respectively; τ - lifetime of an electron in an excited state, f - frequency of the square wave pulses irradiating the luminophor, N - rate of generation of the current carriers per unit volume due to the irradiation, α - probability of recombination of the current carrier in a unit volume with one of the recombination centers; σ and σ_0 - amplitudes of the photoconductive pulses, σ_0 corresponding to the zero frequency of irradiation. Eq.(4) was checked for the case of cathode luminescence of $Zn_2SiO_4 \cdot Mn$ which has exponentially decaying luminescence. Cathode luminescence was studied in a 6E5C (6Ye5S) tube which was incorporated in a circuit containing a square wave pulse generator and a photoelement СЦВ (STsV) with an oscilloscope. Values of τ measured at a frequency of 10 cs were $(1.14 \pm 0.01) \cdot 10^{-2}$ sec. It was shown that with the coefficient of filling $\gamma = 0.5$, the decrease of frequency did not increase the amplitude of the luminescence, hence knowing τ and Φ_0 it was possible to determine y and Φ/Φ_0 for each measured value of frequency. A graphical comparison showed good agreement between the experimental and theoretical results of luminescence

S/139/63/000/001/022/027
E202/E420

AUTHORS: Zavadovskaya, E.P., Lazebnikov, Yu.Ye., Malyshev, V.A.

TITLE: Experimental checking of the theory of frequency characteristics of photoresistors and luminophors

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Fizika, no.1, 1963, 142-146

TEXT: The authors developed apparatus to check the two formulas

$$\frac{\Phi}{\Phi_0} = \frac{1-e^{-\frac{1}{y}}}{1+e^{-\frac{1}{y}}}; \; y = 2\tau f; \tag{4}$$

$$\frac{\sigma}{\sigma_0} = \frac{\operatorname{th}\frac{1}{x}}{1 + x\operatorname{th}\frac{1}{x}}; \quad x = \frac{2f}{\sqrt{N\alpha}} . \tag{5}$$

where Φ and Φ_0 are the luminescence pulse amplitudes at a

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001032000044-6

L 16211-63 EWT(1)/BDS AFFTC/ASD

ACCESSION NR: AR3005176 S/0058/63/000/006/H027/H027

SOURCE: RZh. Fizika, Abs. 6 Zh170

51

AUTHOR: Maly*shev, V. A.

TITLE: Principles of calculation of the coupling of a resonator and a transmission line

CITED SOURCE: Sb. Vopr. elektroniki i elektrodinamiki sverkhvy*sokikh chastot, Taganrog, 1962, 50-60

TOPIC TAGS: coupling loop, round loop, square loop, resonator coupling, transmission line coupling

TRANSLATION: The parameters of a round and rectangular loop for the coupling of a resonator with a transmission line are calculated; the coupling is assumed to be inductive. Assuming the parameters of the resonator and of the transmission line and the resonant-circuit efficiency specified, the main parameters of the coupling loop are calculated. The use of the theory developed is illustrated with specific examples wherein a round and a rectangular loop are designed for a transmission line for the 10 cm band. Yu. Pirogov.

DATE ACQ: 15Jul63 SUB CODE: GE, SP ENCL: 00

Card 1/1

if the boundary conditions are $\nu|_{r=r_1} = \nu_1$ and if $\nu|_{r=r_2} = \nu_2$. The gas flow through a cylindrical surface of unit length is obtained from

$$Q = -D_0 2\pi r \frac{d(\ln \nu)}{dr} = 2\pi D_0 \frac{\ln \frac{\nu_1}{\nu_2}}{\ln \frac{r_2}{r_1}}. \quad (9).$$

The solution of (4) for a stationary central-symmetrical diffusion takes the form

$$\nu = \left[\nu_1^{R_1(R_2-R)} \nu_2^{R_2(R-R_1)}\right]^{\frac{1}{R(R_2-R_1)}}, \quad (10)$$

subject also to

$$Q = -4\pi R^2 D_0 \frac{d(\ln \nu)}{dR} = \frac{4\pi D_0 R_1 R_2}{R_2 - R_1} \ln \frac{\nu_1}{\nu_2}. \quad (11)$$

if the boundary conditions are analogous as above.

ASSOCIATION: Taganrogskiy radiotekhnicheskiy institut (Taganrog Radio Engineering Institute)

SUBMITTED: March 20, 1962 (initially)
June 26, 1962 (after revision)

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001032000044-6

C the Sutherland constant, σ the diameter of the molecule, ν the concentration. If the boundary conditions are $\nu|_{x=x_1} = \nu_1$ and $\nu|_{x=x_2} = \nu_2$ and the diffusion is one-dimensional the stationary solution of (4) can be written in the form

$$\nu = \nu_1^{\frac{x_2-x}{x_2-x_1}} \nu_2^{\frac{x-x_1}{x_2-x_1}} . \qquad (6).$$

For the gas flow through the unit cross-section

$$Q = -D_0 \frac{d(\ln \nu)}{dx} = \frac{D_0}{x_2 - x_1} \ln \frac{\nu_1}{\nu_2}, \qquad (7)$$

is given. If Q is known, one of the boundary conditions can be found. The stationary solution of (4) with axially symmetrical diffusion can be given in the form

$$\nu = \left(\nu_1^{\ln \frac{r}{r_1}} \nu_2^{\ln \frac{r_1}{r}}\right)^{\frac{1}{\ln \frac{r_1}{r_1}}}, \qquad (8)$$

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001032000044-6

S/057/62/032/012/011/017
B104/B186

AUTHOR: Malyshev, V. A.

TITLE: Symmetrical stationary problem of isothermic gas diffusion

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 12, 1962, 1482-1483

TEXT: The stationary solution of the total differential equations

$$D_0 \nabla^2 (\ln \nu) = \frac{\partial \nu}{\partial t}, \quad (4)$$

$$D_0 = \nu D = \frac{2T}{3\pi\sigma^2 (T + C)} \sqrt{\frac{kT}{\pi m}}. \quad (5)$$

describing the isothermic diffusion of a single-component gas is studied.

$$D = \frac{1}{3} v\lambda; \quad v = \sqrt{\frac{8kT}{\pi m}}; \quad \lambda = \frac{1}{\sqrt{2}\,\pi\sigma^2 \nu (1 + \frac{C}{T})} \quad (3)$$

holds for the diffusion coefficient, where m is the mass of the molecule,

Card 1/3

sorption, the slope of the curve indicated by the full line toward the dashed curve decreases during evacuation thus indicating decreasing evacuation rate. Sorption is most distinct at small time constants $\left(\frac{V}{\gamma G}\right)$ and low temperatures. There are 2 figures and 5 references: 3 Soviet and 2 non-Soviet.

ASSOCIATION: Taganrogskiy radiotekhnicheskiy institut (Taganrog Institute of Radio Engineering)

SUBMITTED: April 17, 1961

X

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001032000044-6

$\left(\frac{dn}{dt}\right)_u = -\left(\frac{dn}{dt}\right)_a = \nu n - ap$. Hence the gas afflux to the system per second $\frac{dG}{dt} = kTq(\nu n - ap)$ where q is the wall area of the system. The pressure ratio is given by

$$\ddot{x} + 2\rho\dot{x} + \omega_o^2 x = 0 \quad (13)$$

where $x = p - p_f$; $\rho = \frac{\gamma}{2V}(C + kTqa) + \frac{\nu+\beta}{2}$; $\omega_o^2 = \frac{C\gamma\nu}{V}\left[1 + \frac{\beta}{\nu}\right]$ (14)

Since $\rho^2 > \omega_o^2$ is satisfied in any case and the conditions at the onset of evacuation always guarantee the inequalities $x_o < 0$; $-\dot{x}_o < (\rho + \sqrt{\rho^2 - \omega_o^2})x_o$ (17) the solution of (13) represents a monotonically decreasing function. The dependence $-\ln \frac{p - p_f}{p_{in} - p_f} = f(t)$ is represented by a straight line of the slope $\frac{C\gamma}{V}$ toward the time axis(dashed line in Fig. 1); in the case of large t, the slope may come up to $\rho - \sigma$ (full line in Fig. 1). Owing to

S/057/62/032/003/014/019
B139/B102

26.2358

AUTHOR: Malyshev, V. A.

TITLE: Effect of sorption on kinetics of evacuation of vacuum systems

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 3, 1962, 360-364

TEXT: The author develops the kinetic equation of the evacuation of vacuum systems for quasi-steady conditions in the light of a sorption which proceeds proportionally to pressure, and analyzes the effect of sorption on the evacuation parameters. If the sorption isotherm satisfies Henry's law, it follows that $\left(\frac{dn}{dt}\right)_g = \beta\left[\frac{f(p)}{\nu} - n\right]$, where n is the molecular concentration on the walls, $\left(\frac{dn}{dt}\right)_g$ describes the diffusion through the walls, β is a definite coefficient, f(p) is the adsorption per unit area, ν is the evaporation probability of a surface molecule per unit time. Desorption is characterized by the relation

Card 1/3

Theory of plate diode ... S/141/62/005/001/013/024
E203/E435

decreasing diode dimensions and increasing current density. There are 3 figures and 2 tables.

ASSOCIATION: Taganrogskiy radiotekhnicheskiy institut (Taganrog Radioengineering Institute)

SUBMITTED: April 15, 1961

Card 3/3

common cathode materials. The following conclusions are drawn. The space charge influence can only be neglected at such high anode potentials which often cannot be realized in practice or demand power dissipation beyond the anode's capability. Under more usual conditions practical errors result, for instance an extrapolation of the current-voltage curve down to zero field values will always result in too low a figure for emission current density. Richardson's method for determining emissivity and work function will give values too low for both. The author then gives a detailed method of solving the problem graphically, obtaining near approximations to actual conditions. The calculations having been based on the assumption of a uniform smooth cathode, two criteria arise to test this assumption. The experimental and theoretical values of C must coincide; the slope of the current-voltage characteristic must follow the "three halves power law". It is claimed that non fulfilment of these criteria gives a measure of the non-uniformity of the cathode. The author points out that errors arise due to finite dimensions of the diode and that these errors will increase,

S/141/62/005/001/013/024
E203/E435

9,4110

AUTHOR: Malyshev, V.A.

TITLE: Theory of plate diode with a uniform cathode under saturation conditions

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Radiofizika. v.5, no.1, 1962, 128-135

TEXT: This paper was presented at the Conference of MV and SSO SSSR on Radioelectronics, Khar'kov, 1961 and at the 7th Scientific-Technical Conference of the Taganrog Radioengineering Institute.
A quantitative evaluation is made of the effect of the space charge on the current-voltage characteristic of a plate diode (without spots and non-uniformities) a.d the consequent deviation from Schottky's law. From energy considerations the author derives formulae for a correction coefficient γ in respect of the nonuniformity of the field between the electrodes and for a dimensionless parameter C depending on the work function of the cathode material, the distance between the electrodes and the temperature. A few actual values of C are quoted for the more

B

Card 1/3

(the direction of the change of function p-p' = f(p') with time being indicated by arrows). The relations obtained can be practically applied. Equation (6) indicates that in the absence of negative sources pressure drop at the ends of the tube becomes zero. This is an advantageous criterion when examining the tightness of the system. Practical experiments were made with a vapor-oil pressure pump CДH -1 (SDN-1) in a pressure region in which the conditions of evacuation can be regarded as steady, whereas the conditions of air flow are molecular. The evacuation kinetics are determined by equation (8)

$$p - p_0 = (p_1 - p_0)\, e^{-\frac{C'}{V}t}$$

taking account of the backflow into the object, where V is the volume of the sucked-off object. There are 1 figure and 3 Soviet-bloc references.

ASSOCIATION: Taganrogskiy radiotekhnicheskiy institut (Taganrog Radio-technical Institute)

SUBMITTED: October 16, 1959

is obtained as the dependence of the pressure drop at the ends of the tubes on pressure p' at the pump. Equation (6) does not hold in the region of the initial pressures. This is explained by the fact that the flow along the tube is not constant and the conditions are quasisteady. The pressure region $p_1 - p_2 = (C/C + U)(p_1 - p_0)$ at the suction tube of the pump is the region of quasisteady conditions for the ideal case of an infinitely large volume (V) of the sucked-off object. The general dependence of the pressure difference at the ends of the tube on pressure p' is shown in the Fig.

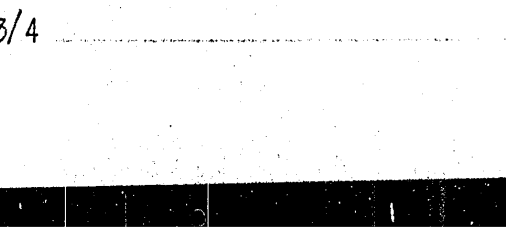


Abb.

89161

the vacuum system and simultaneously also the pressure in the exhaust tube of the pump and p_0 the limiting pressure attained by means of the pump. The limiting pressure is explained by a backflow of the gas from the pump into the system. In mechanic pumps this backflow has the same character as the passage of a gas through a small opening whose permeability K is independent of pressure. The backflow $K(p_1-p')$ increases with decreasing pressure. The resulting gas flow is given by $S_p p' = S'_p p' - K(p_1 - p')$, where p' denotes the pressure at the suction tube of the pump, if $p' = p_1$, $S_p = S'_p$, with $p' = p_0$, however, $S_p = 0$ and

$$S'_p = K\,(p_1 - p_0/p_0);\; Kp_1 = p_0(S'_p + K) \qquad (1)$$

and with $C = S'_p + K = Kp_1/p_0$ the author obtains $S_p = C(1-p_0/p')$ (2)

The relation obtained between the pressures at the ends of the tubes is

$$p - p_0 = \frac{C+U}{U}(p' - p_0); \qquad (5)$$

from which

$$p - p' = \frac{C}{U}(p' - p_0). \qquad (6)$$

S/057/61/031/002/007/015
B020/B067

26.2358

AUTHOR: Malyshev, V. A.

TITLE: Kinetics of the pumping of vacuum systems in quasisteady state

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 2, 1961, 200-203

TEXT: The published theoretical data on the pressure change with time in an evacuated vacuum system are based on the assumption that the rate of evacuation of the pump is independent of pressure but depends on the quasisteady state during the evacuation. The effective rate of evacuation in a real vacuum system depends, however, on the pressure in the system. Taking account of this dependence the kinetics of the evacuation process in the real vacuum systems can be determined more exactly. The present paper deals with this problem. All conditions are assumed to be fulfilled which are necessary to attain the quasisteady state. S_p and S are the effective rates of evacuation of the pump and the vacuum system, S_p' and S' the actual rates of evacuation of the pump, p_1 is the initial pressure in

Card 1/4

89161

MALYSHEV, V.A.

Concerning the article "Theory of a magnetron generator." Radiotekh.i elektron. 6 no.6:1030 Je '61. (MIRA 14:6)
(Magnetrons)

22898
S/109/61/006/004/012/025
E140/E135

On the theory of diode microwave oscillators

M.O. Thurston (Ref.7: Vide, 1956, Vol.12, 65, 281).
There are 4 figures and 10 references: 6 Soviet, 3 English and 1 translation from English into Russian.

SUBMITTED: February 15, 1960

Card 2/2

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001032000044-6

22898

9,2585

S/109/61/006/004/012/025
E140/E135

AUTHOR: Malyshev, V.A.

TITLE: On the theory of diode microwave oscillators

PERIODICAL: Radiotekhnika i elektronika, Vol.6, No.4, 1961, pp. 604-612

TEXT: Analysis of retarding-field diode oscillators shows that they have no substantial advantages over reflex klystrons, either in regard to the range of electronic tuning or maximum efficiency. An increase in the rate of electronic tuning (by a factor of 1.42) is balanced by a commensurate deterioration in the frequency stability. The obtained results show that the operation of diode oscillators is generally similar to the operation of reflex klystrons and that all the types of diode oscillators considered in the paper can be studied and calculated in the same way. The output parameters of diodes with a retarding field may be close to the values observed in analogous reflex klystrons. The analysis given in this paper confirms experimental results published by C.J. Carter, W.H. Cornett and

Card 1/2

21649
S/109/61/006/003/003/018
E140/E135

On the Theory of the TWT-Oscillator With Weak Feedback

that a system with normal dispersion leads to stable wide-band operation contradicts the conclusion of E. Jones (Proc. R.E., 1952, 40, 4, 478) (Ref.1) and M. Denis (Ann. radioélect 1952, 7, 29, 169) (Ref.2), that systems with anomalous dispers on should be superior. This is due to the fact that these authors in their analysis completely ignored the reactance of the electron stream. The present work is in accordance with experimental results and is analogous in character to well-established formulae in the theory of the reflex klystron.

There are 3 figures and 14 references: 10 Soviet and 4 non-Soviet.

SUBMITTED: June 27, 1960

Card 6/6

21649

S/109/61/006/003/003/018
E140/E135

On the Theory of the TWT-Oscillator With Weak Feedback

where v_0 and v_Φ are taken at the centre of the band. The electronic tuning range $\Delta\omega_p$ obtained experimentally is usually small because of the great value of the parameter B in the usual delay system. To broaden the range it is recommended to design the oscillator to satisfy the conditions

$$\left(\frac{\partial v_\Phi}{\partial \omega}\right)_0 = -\frac{4Q_H \gamma v_\Phi^2 \left(1-\frac{1}{2Q_H}\right)^2}{\omega_0^2\left(2-\frac{1}{Q_H}\right)} \simeq -\frac{2Q_H \gamma v_\Phi^2}{\omega_0^2} = -\frac{Q_H \gamma \lambda^2}{2\pi^2}\left(\frac{v_\Phi}{c}\right)^2, \qquad (21)$$

where γ and c - wave length and speed of light in the free space. Finally optimal loading for a given value of X

$$\frac{J_1(X)}{X} = \frac{G}{G_0 \cos\delta}; \qquad \frac{1}{X}\left[2\frac{1 - J_0(X)}{X} - J_1(X)\right] = \frac{G_H}{G_0 \cos\delta} \qquad (26)$$

The oscillator efficiency, time of establishment and load characteristics are also discussed. The authors' conclusion
Card 5/6

21649

S/109/61/006/003/003/018
E140/E135

On the Theory of the TWT-Oscillator With Weak Feedback

$$Y_e = 2G_0 \frac{1 - J_0(X)}{X^2} e^{-j(\delta+\pi)} = G_e + jB_e,$$

where

$$G_0 = \frac{9\varepsilon\omega I_0}{\gamma m M^2 v_0^3 (\theta^2 + \gamma^2)} = pI_0; \quad X = \frac{3\varepsilon\omega U}{m M v_\phi v_0^2 (\theta^2 + \gamma^2)} = rU; \qquad (1[illegible])$$

$$\delta = \psi - \pi = \mathrm{arc\,tg} \frac{\theta^2 - \gamma^2}{2\gamma\theta} - \pi.$$

where X is the bunching parameter. Based on these relations the author then analyzes the operation of the oscillator, determining the output power and frequency of oscillation. In particular the question of electronic tuning is considered and an approximate expression found for the whole range of $\Delta\omega_p$

$$\Delta\omega_p = \frac{\sqrt{1 - 4N^2 v_0^2 \gamma^2}}{N\left|\left(B\omega_0 v_\phi + \frac{\gamma}{\beta_0}\right)\right|}; \qquad \beta_0 = \frac{\omega_0}{v_\phi}, \qquad (24)$$

Card 4/6

21619
S/109/61/006/003/003/018
E140/E135

On the Theory of the TWT-Oscillator With Weak Feedback

$$\operatorname{tg}\psi = \frac{1 - \frac{\gamma^2}{\theta^2}}{2\frac{\gamma}{\theta}}; \quad \theta = \frac{\omega}{v_0}\rho = \frac{\omega}{v_0}\left(1 - \frac{v_0}{v_\Phi}\right); \quad \mu = \frac{\varepsilon E_1}{m v_0 \omega \left(1 - \frac{v_0}{v_\Phi}\right)}; \quad (4)$$

$$\varphi = \omega t - \omega\tau; \quad \varphi_0 = \frac{\omega x}{v_0},$$

where: τ - time of electron entry into the system; γ - propagation constant; ε - the electron charge; v_Φ - the phase velocity of the wave; v_0 - the velocity of the undisturbed electron. Examining further the interactions taking place in the system, an equivalent circuit is found (no diagram given) in the form of a parallel combination of L, C, G and G_1 elements, where G_1 represents the load losses and G the device losses. Then the electron stream represents a conductance for which there is given the expression

Card 3/6

21649
S/109/61/006/003/003/018
E140/E135

On the Theory of the TWT-Oscillator With Weak Feedback

spaced. It is assumed that measures have been adopted on the device for separation of the natural frequencies, for example by the use of a special filter in the feedback circuit, or by the use of systems with normal dispersion. This assumption permits neglect of the possibility of oscillation at several neighbouring frequencies. Finally, the analysis takes into account interaction of the flow only with a single definite space harmonic of the wave, uniquely defined by the phase velocity in the system. The analysis proceeds from the equation of motion of the electron, from which the Kepler's equation for the transit angle of the electron has been found by V.N. Shevchik (Ref.10):

$$\varphi = \varphi_0 - \frac{\mu e^{\frac{\gamma v_0 \varphi_0}{\omega}}}{\rho\left(1+\frac{\gamma^2}{\theta^2}\right)} \sin\left(\omega t - \frac{v_0}{v_\phi}\varphi - \psi\right), \quad (3)$$

where:

Card 2/6

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001032000044-6

21047

9,4230 (also 1532)

S/109/61/006/003/003/018
E140/E135

AUTHORS: Malyshev, V.A., and Mikhalevskiy, V.S.

TITLE: On the Theory of the TWT-Oscillator With Weak Feedback

PERIODICAL: Radiotekhnika i elektronika, 1961, Vol.6, No.3, pp. 363-370

TEXT: In previous work the problem of the title has been treated only qualitatively. The present article attempts to derive certain features of operation of such oscillators using the cinematic approximation. The detailed mechanism for realization of feedback is not considered, it being assumed only that the feedback factor for a given space harmonic is much less than unity and independent of the generated frequency which must be close to one of the natural frequencies of the system. These conditions are best realized in oscillators with external feedback; in oscillators with internal feedback they can be satisfied only under the condition of negligibly small interaction of the modulated electron stream with the reflected wave. These conditions are not satisfied in reflex TWT. The delay system is considered in the form of a simple resonator with natural frequencies fairly closely

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001032000044-6

34258
S/142/61/004/005/001/014
E192/E382

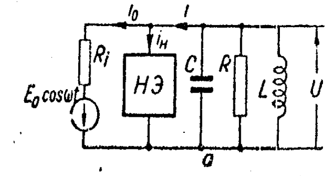
Influence of ....

There are 11 figures and 18 references: 17 Soviet-bloc and 1 non-Soviet-bloc. The English-language reference mentioned is: Ref. 18 - M. Chodorow and V. Westburg - PIRE, 1951, 39, no. 12, 1548.

ASSOCIATION: Kafedra obshchey fiziki Rostovskogo-na-Donu gos. universiteta (Department of General Physics of Rostov-on-Don State University)

SUBMITTED: May 11, 1960

Fig. 1a:



Card 6/6

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001032000044-6

34258
S/142/61/004/005/001/014
E192/E382

Influence of ....

from 0 to 100°, the frequency bandwidth between the half-power points of the output signal increased monotonically. As regards the regenerative and negative-feedback operation of the system, the amplitude monotonically decreased as the phase of the negative admittance varied from the value corresponding to the transition conditions to $\delta = 180°$. When δ changes from 0 to 180°, the regions of instability undergo considerable changes; in particular, in the pull-in and negative-feedback regimes two regions of instability and 3 different types of unstable points are encountered; when the operating conditions correspond to the transition from regeneration to pull-in, the maximum output signal increases and the bandwidth becomes reduced as δ changes from 0 to 90°. In vacuum-tube oscillators the highest gain in the regenerative system can be obtained for values of $\delta > 60°$, when an unstable region occurs within the amplification bandwidth. One of the important problems in the operation of a regenerative amplifier is the gain stability. The experiments show that stable operation of a reflex klystron amplifier can be achieved by employing the usual electronic stabilizers and that a stable gain of 20 db can be obtained.
Card 5/6

$$F(A)e^{-j(\delta+\pi)} = \frac{2j}{T}\int_0^T e^{-j\omega t} f_0(A\sin\omega t)\,dt.$$

It is also shown (Ref.6 - I.M.Kapchinskiy - Methods of the theory of oscillations in radio-engineering - Gosenergoizdat, 1954) that the conditions of stable operation of the system at the frequency ω are determined by

$$P = -\left(\frac{\partial\Phi}{\partial A} + \frac{\partial\Psi}{\partial\Theta}\right) > 0; \quad q = \left(\frac{\partial\Phi}{\partial A}\cdot\frac{\partial\Psi}{\partial\Theta} - \frac{\partial\Phi}{\partial\Theta}\cdot\frac{\partial\Psi}{\partial A}\right) > 0. \qquad (6)$$

The above expressions are employed to investigate the general case of the oscillators with weak excitation, in which $\delta \neq f/(A)$, $\delta \neq f(\omega)$, and $F \neq f(\omega)$. The formulae derived are then used to study the pull-in of a vacuum-tube oscillator and that of UHF oscillators. The case of under-excited oscillators (regenerative amplifiers) of the vacuum-tube and UHF types is also considered. The expressions derived for these systems were verified experimentally, in particular for UHF generators (reflex klystrons). From the analysis and experimentsl results, it was found that as the negative-admittance phase δ increased where $A(\tau)$ and $\Theta(\tau)$ are slowly changing functions of time. It is shown that the simplified equations for A and Θ are in the form

$$\frac{dA}{d\tau} = -\frac{1}{2\pi}\int_0^{2\pi}[hA\cos\alpha + \frac{1}{Q}A\sin\alpha + E\sin(\alpha+\Theta)]\sin\alpha d\alpha + \frac{1}{2\pi C\omega_0}\int_0^{2\pi}\frac{dI_n}{d\tau}\sin\alpha d\alpha;$$

$$\frac{d\Theta}{d\tau} = \frac{1}{2\pi A}\int_0^{2\pi}[hA\cos\alpha + \frac{1}{Q}A\sin\alpha + E\sin(\alpha+\Theta)]\cos\alpha\cdot d\alpha - \tag{3}$$

$$-\frac{1}{2\pi C\omega_0 A}\int_0^{2\pi}\frac{dI_n}{d\tau}\cos\alpha d\alpha.$$

where F is the amplitude of the first current harmonic, which is, in general, dependent not only on A but also on the frequency ω; δ is the phase difference between the first harmonic of the current i_H and voltage U and the angle π (δ is often referred to as the phase or the negative admittance of the oscillator). In general, the quantities F and δ can be determined by the method indicated in Ref.7 (Izv. vuzov SSSR - Radiotekhnika, 1960, v.3, no.5, 474) by using:

current $i_H = f_o(U)$, where U is the voltage across the linear element. By assuming that $i = i_o + i_H$ and $i_o R_i = U + E_o^2 \cos \omega t$, the system is described by the following equation:

$$\frac{d^2U}{d\tau^2} + U = hU - \frac{1}{Q}\frac{dU}{d\tau} + E \sin \tau - \frac{1}{C\omega_o}\frac{di_H}{d\tau} \qquad (1)$$

where $\tau = \omega t$, $h = 1 - \omega_o^2/\omega^2 \simeq 2\Delta\omega/\omega_o$, Q is the quality factor of the resonance circuit, $\omega_o^2 LC = 1$, $Q_B = \omega_o C R_i$ is the quality factor of the resonance circuit with load and $E_o = ER_i C\omega \simeq EQ_B$, $Q = C\omega_o RR_i/(R = R_i) \simeq C\omega RR_i/(R + R_i)$.
Since the righthand-side portion of Eq. (1) is smaller than each of the terms in the lefthand-side portion, the solution of Eq. (1) is in the form of:

$$U = A(\tau)\cos[(\tau - \Theta(\tau)] = A \cos \alpha \qquad (2)$$

34258
S/142/61/004/005/001/014
E192/E382

9.3260 (1139,1159)

AUTHOR: Malyshev, V.A.

TITLE: Influence of a small sinusoidal signal on a narrow-band oscillatory system with delayed feedback

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiotekhnika, v. 4, no. 5, 1961, 513 - 534

TEXT: The problem of the influence of a harmonic signal on a narrow-band oscillatory system with an arbitrary phase of the negative admittance is of some practical interest. Here, this problem is solved by the method of slowly-changing amplitudes. For the purpose of analysis, it is assumed that the frequency of the external signal is near to the frequency of the free oscillations of the system and that the amplitude of the signal is small. The equivalent circuit of the system can therefore be represented as shown in Fig. 1a, where the parameters R, L and C characterize the oscillatory circuit of the system; R_i is the internal resistance of the oscillator; NЭ is the nonlinear element of the oscillator and the

Card 1/6

MALYSHEV, V. A., Cand Phys-Math Sci -- "Solution of certain problems of the theory of oscillations for narrow-band generators of ultra-high frequencies." Taganrog, 1961. (Min of Higher and Sec Spec Ed RSFSR. Saratov Order of Labor Red Banner State U im N. G. Chernyshevskiy) (KL, 8-61, 1927)

21581

S/109/60/005/010/004/031

On the Theory of the Magnetron ... E033/E415

values of m and graphs of $L/\tau^2 = f(\tau)$ and $B = f(\tau)$ are constructed. Finally, the oscillator operation is analysed by representing the oscillator system of the magnetron by an equivalent parallel resonant circuit. There are 7 figures and 8 Soviet references.

SUBMITTED: December 14, 1959

Card 6/6

21581

S/109/60/005/010/004/031

 E033/E415

$$\delta = \tau - \frac{3\pi}{2} - \operatorname{arc\,tg} \frac{2\cos z\tau + (z+1)\tau\sin z\tau - z\tau^2 - 2}{2\sin z\tau - (z+1)\tau\cos z\tau + \tau(1-z)}, \quad (12a)$$

$$L = \tau\sqrt{2(z+1)^2 + (z\tau)^2 + \frac{8}{\tau^2} - 2z\left[\frac{4}{\tau} + \tau(z+1)\right]\sin z\tau - 2\left[\frac{4}{\tau^3} + 2z + 1 - z^2\right]\cos z\tau},$$

$$A = \frac{M\Theta_0 PB}{2U_0} = \frac{M\Theta_0 P}{2U_0}\sqrt{\frac{z^3}{4} + \left[(2+z) + \frac{2}{\tau^2}\right]\left(1 - \cos\frac{z\tau}{2}\right) - \frac{z}{\tau}\sin\frac{z\tau}{2}}, \quad (12b)$$

(12B)

and $z = m - 2$; δ is the phase of the electron admittance; $\tau = \Theta_0 - \alpha$ is the parameter characterizing the flight angle; P is the space charge parameter. To obtain an expression for M, the electron inter-action coefficient, two effects are considered: 1) the effect of inhomogeneity of the electric field in the direction of the electron movement and 2) the fact that the electron is acted upon by only a portion of the a.c. voltage in the gap (i.e. by the field at the edges of the gap). A rectilinear electrode configuration is assumed. The phase of the electron admittance is analysed to find the oscillation regions for various

21581

S/109/60/005/010/004/031
E033/E415

On the Theory of the Magnetron ...

$$P = \frac{\sin\frac{l\omega_p}{v_0}}{\frac{l\omega_p}{v_0}}, \tag{5}$$

where ω_o is the plasma frequency determined by

$$\omega_p = \sqrt{\left|4\pi\frac{e}{m}\rho_0\right|} = 1{,}83\cdot10^{10}\sqrt{\frac{I_0}{NF\sqrt{U_0}}} \tag{6}$$

F is the cross-sectional area of the stream (F = h, where h is the height of the block). The magnetron electron admittance Y_e is given by NY_{el} where

$$Y_{el} = \frac{I_0 M^2 \theta_0 PL}{U_0 N\tau^2}\frac{J_1(AU)}{AU}e^{-j(\delta+\pi)}, \tag{12}$$

in which

Card 4/6

n is the mode number of the oscillation: for the π-mode, $\alpha = \pi$);
I_o is the magnetron anode current. Also

$$C_k = \sqrt{A_k^2 + B_k^2}; \quad D_k = \operatorname{arc\,tg} \frac{B_k}{A_k}; \tag{2}$$

$$A_k = \sum_{n=0}^{k-2} (k-n-1) \cos n (\Theta_0 - \alpha); \quad B_k = \sum_{n=0}^{k-2} (k-n-1) \sin n (\Theta_0 - \alpha). \tag{3}$$

X_{o1} is the grouping parameter in the space between the gaps.

$$X_{o1} = \frac{M\Theta_o}{2U_o} U \tag{4}$$

where U_o is the potential which determines the undisturbed electron velocity; U is the a.c. voltage amplitude in the gap. The space charge is taken into account by multiplying the kinematic grouping parameter (Eq.(4)) by the factor

21581

oscillations; 4) analysis of the oscillator operation. The results obtained may be used for evaluating the effect of various specific factors on the output parameters (power, frequency). Shevchik showed that in an N-segment magnetron where each electron of the stream interacts with m slots, the real and reactive components of the first harmonic of current induced in the gap of each segment is determined by the expression

$$i_a = 2\frac{I_0}{N} M \sum_2^m J_1(C_k X_{01}) \sin[(k-1)(\Theta_0 - \alpha) - D_k],$$

$$i_r = 2\frac{I_0}{N} M \sum_2^m J_1(C_k X_{01}) \cos[(k-1)(\Theta_0 - \alpha) - D_k], \quad (1)$$

where M is the electron inter-action coefficient; $\Theta_0 = \omega \ell / v_0$ is the mean flight angle between cavities (ℓ is the distance between the gap centres, v_0 is the undisturbed electron velocity, ω is the frequency); α is the phase change between oscillations in neighbouring resonators ($\alpha = n(2\pi/N)$ where

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001032000044-6

21581

S/109/60/005/010/004/031
E033/E415

9,4210

AUTHOR: Malyshev, V.A.

TITLE: On the Theory of the Magnetron Oscillator

PERIODICAL: Radiotekhnika i elektronika, 1960, Vol.5, No.10, pp.1603-1613

TEXT: There is considerable difficulty in deriving a mathematical description of magnetron behaviour but, nevertheless, development of a complete theory of the magnetron oscillator is a real requirement. V.N.Shevchik's theory of "cascade grouping" (Ref.1) was an advance but his expressions for the electron conductance took the form of finite sums and, although it was possible to find from them a number of the oscillator parameters, nevertheless a full analysis could not be made. In this article an attempt is made, by simplifying Shevchik's formulae, to obtain a theory for the magnetron (for small amplitudes) similar in type to the theory developed by S.D.Gvozdover for the reflex klystron (Ref.2). The article is in four sections: 1) derivation of an expression for the electron admittance; 2) obtaining of an expression for the electron inter-action coefficient; 3) analysis of the electron admittance expression to find the regions of

Card 1/6

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001032000044-6

24378

Method of ....

S/142/60/003/005/005/015
E192/E382

ASSOCIATION: Kafedra elektrovakuumnoy tekhniki Taganrogskogo radiotekhnicheskogo instituta (Chair of Electrovacuum Technology of Taganrog Radio-technical Institute)

SUBMITTED: October 12, 1959 (initially)
November 16, 1959 (after revision)

Card 12/13

24378

Method of ....

S/142/60/003/005/005/015
E192/E382

It is shown on the basis of Eqs. (16) and (14) that provided the parameters of the oscillation system are known it is possible to determine six equations for the quantities U_1, U_2, U_3, φ_2, φ_3 and ω. The inverse problem for the dynatron is also considered. The use of the above equations is illustrated by analysing an oscillator. For this purpose, a single-harmonic approximation is employed and it is assumed that the phase-shift between the anode and grid voltages is arbitrary. The author expresses his gratitude to his collaborators at the Chair of Electrovacuum Technology of Taganrog Radiotechnical Institute and to A.V. Kalyayev for discussing this work. There are 2 figures and 5 Soviet references. One of the references is translated from English.

Card 11/13

provided the process is described by k harmonics; the quantity δ_ν and φ_ν in Eq. (16) can be determined from Eq. (14). In the case of dynatron and transitron oscillators it can be assumed that in Eq. (15) n = 3. The coefficients of the polynomial for these oscillators can be expressed by:

$$a_0 = I_{a0} - SE + \frac{SE^3}{3p^2}; \qquad a_1 = S(D + \bar{K}_\nu)\left(1 - \frac{E^2}{p^2}\right);$$

$$a_2 = \frac{SE}{p^2}(D + \bar{K}_\nu)^2; \qquad a_3 = -\frac{S}{3p^2}(D + \bar{K}_\nu)^3, \qquad (17)$$

where S is the slope of the tube,
p the saturation voltage,
E the bias voltage,
D is the inverse amplification factor, and
$\bar{K}_\nu$ is the complex transfer coefficient of the feedback circuit for the ν-th harmonic.

For the purposes of investigating these oscillators it is assumed that it is sufficient to consider only three harmonics.

system and the nonlinear element, the number of the parameters being equal to the double number of harmonics plus one. In general, the current-voltage characteristic of most nonlinear elements can be represented by a polynomial of the type:

$$I = \sum_{i=0}^{n} a_i U^i \qquad (15)$$

Consequently, the oscillator characteristic of the nonlinear element with respect to the ν-th harmonic is represented by:

$$F_\nu e^{-j(\theta_\nu - \varphi_\nu + \pi)} = \sum_{l=0}^{n} a_l \left(\frac{1}{2j}\right)^{(l-1)} \underbrace{\sum_{r=-(k+\nu)}^{r=k+\nu} \; \sum_{s=-(k+\nu)}^{s=k+\nu} \; \sum_{q=-k}^{q=k}}_{(l-1)\ \text{раз}} \times$$

$$\times \underbrace{\overline{U}_{(\nu-r)}, \overline{U}_{(r-s)} \dots \overline{U}_q}_{l\ \text{множителей}} \qquad (16)$$

multipliers

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001032000044-6

24378

Method of ....

S/142/60/003/005/005/015
E192/E382

$$F_\nu e^{-j(\delta_\nu - \psi_\nu + \pi)} = \frac{2j}{T}\int_0^T e^{-j\omega\nu t}\,\Phi\left[\frac{1}{2j}\sum_{n=-k}^{k}\bar{U}_n e^{j\omega n t}\right]dt, \tag{14}$$

where ψ_ν is the phase of the complex amplitude of the ν-th harmonic. Eq. (13) permits determination of the amplitude and phase of all the harmonics. It should be borne in mind, however, that only those harmonics are present in the oscillations for which the oscillation stability conditions are met. It is therefore possible to obtain k inequalities in the form of Eq. (10) which determine those harmonics which exist in the oscillations. It is now necessary to exclude from Eq. (13) those harmonics which do not satisfy Eqs. (10). The number of harmonics in Eq. (13) is therefore reduced and the procedure is repeated until all the harmonics of Eq. (13) satisfy the stability conditions of Eq. (10). In the case of solving the indirect problem it is necessary to construct a system of equations of the type of Eq. (13), which represent all the given harmonics. This will determine the parameters of the

Card 8/13

24378
S/142/60/003/005/005/015
E192/E382

$$c = \lim_{U \to 0}\left[\frac{F(U_0,\omega,U)}{U}\cos\delta(U_0,\omega,U)\right]. \qquad (11a)$$

In order to determine the behaviour of the oscillator in the presence of higher harmonics and to evaluate the spectral content of the generated oscillations it is necessary to employ the method of successive approximations. Eq. (6) now results in a system of k+1 equations of the type:

$$\overline{Y}_\nu + \frac{F_\nu(U_0,\omega,\overline{U}_1,\overline{U}_2,\ldots,\overline{U}_k)}{U_\nu} e^{-j[\delta_\nu(U_0,\omega,\overline{U}_1,\overline{U}_2,\ldots,\overline{U}_k)+\pi]} = 0, \qquad (13)$$

where k is the number of harmonics which describe the process, F_ν is the oscillation characteristic of the non-linear element with respect to the ν-th harmonic and δ_ν is the phase of the negative admittance for this harmonic. These quantities are given by:

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001032000044-6

the amplitude and frequency of the generated oscillations. On the basis of the A.M. Lyapunov theory (Ref. 5 - Gvosdover, S.D. Theory of Electron Devices for Ultrahigh Frequencies, GITTL, 1956) the condition of the stability of the oscillations is in the form:

$$\frac{\partial}{\partial U}\left[\frac{F(U_0,\omega,U)}{U}\cos\delta(U_0,\omega,U)\right] < 0. \qquad (10).$$

If this condition is met for any U smaller than those determined by Eqs. (8) and (9), the oscillator operates under conditions of "weak" excitation. On the other hand, the self-excitation condition requires that:

$$c \gtrsim G \qquad (11)$$

where:

24378

where

$$F(U_0,\omega,U)\,e^{-j[\delta(U_0,\omega,U)+\pi]} = \frac{2j}{T}\int_0^T e^{-j\omega t}\,\Phi(U_0 + U\sin\omega t)\,dt. \qquad (7a)$$

In the above expression the initial voltage phase is assumed to be zero and U_0 represents the operating point. The function F can be referred to as the oscillation characteristic of the oscillator and the quantities F/U and δ represent the modulus and phase of the negative admittance. From Eq. (7) it is found that

$$G = \frac{F(U_0,\omega,U)}{U}\cos[\delta(U_0,\omega,U)]; \qquad (8)$$

$$\frac{B}{G} + \mathrm{tg}[\delta(U_0,\omega,U)] = 0, \qquad (9)$$

where $G + jB = \bar{Y}$. Thus, Eqs. (8) and (9) fully determine

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001032000044-6

24378

Method of S/142/60/003/005/005/015
E192/E382

where $\overline{F}_\nu$ is the ν-th complex harmonic of the function Φ. If it is sufficient to consider k harmonics, the equation can be written as:

$$\overline{Y}_\nu + \frac{2j}{\overline{U}_\nu T}\int_0^T e^{-j\omega\nu t}\,\Phi\left[\frac{1}{2j}\sum_{n=-k}^{k}\overline{U}_n e^{j\omega n t}\right]dt = 0. \qquad (6)$$

The above equation has 2k + 2 unknowns which include the biasing voltage component U_0, amplitudes and phases of the harmonics and the frequency ω of the fundamental. On the basis of the above equation it is possible to solve the two oscillator problems. The case of a single-harmonic approximation is considered as an example. In this case, Eq. (6) can be represented as:

$$\overline{Y} + \frac{F(U_0,\omega,U)}{U}\,e^{-j[\delta(U_0,\omega,U)+\pi]} = 0, \qquad (7)$$

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001032000044-6

$$U(t) = \frac{1}{2j} \sum_{n=-\infty}^{\infty} \overline{U}_n e^{j\omega nt};$$

$$\overline{U}_n = \frac{j}{T} \int_0^T U e^{-j\omega nt} dt. \qquad (2)$$

From the above it follows that

$$-\frac{d\Phi(U)}{dt} = \sum_{n=-\infty}^{\infty} \left(\frac{1}{R} + j\omega nC + \frac{1}{j\omega nL}\right) n\overline{U}_n \frac{\omega}{2} \cdot e^{j\omega nt}. \qquad (3)$$

where the expression in brackets denotes the admittance $\overline{Y}_n$ of the resonance circuit at the n-th harmonic. Eq. (3) can therefore be written as Eq. (4). By multiplying all terms of Eq. (4) by 2j/T exp(jωνt)dt and integrating from zero to T, Eq. (4) can be written as:

$$\overline{F}_\nu (U) + \overline{Y}_\nu \overline{U}_\nu = 0 \qquad (5)$$

The method can be referred to as the method of spectral linearisation. An oscillator can be represented in the form of two bipoles: a nonlinear bipole containing the nonlinear element НЭ (Fig. 1a) and a linear element representing the oscillator circuit. Sometimes, an oscillator circuit is represented in the manner shown in Fig. 1б but this is equivalent to the circuit in Fig. 1a. In the following it is assumed that the oscillator circuit is in the form shown in Fig. 1б. The nonlinear element is approximated by a function $i = \Phi(U)$, where U is the voltage. The Kirchhoff equation for the system is:

$$\frac{d^2U}{dt^2} + \frac{1}{RC}\frac{dU}{dt} + \frac{1}{C}\frac{d\Phi(U)}{dt} + \frac{1}{LC}U = 0. \qquad (1)$$

In general, U as a function of time can be represented as the Fourier series:

9.3260

24378

AUTHOR: Malyshev, V.A.

S/142/60/003/005/005/015
E192/E382

TITLE: Method of Spectral Linearisation in the Theory of Oscillators and Some of Its Applications

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiotekhnika, 1960, Vol. 3, No. 5, pp. 474 - 485

TEXT: The general problem in the theory of oscillators, with one nonlinear element, consists of solving the direct and indirect design problems. The first problems can be formulated as follows. For a given nonlinear element and oscillator system, it is necessary to determine the shape of the generated oscillations and the frequency of the fundamental harmonic. The second problem amounts to the determination of the parameters of the nonlinear element or of the oscillator circuit which would produce the desired waveform and frequency of the oscillations. In the following an attempt is made to tackle these problems by employing the method developed by G.Ye. Pukhov (Ref. 1: Complex Variable Calculus and its Application, Taganrog, 1956).

Card 1/13

S/1../60/003/003/0../0../XX
E192/E382

Experimental Verification of the Theory of Ultrahigh-frequency Oscillators with Resonance Loading

calculated λ_1. The experimental points, together with the theoretical line, for the function given by Eq. (4), are illustrated in Fig. 2. The curves of functions expressed by Eqs. (3) and (4) are shown in Fig. 3; the circles denote the experimental points, while the solid lines show the calculated curves. The "solid" curve of Fig. 4, representing the function of $1/\Delta\lambda = f(z)$ was calculated on the basis of Eq. (6); the circles of Fig. 4 give the experimental points. From the figures it is concluded that Eqs. (1), (3), (4) and (5) give correct results. The author expresses his gratitude to P.N. Faktorovich and G.M. Svinarev for their help in carrying out the experiments. There are 4 figures and 1 Soviet references.

ASSOCIATION: Taganrogskiy radiotekhnicheskiy institut (Taganrog Radio-engineering Institute)

SUBMITTED: November 5, 1959

Card 4/4

Experimental Verification of the Theory of Ultrahigh-frequency Oscillators with Resonance Loading

resonator. In the earlier work (Ref. 1), it was also shown that when the coupling parameter $z > 1$, a discontinuity $\Delta\lambda$ in the wavelength is observed; this is determined by Eqs. (6). The validity of the above formulae was checked experimentally. The experiments were carried out on a klystron where the auxiliary resonator was connected to the principal resonator separately from the useful load. First, the quantities Q_{01}, Q_{B1}, Q_{0H2}, Q_{B2} and λ_2 were determined for a cold klystron. The auxiliary resonator was then connected to the principal resonator by means of a coaxial line and the generation zones were observed on the oscillograph. By varying λ_1 and $\beta\ell$, it was possible to obtain symmetrical zones and to study their characteristics. The experimental results are shown in Figs. 1-4. The function $\lambda_1 = f(\beta\ell)$ is illustrated in Fig. 1 (see Eq. 1). The circles on the figure illustrate the experimental points, while the straight lines show the

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001032000044-6

65??

?/14?/???/003/016/021/XX
E192/E382

Experimental Verification of the Theory of Ultrahigh-frequency Oscillators with Resonance Loading

"external" quality factors of the resonators with respect to the coupling line, $\beta\ell$ is the electrical length of the coupling line. The wavelength generated in the centre of the zone λ_o is determined from:

$$\lambda_1 - \lambda_o = \frac{\lambda_o}{2Q_{B1}} \operatorname{ctg}(\beta\ell) \qquad (2)$$

while the range of electronic tuning between the points of maximum power output $(\Delta\lambda_M)$ and the points having power equal to that of the centre of the zone $(\Delta\lambda_{U})$ can be determined from Eqs. (3) and (4), where Q_{01} is the inherent quality factor of the auxiliary resonator. The parameters r and z are determined by Eqs. (5), where Q_{OH2} is the quality factor of the principal

Card 2/4

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001032000044-6

85999

9,2586 (also 3302)

S/141/60/003/003/010/021/XX
E192/E...

AUTHOR: Malyshev, V.A.

TITLE: Experimental Verification of the Theory of Ultrahigh-frequency Oscillators with Resonance Loading

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1960, Vol. 3, No. 3, pp. 452 - 455

TEXT: The oscillators considered are characterised by the presence of an additional resonator which is coupled to the principal resonator by means of a transmission line. Reflex klystrons represent one class of such oscillators. The theoretical formulae are those from an earlier work (Ref. 1). All the formulae are valid for the symmetrical oscillation zones, the condition of symmetry being expressed by:

$$\lambda_1 = \lambda_2 \frac{Q_{B2}\left[ctg\,(\beta\ell) + 2Q_{B1}\right]}{Q_{B1}\left[ctg\,(\beta\ell) + 2Q_{B2}\right]} \qquad (1)$$

where λ_1 and λ_2 are the resonant wavelengths of the auxiliary and the principal resonator, Q_{B1} and Q_{B2} are

Card 1/4

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001032000044-6

67654
SOV/142-2-5-9/19

On the Theory of Frequency Characteristics of Photoresistors and Luminophores

electron pulses (cathode conductance), and for cathode luminescence. The formulas will produce the more accurate results, the lower the intensity of the primary radiation and the greater the energy of electrons. The article was recommended for publication by the Kafedra elektrovakuumnoy tekhniki (Department of Electrical Vacuum Engineering) of the Taganrogskiy radiotekhnicheskiy institut (Taganrog Radio Engineering Institute). There are 1 graph and 1 Soviet reference.

ASSOCIATION: November 18, 1958 and, after re-working, February 4, 1959

Card 3/3

67859
SOV/142-2-5-9/19

On the Theory of Frequency Characteristics of Photoresistors and Luminophores

the type of recombination mechanism by the shape of the frequency characteristic. The law of luminous flux modulation, which is different from the law of rectangular modulation, may be used for plotting the frequency characteristic. The pecularities of the frequency characteristics distinguishing the recombinations laws from each other, are preserved also with other types of modulation. The frequency characteristics of specimens of industrial photoresistors, plotted according to the law of luminous flux modulation, show in the authors opinion that a monopolar recombination takes place (at 20°C) in FS-Al lead sulfide photoresistors and a bipolar recombination in FS-K1 cadmium sulfide photoresistors. The frequency characteristics shown in this paper for the two recombination mechanisms are correct in the first approximation also for conductance excited in matter by

Card 2/3

66856
SOV/142-2-5-9/19

9(24.2600

AUTHOR: Malyshev, V.A.

TITLE: On the Theory of Frequency Characteristics of Photoresistors and Luminophores

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiotekhnika, 1959, Vol 2, Nr 5, pp 616 - 618 (USSR)

ABSTRACT: The author explains the theory of the dependence of the frequency characteristics of photoconductance and luminescence on the type of electronic processes taking place within photoresistors or luminophores. He discusses linear and square recombination laws and derives formulas describing the frequency response. The formulas show that the generalized frequency characteristics of photoresistors and luminophores are identical at high frequencies for both recombination mechanisms and are subject to the law of inverse proportionality. The graph in Figure 1 may be used for determining the

Card 1/3

67541

SOV/141-2-3-18/26

The Theory of Very High Frequency Oscillators with a Resonating Load

There are 2 figures and 5 references, 4 of which are Soviet and 1 English.

ASSOCIATION: Taganrogskiy radiotekhnicheskiy institut (Taganrog Radio Engineering Institute)

SUBMITTED: January 8, 1958

Card 4/4

67541

SOV/141-2-3-18/26

The Theory of Very High Frequency Oscillators with a Resonating Load

electronic tuning range is given in Eq (13) and the width to the "u-times-down" power level in Eq (14). The stabilizing factor is defined in Eq (15). The conditions for mode symmetry are most succinctly expressed by Eq (25) in terms of the wavelengths and qualities of the two resonators. In the more general case, where the electrical length of the line is small but not equal to $n\pi$, the frequency-phase curve has the shape in Figure 2a. There are three zero phase points, but y_3 is always unstable. The electronic tuning range is now Eq (43). Two important parameters in this discussion are r, z in Eq (22). The choice of these parameters controls the width of the e.t.r. and the widening possible. The mode-centre tuning slope is in Eq (57), the mode-width at mode-centre power is given in Eq (58) and the width between power peaks in Eq (59). When the resonator is connected in series with the load the same formulae apply but the factors affecting the parameter D, Eq (35), are different.

4

Card 3/4

67541

SOV/141-2-3-18/26

The Theory of Very High Frequency Oscillators with a Resonating Load

regime and $u = u_1$ (a critical value in Eq (2)) in the 'hard' regime. The class of oscillators studied satisfy the following conditions:

1) the phase of the electronic conductance hardly changes with frequency and amplitude;

2) the variation of δ with power supply variation is symmetrical with respect to the value at mode centre;

3) there is a 'soft' excitation regime;

4) the oscillation characteristic is almost constant over the mode.

These conditions are satisfied by monotrons, by some klystrons, including reflex klystrons and by certain other values. Two methods of connecting the supplementary resonator are distinguished: direct connection by a transmission line to the main cavity; connection in series to the load. The general equation, written for the present case, is given in Eqs (8) and (9), the parameters being defined in Eqs (5), (6) and (7). When the electrical length of the transmission line is short, the total width of the

Card2/4

SOV/141-2-3-18/26

9,2580, 9,3260

AUTHOR: Malyshev, V.A.

TITLE: The Theory of Very High Frequency Oscillators with a Resonating Load

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1959, Vol 2, Nr 3, pp 463 - 472 (USSR)

ABSTRACT: The operation of a particular class of oscillators is considered to which, in addition to the useful load, a supplementary resonator is connected by a transmission line. The oscillating mode is symmetrical; the 'long-line effect' is neglected. Other topics treated are: mode jump, electronic tuning bandwidth and slope. Any oscillator can be represented by the simple diagram of Figure 1a, where a non-linear element is connected to a tuned circuit. The operation is described by Eq (1), where the F-function refers to the oscillation characteristic of the generator and the δ-function to the phase of the electronic conductance of the generator. The criterion for the stability of the stationary state is Eq (2) and for the maintenance of oscillations is Eq (3), where $u_1 = 0$ in the 'soft'

Card 1/4

SOV/58-59-4-8881

Translation from: Referativnyy Zhurnal Fizika, 1959, Nr 4, p 218 (USSR)

AUTHOR: Malyshev, V.A.

TITLE: Methods for Determining the Equivalent Circuit Parameters of a Resonator Connected Into an Arbitrary Section of the Transmission Line

PERIODICAL: Tr. Taganrogsk. radiotekhn. in-ta, 1958, Vol 2, pp 55 - 62

ABSTRACT: A method is proposed for determining the parameters of the equivalent circuit of a cavity resonator connected into an arbitrarily chosen section of the transmission line. This method is based on the taking into account of the effect of coupling with the non-resonating oscillations of the resonator.

Card 1/1

Analysis of the Time Course of the Exciton Photoeffect SOV/58-59-5-10959

It is possible to determine the parameters of exciton excitation with the aid of the derived relationships and the experimental data on the optical measurements and time course of the photoeffect. (Arker, I.; Taft, E., Phys. Rev., 1950, Vol 79, Nr 6, pp 964 - 966).

G.E. Levin

Card 2/2

SOV/58-59-5-10959

Translation from: Referativnyy Zhurnal Fizika, 1959, Nr 5, p 150 (USSR)

AUTHOR: Malyshev, V.A.

TITLE: Analysis of the Time Course of the Exciton Photoeffect

21

PERIODICAL: Tr. Taganrogsk. radiotekhn. in-ta, 1957, Vol 3, Nr 2, pp 117 - 127

ABSTRACT: The author calculates the time course of the photoeffect for the following mechanism: a crystal is irradiated with light corresponding to the exciton absorption band; the excitons approach the metalloid vacancies, are annihilated, and create F-centers; other excitons in transit approach the F-centers and create photoelectrons and metalloid vacancies on account of their excitation energies. The author derives approximate expressions for the variation with time of the photocurrent (in relative units) for colored and uncolored crystals after the inception of protracted irradiation, as well as after the discontinuation of irradiation when the latter has lasted a given short interval of time.

Card 1/2

ALEKSEYEV, Yuriy Aleksandrovich; SOFOV, Georgiy Aleksandrovich; MALYSHEV, V., red.

[Parasites] Darmoedy. Moskva, Politizdat, 1964. 77 p.
(MIRA 17:12)

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001032000044-6

GLUKHOVSKOY, K., inzh.; KRYLOV, N., kand.tekhn.nauk; MALYSHEV, V., inzh.

Acoustical and radiometric methods of inspecting the quality of building materials and structural elements. Na stroi. Ros. no.11:16-18 N '61. (MIRA 16:7)
(Building materials--Testing)

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001032000044-6

MALYSHEV, S.P.; PROTOPOPOV, S.P.

Quick-acting secondary device based on electric-contact method. Biul.tekh.-ekon.inform.Gos.nauch.-issl.inst.nauch. i tekh.inform. no.3:43-45 '63. (MIRA 16:4)

(Electronic instruments)

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001032000044-6

KUDRYAVTSEV, N.P.; RAMO RAO, A.G.; MALYSHEV, S.I.

Rolling H-beams on the 350 semicontinuous mill at the "Bkhilaiskii" Metallurgical Plant. Stal' 24 no.5:443-444 My '64. (MIRA 17:12)

MALYSHEV, S.I.; KUDRYAVTSEV, N.P.; KARTA, V.G.

Mastering the rolling of beam columns on the rail and structural steel 800 mill. Stal' 23 no. 3 253-255 Mr '64. (MIRA 17:5)

KASHAKASHVILI, N.V.; SHARADZENIDZE, S.A.; MALYSHEV, S.I.; CHKHEIDZE, Z.A.
GIBRADZE, Sh.S.; KHOSHTARIYA, Sh.F.; RUKHADZE, D.A.; SHARASHIDZE, S. Sh. Prinimali uchastiye: SHENGELAYA, V.; OKROMCHEDLISHVILI, Sh.; POPIASHVILI, Sh.; LOLUA, K.; MINDELI, M.; TSKHELISHVILI, D.; GORDEZIANI, N.; ODIKADZE, Ch.; TATARADZE, Z.; KHUTSISHVILI, A.

Production and use of highly basic, open-hearth furnace sinters from Dashkesan iron ore. Trudy GPI [Gruz.] no.4:25-32 '62
(MIRA 17:8)

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001032000044-6

22312

S/133/61/000/004/001/015
A054/A127

Production of tubes from semi-killed steel...

for killed steel (Ст.2, Ст.3 etc. Ст = St). There are 4 figures and 3 Soviet references.

ASSOCIATION: Moskovskiy institut stali (Moscow Steel Institute) and Zakavkazskiy metallurgicheskiy zavod (Zakavkaz Metallurgical Plant)

Card 4/5

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001032000044-6

the conventional process piercing can easily be performed at 1150 - 1180°C. However, even when the temperatures were sufficiently high (1230 - 1260°C), the rejects amounted to 8%, as a result of incorrect adjustment of the first piercing stand. The hardness of the billet is not uniform in its cross-section (Fig. 2). The core is harder, than the external layers. The failure of the piercing tests could be eliminated by modifying some of the rolling parameters. The inclination of the rolls in the first stand was reduced by 1°, reduction at the neck of the rolls was increased by 2.7 - 2.8% and drawing out the nosepiece of the mandrel by 22 - 25%. By decreasing the inclination angle of the working rolls, friction and pulling forces increased whereas axial slip decreased. As a result of the increased reduction, the central parts were processed more thoroughly and piercing was promoted. The above mentioned changes in rolling parameters decreased the amount of non-piercable billets from 8% to 1.7%. Non-piercing of the billets can be entirely eliminated by raising the cropping of the top to 2 - 3%. A further cropping (3 - 4%) should be carried out for the 900 mm stand. The quality of the tube surface with double-layer structure is satisfactory. The rate of flawless products increased to 95 - 98%. The mechanical properties of the tubes made of the test steel complies with ГОСТ (GOST) 8731-58

22312

S/133/61/000/004/001/015
A054/A127

the metal which were in contact with the mold wall, were already crystallizing and formed a low-carbon, sulfur- and phosphorus-free rimming skin, while, at the same time the core of the ingot was still liquid. Aluminum kills the rimming metal of the core, while the rate of oxidation can be controlled by the amount of aluminum added. Provided deoxidation was carried out in the correct way, the ingot consists of a) a soft, blister-free rimming skin, on an average 12 - 20 mm thick and b) a semi-killed core with uniform liquation of carbon, sulfur and phosphor, (not exceeding 130%), in vertical and transversal direction. The average rate of the rising of the metal in the mold was 0.28 - 0.32 m/min. The 250 x 310 mm and 280 x 310 mm blooms made of the test steel were put into the pusher-type furnace of the tube-rolling mill. The surface of the blooms is remarkably clean, not displaying any of the usual flaws of killed steel. The blooms were rolled on 400 mm stands, with the working rolls having the following angles of inclination: 8 - 9° for 168 x 6 mm tubes, 8 - 9° for 219 x 7 - 8 mm and 7 - 8° for 325 x 8 mm tubes. The piercing tests showed that the test metal was more strongly affected by the changes in temperature than billets made of killed steel. The test billets could not be pierced at 1190°C, whereas in

22312

S/133/61/000/004/001/015
A054/A127

18.3200

AUTHORS: Oyks, G. N., Doctor of Technical Sciences, Professor; Sharadzenidze, S. A., Engineer; Svetlitskiy, Ye. A., Engineer; Malyshev, S. I., Engineer; Lolua, K. K., Engineer, and Mind-lin, B. I., Engineer

TITLE: Production of tubes from semi-killed steel with a double-layer crystalline structure

PERIODICAL: Stal', 21, no. 4, 1961, 304 - 307

TEXT: Tests were carried out on automated manufacture of seamless tubes from semi-killed steel, instead of from killed steel as in the conventional process. A metal was required, incorporating the advantages of both killed and rimming steels. For this pupose rimming steel smelted in openhearth furnaces was cast in ingot molds with widened bases, into 5.5 - 6.3 ton ingots. Without interrupting the metal flow, aluminum granules (250 - 100 gr/ton of steel) were introduced during pouring in the central zone of the casting (the carbon-content varied correspondingly between 0.11 and 0.23%). Aluminum was added. Upon adding aluminum, the outer layers of

Card 1/54

OYKS, G.N., prof., doktor tekhn.nauk; LOLUA, K.K., inzh.; SHARADZENIDZE, S.A., inzh.; MALYSHEV, S.I., inzh.

Making capped steel with a two-layer crystal structure for the manufacture of seamless tubes. Biul.TSIICHM no.4:13-21 '61. (MIRA 14:10)

(Steel--Metallography) (Pipe, Steel)

MALYSHEV, S.I., inzh.; KHOSHTARIYA, Sh.F., inzh.; GLADKOSKOK, P.P., inzh.; RADCHENKO, F.G., inzh.; Prinimali uchastiye: BOKOLISHVILI, Sh.S.; RUKHADZE, R.I.; SHARASHIDZE, S.Sh.; BEREZHNOY, N.; GORDEZIANI, N.N.; RUKHADZE, D.A.; TATARADZE, Z.

Mastering the sintering of Dashkesan ores as acceptable charge for open-hearth furnaces. Stal' 20 no. 7:584-590 Jl '60. (MIRA 14:5)

1. Zakavkazskiy metallurgicheskiy zavod.
(Dashkesan--Iron ores) (Sintering)
(Open-hearth furnaces--Equipment and supplies)

MALYSHEV, S.I. (Leningrad)

Formation of flowering plants in the light of the evolution of the behavior of wasplike ancestors of bees (Angiospermae, Vespiformia s. Lat.). Usp. sovr.biol. 57 no.1:159-174 Ja-F '64.
(MIRA [illegible])

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001032000044-6

MALYSHEV, S.I.

A comparative study of the life and development of primitive gaster-uptionid wasps (Hymenoptera, Gasteruptiidae). Ent. oboz. 43 no.3:514-534 '64. (MIRA 17:10)

1. Institut evolutsionnoy fiziologii imeni I.M.Sechenova AN SSSR, Leningrad, i Khoperskiy gosudarstvennyy zapovednik.

MALYSHEV, S.I.

Evolutionary paths and conditions of the development of instincts in ants (Hymenoptera, Formicoidea). Trudy Vses.ent.ob-va 47: 5-52 '60. (MIRA 13:6)

(Ants) (Phylogeny)

MALYSHEV, S.I.

Paths and conditions of the development of archaic trigonalid ichneumon flies (Hymenoptera: Trigonalidae). Mat. po evol. fiziol. 4:91-99 '60. (MIRA 13:10)
(ICHNEUMON FLIES) (INSECTS--DEVELOPMENT)

MALYSHEV, S.I.

Paths and conditions of the evolution of ants (Hymenoptera, Formico-idea). Trudy Inst.morf.zhiv. no.27:249-260 '59.
(MIRA 13:2)

1. Institut evolyutsionnoy fiziologii AN SSSR i Khoperskiy gosudarstvennyy zapovednik.
(Ants)

MALYSHEV, Sergey Ivanovich, prof.; ZALESSKIY, Yu.M., red.; LIPKINA, T.G., red.izd-va; PAVLOVA, V.A., tekhn.red.

[Hymenopterons, their origin and evolution] Pereponchatokrylye, ikh proiskhozhdenie i evoliutsiia. Moskva, Gos.izd-vo "Sovetskaia nauka," 1959. 290 p. (MIRA 13:5)

(Hymenoptera)

P

COUNTRY : USSR
CATEGORY : General and Specialized Zoology, Insects. Biology and Ecology
ABS. JOUR. : RZhBiol., No. 22 1958, No. 10079
AUTHOR : Malyshev, S.I.
INST. : Leningrad Society of Experimenters of Nature
TITLE : The Origin of Secondary Phytophagia in Ichneumon Flies (Hymenoptera Terebrantia s. Parasitica)

ORIG. PUB. : Tr. Leningr. o-va Yestestvoispyt., 1957, Vol.73, No.4, [illegible]-[illegible]

ABSTRACT : Plant-eating ichneumon flies, seed-eaters and gall-producers belonging to the families Eurytomidae, Callimomidae, Cynipidae, and others, arrived at the form of life following a period of time in an archaic in-[illegible] phase which was common to all ancestors of the parasitic Hymenoptera. Of primary significance is the connection of these plant-eating forms with the generative organs of plants, so that grain or seed-eaters may be considered plant ovum-eaters - phyto-

CARD: 1/2

MALYSHEV, S.I.

Modes and conditions of the origin of Hymenoptera terebrantia s. parasitica. Dokl. AN SSSR 109 no.5:1053-1055 Ag. 1956.
(MLRA 9:10)

1. Institut evolyutsionnoy fiziologii Akademii nauk SSSR i Khoperskiy gosudarstvennyy zapovednik. Predstavleno akademikom L.A. Orbeli.
(Hymenoptera, Fossil)

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001032000044-6

USSR/General and Special Zoology - Insects. P.

Abs Jour : Ref Zhur - Biol., No 7, 1958, 30511

Author : Malyshev, S.I.
Inst :
Title : The Ways and Conditions of the Evolution of Instincts in Wasp-like Hymenoptera.

Orig Pub : Tr. Vses. entomol. o-va, 1956, 45, 3-50.

Abstract : The evolution of instincts of wasp-like Hymenoptera passed through a number of stages: first (pompiloid) -- characterized by the paralysis of the prey and subsequent preparation of the dwelling; second (sphecoid) -- during which the building of the dwelling was followed by the preparation of one gib prey specimen; third (crabroid) -- different from the second by the preparation of smaller prey, cought one at a time; the fourth (bembecoid) -- the laying of an egg on the first prey and providing for the larva bit by bit; fifth (moneduloid) -- the laying of eggs

Card 1/2

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001032000044-6

MALYSHEV, S.I.

Factors and conditions affecting the development of ants (Hymenoptera, Formicoidea). Dokl.AN SSSR 94 no.6:1185-1188 F '54. (MLRA 7:2)
(Ants)

MALYSHEV, S.I.

"The origin and evolution of parasitism of ichneumon flies and their development in the U.S.S.R." N.A. Telenga. Reviewed by S.I. Malyshev. Zool.zhur. 32 no.3:559-562 My-Je '53. (MLRA 6:6)
(Ichneumonidae) (Parasites) (Telenga, N.A.)

MALYSHEV, S. I., PUZANOVA-MALYSHEVA, E. V.

Sawflies

Inquilinism of sawflies (Hymenoptera, Tenthredinidae) in experimental conditions. Trudy Len. ob-va est. 71, No. 4, 1952.

Monthly List of Russian Accessions, Library of Congress June 1953. UNCL.

MALYSHEV, S.I.

Nesting habits of the relict wasp Discoelius zonalis Panz. (Hymenoptera, Vespidae). Ent.oboz. 32:183-191 '52. (MLRA 7:1)
(Wasps)

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001032000044-6

1. MALYSHEV, S.I

2. USSR (600)

4. Bees

7. Ways and conditions under which instinct of bees (Hymenoptera, Apoidea) develops in the process of evolution. Trudy Vses. ent. obshch. 43, 1951

9. Monthly List of Russian Accessions, Library of Congress, March 1953, Unclassified

MALYSHEV, S. I.

"Methods and Conditions of Evolution of Bee-Like Hymenoptera (Vespoidea and Sphecoidea)",

SO: Dok, AN, 65, No. 4, 1949.

Mbr., Inst. of Evolutionary Physiol. & Pathol. of the Higher Nervous Activity im. I. P. Pavlov, Acad. Med. Sci., -c1949-.

MALYSHEV, S. I.

"Ways and conditions of evolution of the instincts of the lower hymenopterae." (Symphyta & Terebrantia) by Malyshev, S. I. (p. 13)

SO: Journal of General Biology, (Zhurnal Obshchei Biologii) Vol. X, No. 1, 1949

ABEL'CHUK, N.A.; MALYSHEV, S.I.; LUKONIN, G.A.

Apparatus for the horizontal bending and tempering of windshield glass. Stek. i ker. 18 no.6:9-11 Je '61.
(MIRA 14:7)
(Glass manufacture) (Automobiles--Windows and windshields)

MALYSHEV, S.I.

Using metal forms in making bent hardened automobile glass. Stek. i ker. 17 no.12:15-16 D '60. (MIRA 13:11)

(Automobiles--Windows and windshields)

MALYSHEV, S.B.

Echinococcosis as revealed by autopsy material from hospitals in Frunze. Izv. AN Kir. SSR. Ser. biol. nauk 2 no.6:65-71 '60. (MIRA 14:6)

(FRUNZE--HYDATIDS)